

## D4.2 Evaluation of cycle 1 pilots

### Citation for published version (APA):

Moghnieh, A., Hernández-Leo, D., Navarrete, T., Josep, B., Santos, P., Alonso, J., ... Lemmers, R. (2008). *D4.2 Evaluation of cycle 1 pilots*. Heerlen.

### Document status and date:

Published: 01/01/2008

### Document Version:

Publisher's PDF, also known as Version of record

### Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

<https://www.ou.nl/taverne-agreement>

### Take down policy

If you believe that this document breaches copyright please contact us at:

[pure-support@ou.nl](mailto:pure-support@ou.nl)

providing details and we will investigate your claim.

Downloaded from <https://research.ou.nl/> on date: 17 Jan. 2020

Open Universiteit  
[www.ou.nl](http://www.ou.nl)





Project no. 027087

TENCompetence

Building the European Network for Lifelong Competence Development

Project acronym: Integrated Project TENCompetence

Thematic Priority: 2.4.10

## D4.2 Evaluation of cycle 1 pilots

Due date of deliverable: 01-09-2007

Actual submission date: 08-01-2008

Start date of project: 01-12-2005

Duration: 4 years

Fundació Barcelona Media Universitat Pompeu Fabra

Version 1.0

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
<b>PU</b>	Public	X
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	



Building The European Network for Lifelong Competence Development

Building the European Network  
For Lifelong Competence Development

TENCompetence IST-2005-027087

## Project Deliverable Report

### D4.2 - Evaluation of cycle 1 pilots

<b>Work package</b>	WP4 – Pilots with the Integrated System & validation of the project		
<b>Task</b>	T. 1, T. 3, T. 4		
<b>Date of delivery</b>	<b>Contractual:</b> 01-09-2007	<b>Actual:</b> 08-01-2008	
<b>Code name</b>	D4.2	<b>Version:</b> 1.0	Draft <input type="checkbox"/> Final <input checked="" type="checkbox"/>
<b>Type of deliverable</b>	Report		
<b>Security (distribution level)</b>	Public		
<b>Contributors</b>			
<b>Authors (Partner)</b>	Ayman Moghnieh (FBM-UPF), Davinia Hernández-Leo (FBM-UPF), Toni Navarrete (FBM-UPF), Josep Blat (FBM-UPF), Patricia Santos (FBM-UPF), Jordi Alonso (FBM-UPF), Santi Fort (FBM-UPF), Krassen Stefanov (SU), Petko Ruskov (SU), Judith Schoonenboom (UvA), Henk Sligte (UvA), Uulkje de Jong (UvA), Joost Meijer (UvA), Christian Glahn (OUNL), Marcus Specht (OUNL), Ruud Lemmers (LOGICACMG)		
<b>Contact Person</b>	Ayman Moghnieh		
<b>WP/Task responsible</b>	Josep Blat		
<b>EC Project Officer</b>	Mr. M. Májek		
<b>Abstract (for dissemination)</b>	This report describes the efforts in cycle 1 pilots to evaluate the concept of TENCompetence and its first-release system implementation. Cycle 1 pilots are framed in two different domains: Digital Cinema and ICT Teacher Training. Both pilots are preceded by two preliminary experiences, which are very useful for planning the actual cycle 1 implementation, deployment and evaluation. The first results from cycle 1 pilots are encouraging and indicate that learners using the first-release of the TENCompetence infrastructure feel more in control of their own learning.		
<b>Keywords List</b>	Testing and Validation, Pilots, Proof of Concept Validation, Competence Development Programmes		

TENCompetence Project Coordination at: Open University of the Netherlands

Valkenburgerweg 177, 6419 AT Heerlen, The Netherlands

Tel: +31 45 5762624 – Fax: +31 45 5762800



**Table of contents**

<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
<b>INTRODUCTION .....</b>	<b>7</b>
<b>1. THE CONTEXT FOR CYCLE 1 PILOTS .....</b>	<b>9</b>
1.1    DIGITAL CINEMA PILOTS .....	9
1.1.1    ARTICULATING THE DOMAIN OF DIGITAL CINEMA .....	11
CANDIDATE TENCOMPETENCE COURSES FOR DIGITAL CINEMA .....	12
1.1.2    THE FIRST TENCOMPETENCE DIGITAL CINEMA PILOT: ON SET VIRTUAL SET STUDIO TECHNICIAN .....	13
A BRIEF INTRODUCTION TO VIRTUAL SETS .....	13
A BRIEF INTRODUCTION TO BRAINSTORM SOFTWARE .....	15
1.1.3    CHALLENGES IN COMPETENCE DEVELOPMENT IN DIGITAL CINEMA .....	15
1.1.4    FOUR USE CASES FOR DIGITAL CINEMA .....	16
USE CASE 1: GETTING TO GRIPS WITH DIGITAL CINEMA TECHNOLOGY .....	16
USE CASE 2: SWITCHING PLATFORMS .....	17
USE CASE 3: SUPPORTING COMMUNITIES OF PRACTICE .....	19
USE CASE 4: REMOTE LEARNING WITH SPECIALISED EQUIPMENT .....	20
1.1.5    PILOT DEVELOPMENT PLAN /ROADMAP .....	21
<i>Characteristics of TENCompetence pilots.....</i>	<i>21</i>
<i>Pedagogical model.....</i>	<i>21</i>
<i>Develop pilot description and initial plan.....</i>	<i>21</i>
<i>Develop academic materials / design learning experience .....</i>	<i>22</i>
<i>Develop three types of assessment processes .....</i>	<i>22</i>
<i>Form learner community.....</i>	<i>22</i>
<i>Infrastructure.....</i>	<i>23</i>
<i>Pilot Evaluation.....</i>	<i>23</i>
1.1.6    DIGITAL CINEMA PILOT IMPLEMENTATION AND DEVELOPMENT .....	23
<i>Enrolment requirements .....</i>	<i>24</i>
<i>Assessment of learning and competence development.....</i>	<i>24</i>
<i>Developing pilot materials .....</i>	<i>25</i>
<i>The virtual sets curriculum.....</i>	<i>25</i>
1.1.7    CHALLENGES ENCOUNTERED DURING PILOT IMPLEMENTATION .....	28
1.2    ICT PILOTS .....	29
1.2.1    ARTICULATING THE DOMAIN OF ICT-ENHANCED COMPETENCIES .....	31
1.2.2    COMPETENCE DEVELOPMENT PROGRAMMES FOR ICT-ENHANCED COMPETENCIES .....	33
1.2.3    NARRATIVE LEARNING SCENARIOS .....	35
1.2.4    ICT TEACHER TRAINING PILOT .....	38
1.3    DESCRIPTION OF THE DEVELOPED SYSTEM .....	40
1.3.1    SUPPORTED PRIMARY USE CASES .....	41
1.3.2    MAIN PCM ENTITIES .....	41
1.3.3    PCM FUNCTIONALITY .....	41
<i>Main application window.....</i>	<i>43</i>
<i>'Select a Competence Profile' view.....</i>	<i>44</i>
<i>Communities view.....</i>	<i>45</i>
<i>Deployment (distribution and installation) .....</i>	<i>46</i>
<i>User support.....</i>	<i>46</i>
<i>Bug reporting .....</i>	<i>46</i>
<b>2. LAUNCHING AND EVALUATING PRELIMINARY PILOTS .....</b>	<b>47</b>
2.1    PRELIMINARY DIGITAL CINEMA PILOT .....	47
2.1.1    LAUNCHING DIGITAL CINEMA PILOT .....	47
2.1.2    EVALUATION IMPLEMENTATION PLAN .....	51
2.1.3    EVALUATION RESULTS .....	54
<i>Teacher's role and its influence .....</i>	<i>54</i>
<i>The impact of socially outgoing learners .....</i>	<i>55</i>
<i>The academic resources' stimulation.....</i>	<i>56</i>

<i>The system's affordances</i> .....	57
2.1.4 DISCUSSION .....	58
2.2 PRELIMINARY ICT PILOT .....	58
2.2.1 LAUNCHING OF ICT PILOT.....	59
2.2.2 EVALUATION IMPLEMENTATION PLAN .....	61
2.2.3 DISCUSSION OF THE PRELIMINARY EVALUATION RESULTS .....	62
<b>3. LAUNCHING AND EVALUATING CYCLE 1 PILOTS .....</b>	<b>63</b>
3.1 A MODEL FOR PILOT EVALUATION .....	63
3.2 MODEL COMPONENTS .....	64
3.3 RESEARCH QUESTION.....	66
3.4 DATA COLLECTION AND ANALYSIS IN GENERAL .....	70
3.5 DATA COLLECTION METHODS: DESCRIPTIONS FOR EACH RESEARCH QUESTION .....	70
<i>Measures</i> .....	71
3.6 CYCLE 1 DIGITAL CINEMA PILOT .....	77
3.6.1 LAUNCHING DIGITAL CINEMA CYCLE 1 PILOT .....	77
INITIAL PLANNING .....	77
<i>Target group and workload</i> .....	77
<i>Experimental (PCM) vs. control (Moodle) groups</i> .....	77
<i>Implementation and launching process according to the initial plan</i> .....	80
<i>Intermediate workshop: event at Universitat Autònoma de Barcelona</i> .....	80
<i>Registering students according to the initial plan</i> .....	81
<i>Marketing strategy and marketing materials</i> .....	81
3.6.2 CURRENT STAGE OF THE PILOT .....	84
3.6.3 PRELIMINARY CONCLUSIONS AND FOLLOW-UP PLAN .....	86
3.7 CYCLE 1 ICT PILOT.....	91
3.7.1 LAUNCHING ICT CYCLE 1 PILOT.....	91
<i>Target group and workload</i> .....	91
<i>Experimental (PCM) vs. control (Moodle) groups</i> .....	91
<i>Preparatory workshop: the Sofia event</i> .....	94
<i>Implementation and launching process</i> .....	94
<i>Marketing strategy and marketing materials</i> .....	95
3.7.2 EVALUATION IMPLEMENTATION PLAN .....	95
3.7.3 EVALUATION RESULTS .....	95
<i>Participants characteristics</i> .....	96
<i>Appreciation of PCM functionalities</i> .....	99
<i>PCM and Moodle: the experiment</i> .....	103
<i>Discussion</i> .....	105
<b>4. CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>107</b>
4.1 SUMMARY OF RESULTS .....	107
4.1.1 RESULTS OF PRELIMINARY PILOTS.....	107
4.1.2 RESULTS OF CYCLE 1 PILOTS.....	108
4.2 RECOMMENDATIONS.....	110
4.2.1 RECOMMENDATIONS FOR FUTURE PILOT DEVELOPMENT .....	110
4.2.2 RECOMMENDATIONS FOR DEVELOPERS OF SYSTEM APPLICATIONS .....	112
4.3 FUTURE WORKS.....	114
<b>REFERENCES.....</b>	<b>115</b>
APPENDIX 1: LEARNER'S PRE- AND POST-TEST QUESTIONNAIRES .....	117
<i>Learner's pre-test questionnaire</i> .....	117
<i>Learner's post-test questionnaire – experimental group</i> .....	120
<i>Learner's post-test questionnaire – control groups</i> .....	127
APPENDIX 2: OPERATIONALISATION: MATCHING HYPOTHESES TO QUESTIONS IN THE QUESTIONNAIRES .....	132
APPENDIX 3: WELCOME PACKAGE USED IN DIGITAL CINEMA CYCLE 1 PILOT.....	143
APPENDIX 4: TEST QUESTIONNAIRE FOR LEARNERS DROPPING OUT OF THE DIGITAL CINEMA CYCLE 1 PILOT.....	148

## Executive summary

This deliverable reports on the implementation of pilots, their deployment, and evaluation for the validation of the TENCompetence approach as part of WP4 responsibilities in the project's cycle 1. This report contains a detailed description of the implementation context of TENCompetence's cycle 1 pilots, an extensive explanation of the implementation pilot process and its associated evaluation plan, as well as a compilation of evaluation results and findings achieved so far.

The implementation context of cycle 1 pilots can be divided into two appropriate domains for TENCompetence trials: Digital Cinema (DC), and Information and Communication Technologies Teacher Training (ICT). To this end, four instances of pilots have been launched, two in each domain, using a total of three different system (the IMS Learning Design player SLeD, the TENCompetence Personal Competence Manager or PCM and Moodle), involving an approximate total of 150 different learners over trial periods that aggregate to around six months up till the writing of this report. The pilots launched can be summarized as follows:

1. Preliminary Digital Cinema Pilot: In collaboration with Brainstorm Software Company, 120 hours of courseware were developed to instruct learners on how virtual sets can be created, directed, and produced with Brainstorm's 3D-Max Studio. The pilot was launched on a system composed of SLeD, a social blog, and a support forum. A total of 12 students participated in the pilot and remained active for a period of approximately 2,5 – 3 months. The pilot was assessed to evaluate the pilot development process and identify potentially problematic issues with pilot launching and distant learning.
2. Preliminary ICT Training Pilot: This pilot has been prepared and launched in collaboration with the I\*Teach project. It runs over SLeD and PCM at the same time because it uses SLeD for managing learning resources and PCM to provide basic features for community development and implementation, group formation and discussions, competence management, and others. The duration of the pilot was around 40 days, involved 30 participants and its main objectives were to test the current version of the PCM and to experiment with using the PCM in providing an eLearning platform in the context of ICT Training.
3. Cycle 1 Digital Cinema Pilot: The second version of the digital cinema pilot involves (at the date of writing this document) 32 learners (number of learners actually registered in the systems out of 80 persons initially interested in the pilot) distributed among two independently running instances on PCM and Moodle (differentiating the experimental and the control groups). The courseware represents around 180 hours of activities, and the pilot will run for approximately 5 months. A large number of experimentations, data collection activities, and analysis are being conducted to validate all aspects of TENCompetence implemented in the project's framework so far. The research questions devised as part of the evaluation plan were projected onto the pilot and three aspects of the PCM (functionalities, effects, and learning outcomes) were consequently evaluated.
4. Cycle 1 ICT Training Pilot: This second instance of the ICT training pilot was more developed than the first one and used both PCM and Moodle. A total of 45 learners complete the experience. This pilot tries to show how TENCompetence framework

and approach can be used for the implementation of the innovative and complex training methodologies. Its evaluation closely resembles that of the cycle 1 digital cinema pilot, focusing on understanding the characteristics of the participants' groups, their processes of competence development, as well as their appreciation of the PCM available functionalities. Furthermore, the group of 30 learners that participated in the preliminary version of the ICT Training pilot are also involved in a further experience using the PCM.

In this report, the experiments and evaluations conducted with these pilots are discussed, and recommendations for future development of system applications and services and well as the implementation and deployment of anticipated pilots. Finally, future work planned within WP4 is also pointed out.



## Introduction

The aim of the TENCompetence project is to *meet the needs of users (individuals, groups and organisations in Europe) for lifelong competence development by establishing the best infrastructure, which is possible today, using open-source, standards-based, sustainable and extensible technology.*

This document addresses the steps taken to study how the developed infrastructure can empower competence development in learning networks and in the perspective of life-long learning. The enterprise of developing and evaluating pilots to validate this infrastructure in authentic and challenging settings will ensure that the project is effectively providing solutions for meeting the Life Long Learning (LLL) challenges in the Europe of tomorrow.

The plans presented in D4.1 for the testing and evaluating of the PCM system were implemented and carried on with minor changes related to the specific aspects of the deployment environment and the learners' groups. In short, two deployment contexts, Digital Cinema and ICT Training, were addressed and four pilots were consequently launched and evaluated. The outcomes of this work fall within the scope of the present project vision and validation methodology, and strongly contributes plan as and when they are incorporated into releases of the integrated system.

The document consists of five main sections.

Section 1 focuses on the context for TENCompetence validation work and pilot development. The characteristics of each deployment environment are presented and related to the overall objective of pilot development. In this, two contexts are identified: Digital Cinema, and ICT Training. The competence development challenges of each are addressed along with the relevant use cases, development plans, and systems and infrastructures available. The implementation roadmap of pilot development is also discussed along with the strategies for dealing with pedagogical issues, academic resources, assessment, learning communities, and infrastructure.

Section 2 focuses on the launching and evaluation of preliminary pilots in both contexts. The preliminary digital cinema pilot is described and its evaluation plan's implementation is clarified first, followed by the preliminary ICT training pilot. The results of each evaluation are discussed in the relevant section where the utility and benefits of launching these pilots are highlighted.

Section 3 addresses the launching and evaluation of cycle 1 pilots planned in D4.1. A model for pilot evaluation determines the grounds upon which the implementation of the evaluation plan has been executed for each pilot. This is followed by explicit research questions posed to guide the evaluation toward validating the TENCompetence approach. Data collection and analysis concepts and methods used are also highlighted. A subsection about the launching of each pilot is included to explain the process followed as well as the progress made so far. The available results of each evaluation are presented and discussed.

Section 4 summarizes the results obtained so far from the entire set of activities conducted in the realm of pilot deployment and evaluation. Recommendations for future development of pilots and system applications are discussed. Finally, it focuses on

conclusions drawn from the progress so far and talks about future works and ongoing evaluation activities.

# 1. The context for Cycle 1 pilots

Before focusing on the implementation and evaluation of the pilots, this section justifies their context as appropriate domains for TENCompetence trials.

## 1.1 *Digital Cinema pilots*

The domain of Digital Cinema is chosen for the first project pilot because it provides rich opportunities for testing the TENCompetence system. The move from analogue production to an integrated Digital Cinema chain will involve significant changes in the production workflow, with specific impact in at least two major aspects. The first aspect is that professionals may have to change their tools and position in the workflow. Digital techniques require new skills, for camera operators, directors, and special effects. This is true even for less obvious areas, such as make-up, where visual effects are replacing traditional methods, and as they have in many other areas, are bringing about an increased focus on postproduction.

The second aspect is that the traditional, almost craft based way of producing movies will be under pressure to change to a more conventional industrial type of production with a strengthened integrated workflow.

All these changes require professionals to acquire new competences and adapt to dynamically changing professional environment. Each of the many different roles played in film production has its own detailed set of competences, and so the management of competences is highly challenging (Griffiths et al, 2006; Koper, 2007).

Thus the Digital Cinema domain is challenging in a number of ways:

**1) Digital Cinema has real and urgent need for development of competences.** After more than one hundred years of film cinema production, a new way to make, distribute and project motion pictures is rapidly becoming a reality, and before long digital production, post production and display will be the accepted paradigm for cinema. For this to happen, however, the industry requires a new wave of artists, operators and technicians conscious of the strengths and weaknesses of this new medium.

**2) Digital Cinema involves the definition, development and management of an extensive and complex set of competences.** Traditional film (analogue) based production procedures are being gradually replaced by digital techniques. This is particularly true in that part of the production chain known as Digital Intermediate. This digital phase starts with scanning film into digital format, integrating visual effects or fully synthetic aspects, implementing some post-processing aspects for finalisation (such as colour grading), and, currently, printing to film again, for release, distribution and exhibition. This process involves a large number of professionals, each with their own set of competences which are radically different from those required in the analogue past. The competences are also highly inter-related and dependent on each other.

**3) The competences required by the digital cinema industry are rapidly developing.** A fully digital workflow is now a practicable possibility, which can bring considerable advantages in cost savings and flexibility. It is therefore likely that in the medium term the cinema industry will move to an entirely digital production chain. The

move to Digital Cinema is, however, happening in a piece by piece process, as described by the IP Racine project (IP Racine, 2007).

*The chain currently consists of at least three separate businesses: (1) digital cinematography and content creation; (2) digital postproduction of the movie; and (3) digital distribution and display. While different parts are developing at different speeds, and the transition from analogue to digital is expected to continue for at least a decade, the introduction of digital cameras and projectors has begun and there is a rapidly growing reliance on digital data processing. Nevertheless, the Digital Cinema process is still fragmented, rudimentary and highly skills-based, operating at or beyond the limits of technology...*

*Whilst the US 'majors' dominate film production, specialist European companies, (mainly SMEs), lead in digital cinema technology and services. European manufacturers, studios, and postproduction companies have a reputation for quality, technical sophistication, creativity and cost-effectiveness. Only by continuing to research and develop world-leading technology can Europe maintain its position in the global market for digital film equipment and services (IP Racine, 2007).*

Consequently, while digital intermediate is a valuable and well established technology, it seems unlikely that the procedure will be a long term solution. Digital capture is becoming a more viable and aesthetically accepted option, and digital projection at cinemas is becoming more common (although by no means dominant as yet). Similarly the tendency to shoot in the studio using a virtual set is becoming ever more marked. As these changes become introduced to the production chain the competences definitions for the domain also need to be changed, providing a challenging environment for testing the TENCompetence infrastructure for managing competences.

**4) The actors involved in the Digital Cinema industry are geographically distributed.** Cinema production and post-production is often a highly distributed industry. The teams who come together to work on a production may be drawn from many different areas and countries since post-production may be carried out by specialised geographically distributed companies as it is the case with Hollywood media industry. This makes Digital Cinema a good domain for testing distance education infrastructure.

**5) Digital Cinema professionals require highly flexible training opportunities.** Cinema professionals have valuable skills which are in high demand. Many also have to structure their working life according to the demands of production schedules, and cannot guarantee that they will be available for long periods of time in the same location. At the same time training in Digital Cinema in many cases requires access to specialised equipment, and so there is often a need to provide face to face training. These factors mean that highly flexible course structures will be required to meet the training needs of the domain.

**6) Competences in digital cinema are sought after by a large and diverse corpus of professionals** from journalists to scholars of film studies, and other domains related to media in general. Courses and opportunities to learn about technological advance in digital cinema are generally rare and expensive, making them only accessible to professionals from cinema production and post-production who are often financially supported by their companies to take a short course or two. Providing an open access to learning materials in digital cinema can help all interested people in acquiring competences and knowledge, and facilitate their contact with cutting edge technologies.

### 1.1.1 Articulating the domain of Digital Cinema

The TENCompetence project establishes collaboration with IP RACINE, an integrated project focused on the Digital Cinema production chain. IP RACINE is of great assistance in analysing the competence domain of Digital Cinema, which can be divided into three areas:

- Production
- Postproduction
- Distribution and projection

The different parts of this workflow are represented in the graphic shown in **Figure 1**.

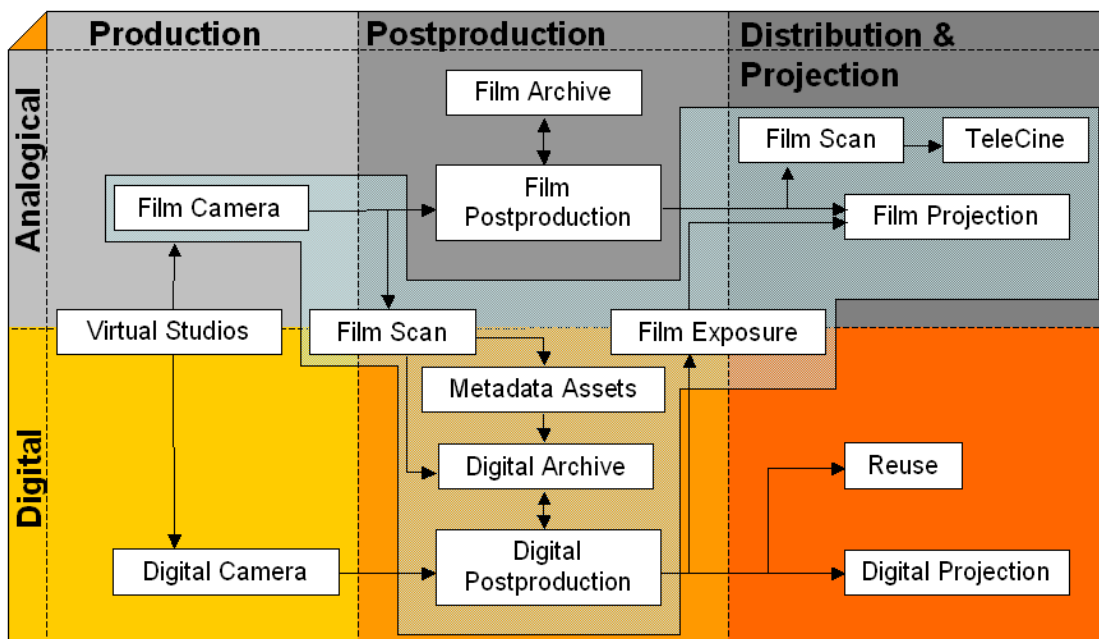


Figure 1 Digital Cinema Workflow (Copyright IP Racine)

This workflow is carried out by a large team of professionals, all of whom have training requirements, as set out in Figure 2.

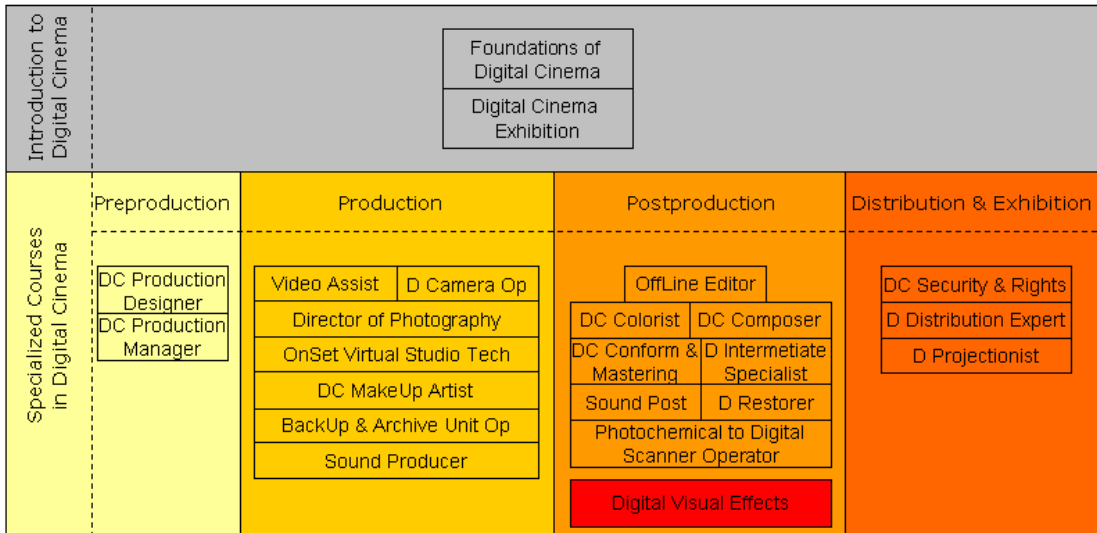


Figure 2 Digital Cinema Courses Scheme (Copyright IP Racine)

Each of these individual course areas may also be subdivided, as they may be addressed both to students and professionals, and may need to be designed in different ways for these groups. It is also likely that some of these courses could be developed with a smaller budget if they were focussed on High Definition TV rather than Digital Cinema.

### Candidate TENCompetence courses for Digital Cinema

The competence domain for digital cinema defined in the previous section is very extensive, and involve a large number of competences. The following aspects are identified as being practicable and appropriate to address within TENCompetence:

- On Set Virtual Studio techniques
- Studio Illumination
- Colour Correction
- Editing
- Sound Design
- Audio Mixing (surround)
- Character Animation (+rigging)
- VFX Animation
- Keying and Rotoscoping
- Shader Artist/Programmer

### 1.1.2 The first TENCompetence Digital Cinema Pilot: On Set Virtual Set Studio Technician

In the first phase of the pilot it is planned to focus on one particular role: On Set Virtual Studio Technician. Extension of the pilot approach to other areas of the domain in later phases of the project should not prove to be too difficult, since:

- The initial pilot is situated within a well articulated domain.
- The competences for the other actors in the domain are well defined using the same methodology as that used for the initial pilot.
- The relationships and workflow in which the various actors carry out their professional activities is well understood.

Extension of the pilot to additional areas would however raise additional aspects to be tested, such as the analysis and facilitation of professional trajectories through the competence space of digital cinema, and the representation of and navigation through related competences.

The pilot course aims to train professionals, for both the Television and Cinema industry, providing them with the competences required to working with Virtual Sets. The competences relate to the entire production process, including pre and post production.

The domain of virtual sets also shares many competences with other aspects of digital cinema such as editing, sound design, character animation, etc. This makes it an ideal starting point for an introduction to the digital cinema's rising technologies.

*Note: The following subsections explain in more detail Virtual Sets and the Brainstorm software. Although this information is not necessary to understand the implementation of the corresponding Competence Development Programme, it is provided in this report for the readers who are interested in a complete technical description of the pilot specific topic.*

#### A brief introduction to Virtual Sets

Virtual studios are an alternative to traditional studios in which real objects are replaced by virtual ones. The movements of a real camera are tracked and a virtual camera simulates the same movement. The resulting virtual picture can then be seamlessly mixed with the one provided by the real camera. In production a number of additional demands are made on the system, such as:

- Updating numbers and texts, object shapes and positions, colours and textures as user events or representing the data being received in real time.
- Reading or controlling mixers, lights, audio devices, video servers, etc., in sync with the evolutions of the Virtual Set.
- Executing many of the standard capabilities of commercial 3D packages, like animations, particles, morphing, deformations, etc, in real time.
- A wide range of demands generated by the creative work of directors.

Brainstorm specialises in the development of interactive real-time 3D graphics applications and is a leader in the field of virtual sets and on-air graphics for television



and feature film production. The eStudio application to be used in the TENCompetence pilot is both a stand-alone application and a foundation for building 3D graphics solutions (some images are shown in **Figure 3**).

The applications of Brainstorm eStudio include:

- Elections: 3D graphics can be interfaced to external data, with the current totals of votes being turned into a graphical representation using 3D objects, textures, various colours, etc, together with logos or pictures of candidates
- 3D Presentations. Corporate companies can use the same studio space to produce different shows with completely different branding in each one. These presentations often use PowerPoint or Excel, and these can be converted directly to 3D.
- TV Tickers: Sometimes there is a need to display changing data in a graphical form. For example financial data can be shown directly from a database or other source, and displayed in real time.
- Shopping channels: Graphics are linked directly to the channel's database of products to be sold, and the setting changes each time the product changes.
- Virtual sets: Virtual sets are widely used for news, sports shows, interviews, chat shows, film reviews etc.
- Film pre-visualisation: The director can see a composite of the final shot rather than looking at a green screen during shooting.

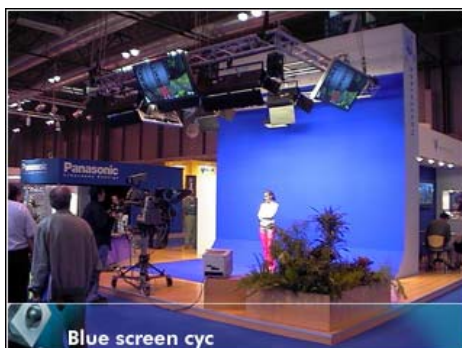


Figure 3 Images of eStudio application, copyright Brainstorm S.L,  
<http://www.brainstorm.es/pages/virtstudio.html#>



## A brief introduction to Brainstorm software

Brainstorm specializes in the development of interactive real-time 3D graphics solutions and is a leader in the field of virtual sets and on-air graphics for television and feature film production (Brainstorm, 2007).

eStudio is the culmination of over fifteen years of production experience and 7 years of software development, developed as both a stand-alone application and a foundation for building 3D graphics solutions. Brainstorm was founded initially as a services company to provide graphics services for broadcast television stations. At the time bespoke software was not available and traditional hardware was limited in what it could do.

Achieving what the customer needed meant creating custom software, but rather than making a "closed" software that would be difficult to adapt to other work it was developed as an open tool to allow you to create whatever service you need. Soon customers wanted to buy the software themselves for their own use.

Now there are many Brainstorm systems being used all over the world in some of the most highly respected broadcast organizations. Despite it started as an SGI/IRIX solution, thanks to advances in graphic performance of personal computers, now Brainstorm eStudio is even available for Laptop PC's with Windows.

### 1.1.3 Challenges in competence development in Digital Cinema

In addition to the complexities of the competence domain in digital cinema, there are other challenges to be addressed in developing competences. These include, but are not limited to:

- **Geographic isolation of learners.** The people who make up cinema production teams are often geographically distributed, only coming together when they are needed to work on a production. This means that there is often no central location available to carry out training.
- **Professional isolation of skilled professionals.** A cinema production team must contain a wide variety of skills, each of which is covered by only a small number of people, who often work in established teams. In many cases there is only one person, for example the director of cinematography. The result is that many professionals very rarely have the opportunity to work with their peers, and so have little opportunity to learn from each other.
- **The schedules of learners do not coincide.** Professionals in digital cinema production tend to work intensively on productions, and then have periods of inactivity (which may not be very long). It is therefore difficult to gather together a group of learners who are all available for a period of weeks or months
- **The equipment required for competence development is expensive.** Digital cinema equipment is costly, and this is particularly true of the cutting edge equipment which is required for developing new competences. Often the best equipment is fully committed to production activities and not available for training purposes.
- **The competences to be developed are rare.** Digital cinema is a developing field, and new technologies and equipment are continuously appearing. The newest

technologies are those with the greatest training needs, but also those where trainers with the necessary skills are hardest to find.

- **Traditional divisions of labour and sectors are breaking down.** The traditional task distinctions of analogue film production are not necessarily appropriate to digital production techniques. For example, directors are now able to make rough cuts of movies themselves, using digital editing suites. The use of digital technology also blurs some of the previously distinct boundaries between TV and film production.

A course on virtual sets is expected to attract potential students from different domains. These students may have represented a wide variety of proficiency levels which can form a good basis for social interaction and exchange of knowledge, but also makes it challenging to offer a “one size fits all” learning package.

#### 1.1.4 Four use cases for digital cinema

Several use cases were developed and refined periodically to reflect the desired version for a pilot on virtual sets considering the functionalities TENCompetence Personal Competence Manager (PCM, for details see section 1.3). They also represent our understanding of the targeted group of learners and the main flows of actions that happen among them, and between them and the different learning services and resources.

### Use case 1: Getting to grips with digital cinema technology

#### Brief Description

Rhiannon Tomos is an independent film producer, producing documentaries using analogue film technology. She would like to move into digital production, but has little idea of the costs involved, or of the readiness of the technology in the various parts of the workflow. She reads articles in the press, but has not had the time to study the matter seriously, and as she lives in a remote area of the UK doesn't have friends who work with digital technology. One day her eye is caught by an advertisement in a trade publication for a training course entitled “*Making the move to digital*” provided by a Digital Training Corporation, she decides to give it a try.

#### Actors

**Primary Actors:** Learner, Digital Training Corporation, Assigned Tutor, Conference Manager, Fellow Trainees

#### Flow of Events

- Learner sends her application and profile to the digital training corporation
- Learner signs up and receives a Username and password for the Virtual Learning Environment
- One month access to short self-study courses on the basics of digital cinema

- Learner conducts a Self Assessment Study: good basic understanding, but poor detailed knowledge of the techniques involved.
- Learner decides to focus on digital acquisition and digital intermediate processing (Competence Development Plan)
- Learner uses the forum and makes contact with classmates having similar interests.
- Learner share and exchange resources with classmates (ideally through a blogging tool)
- Learner completes the courses on digital cinema basics
- Learner registers with some of her peers for an online conference about developing roadmap plans for introducing digital technology into their companies' workflows.
- Learner uses the conference system to share acquaintance with each of her peers' situation in the work environment.
- The system provides the activities to be carried out at each stage, and ensures that the correct documents are available to participants at all times.
- The system manages the formation of the groups: Learners work in small groups to develop plans.
- Plans get peer-reviewed
- Learner takes an appointment with the conference manager to discuss personalized plan
- The system provides support for work processing of the plans
- Over the next six months the learner uses the online environment to discuss progress in the implementation of her roadmap with the good contacts she made during the course.

### **Special Requirements**

- Learner needs to have the right background for this specialized course.
- Learner needs to have the required hardware equipments and connection for the players.

## **Use case 2: Switching platforms**

### **Brief Description**

Wolfgang is an experienced cameraman, but he has never worked in digital acquisition. He has good contacts with a director of cinematography who works in an all digital production workflow, and would like to work with him. He realises, however, that no-one will pay his wages while he learns how to use the new equipment. He needs to learn basic skills on the Snakebite camera, but believes that his only option is to get a basic knowledge of the camera and its operation, and then use his many years of experience to adapt on set.

### **Actors**

**Primary Actors:** Learner, Tutor,

**Secondary Actors:** Dealer, Other Learners

### **Flow of Events**

- The learner searches the web for suitable courses, and finds a Web site which offers guidance.
- Learner sends his application and portfolio describing his experience and skills.
- He is given access to an online training environment consisting of a 3D interactive model of the Snakebite camera, with a number of different activities to carry out.
- Firstly the system presents the camera's features and controls during a short demo.
- The learner is asked to complete a test on the features and controls, and only after reaching a score of 80% correct identification is he able to move on to the next phase.
- Learner passes the test and loads the basic training application
- The next application divided the screen into three regions: the 3D model, and two simulated viewfinder views. His task is to use the controls of the camera to make the top image (which he can manipulate by using the camera controls) the same as the bottom image (which he cannot manipulate).
- The system recognises which controls he is having difficulty with, and provides simpler examples to clarify their use.
- At the end of the week, when Wolfgang has become familiar with the layout of the camera, he is provided with the opportunity to use a Snakebite camera for four hours at the demonstration rooms of the nearest large dealer.
- When he gets there the dealer has report from the online system which indicates which aspects of camera use have proved most difficult for Wolfgang to understand, and the dealer provides a half hour demonstration of those aspects
- For the rest of the afternoon the learner is left largely unsupervised to work in the demonstration room, shooting footage and uploading it to the server.
- By the end of the day he feels that he has mastered the basic use of the camera, and is confident enough to offer to work with the camera.

### **Alternative Flows**

- Learner travels to one of the residential courses organised by the manufacturers.
- Learner is assigned into a group of five people and is provided with a PDA which has all the reference materials, and an interactive schedule for the activities which he is carrying out.
- The first day is focused on familiarisation with the camera. Learner logs in to the system via his PDA
- Each learner works individually with a camera, following the instructions provided in video and sound files streamed to the PDA.
- The second and third days involve practical work with a tutor in a studio. The learner uploads his work and clicks the checkbox to indicate which activities have been completed, and then answers questions provided by the PDA.
- Learner uses the PDA to add his own notes, which are uploaded to his personal area in the server.
- Tutor also has a PDA, and makes notes too.
- In the last two hours of the day the work of the learner camera operators is discussed in the group.
- The tutor selects a camera shot for discussion and retrieves the learner's responses to the questions posed by the PDA, providing information about what he was trying to achieve.
- The learner engages in the discussing asserted with the notes made available by the server to his PDA to match the selected clip, and similarly the tutor can see his own notes. These notes are not made available to the main projector.
- End of the discussion signal the end of the course.

## Use case 3: Supporting Communities of Practice

### Brief Description

The Union of Swedish Camera Operators represents hundreds of the top camera crew technicians in Sweden, including DoP's (Director of Photography), Camera Operators, 1st AC (Assistant Camera/Focus Puller), 2nd AC (Assistant Camera/Clapper Loader), Grips, Gaffers, Script Supervisors through to Still Photographers. The committee which runs the Union has recognised that the move to digital technology is creating learning needs for their members. They provide training courses for their members, but recognise that not all members have time to follow these, and that it is very hard to pitch the level of the courses correctly, when dealing with such accomplished professionals. They decide that the most effective way of maximising the competences of their members is to provide structures which provide support for the emergence of Communities of Practice for each of the distinct professional categories.

### Actors

**Primary Actors:** Union of Swedish Camera Operators committee, Union members, Professional learning designer

### Flow of Events

- A server is created to manage this process, and all members of the Union are given passwords.
- The information which they make publicly available in the Union is now uploaded on the server's forum
- An environment is provided where professionals can post questions to their colleagues about the changes involved in moving to digital technology.
- The server stores pieces of text and links which a member finds particularly helpful along with comments and suggestions, and then presents them as a searchable resource for all the members.
- Members contribute texts, links, graphics, etc, which they find useful, or which they would like to get feedback on.
- Professional learning designer works with the members of the various communities of practice by overseeing the questions and responses, and at the feedback provided by the members, and identifies the key issues.
- The learning designer develops self study units of learning addressing these key issues which can be followed by members.
- Members address these units according to their concerns.
- The learning designer presents periodic progress reports to the forum to reflect progress in the move toward digital technology.

## Use case 4: Remote learning with specialised equipment

### Brief Description

Javier Hernández has extensive experience in analogue television production. He would like to move into the expanding area of Digital Cinema, and so he is studying a general course in Digital Cinema in Lima, Peru. He is particularly interested in the area of virtual sets, and would like to follow a specialised option, but unfortunately there are no courses in this area in Peru.

He is resigned to taking another option, and hoping to find a placement where he can learn about virtual sets on the job, but he knows this will be difficult if he does not have any background knowledge. One day his teacher tells him that he thinks he has found a possible way for Javier to gain the skills he needs, as his school has established an agreement with a centre in Barcelona which offers distance learning in a number of specialised aspects of digital cinema, including precisely this topic. Javier is sceptical, because he believes that practical work with the equipment is essential, and he can't imagine that this will be possible in a distance education course. But his teacher explains that the course includes practical sessions with a virtual set in which he will be able to participate over the network.

### Actors

**Primary Actors:** Learner, Fellow learners, Teacher

**Secondary Actors:** Barcelona student actors

### Flow of Events

- Learner contacts the school by filling the online application and profile
- Learner signs up to the school's web after receiving his admission to the course.
- The course commences in the following term. There are twenty people on the Virtual Sets course, and sessions are carried out once a week.
- Learners sign up to the virtual set environment according to the schedule to participate in the course
- For the first five sessions they all connect at the same time, and participate in virtual lectures using a video conferencing system with a shared whiteboard, text chat, and a personal notes space.
- At the end of each lecture, the teacher publishes an assignment to carry out
- Learners submit assignments to the teacher over the network.
- In the next phase of the course, the 20 participants divide up into subgroups of five persons each.
- For a month the learner works with his colleagues in the tutorial group to write a script for an advertisement which they will shoot using a virtual set in Barcelona.
- Each Thursday evening for a month they access the system for three hours over the internet, using a web based workspace which provides them with, a low resolution video stream of the real set, a low resolution video stream of the virtual set output, a custom remote interface which controls the virtual set configuration, and a conferencing system to coordinate between the participants.
- The learners get to know the system, decide which sets they want to use, and plan for the shooting, and appoint a director.

- Learners sign up for a 4-hour trial session to shoot the advertisement with live actors drawn from the students who are following courses in Barcelona.
- A voice channel is available for the director to communicate with the actors. The interactions between the director and actors are transmitted to the other members of the subgroup, who can also communicate with each other by sound and text.
- When the shoot has been finalised the footage is made available to the subgroup on the workspace system.
- The subgroup works together to edit the final version of the advertisement, at low proxy resolution.
- An Edit Decision List is generated, and a high resolution version of the advertisement is created in Barcelona.
- The four subgroups present their work together online, and discuss the techniques which they used and their learning outcomes.

### **1.1.5 Pilot development plan /roadmap**

The following are steps to be taken during the development of TENCompetence pilots. This procedure has been designed as a roadmap for this task in a manner that encourages cooperation with WP4 partners and facilitates the development and integration of pilots within the TENCompetence environment.

### **Characteristics of TENCompetence pilots**

- Duration: at least 1,5 months, pilots are recommended to continue running after TENCompetence has evaluated them.
- Launching: at least 4 months before the end of each cycle
- Number of active learners (throughout the pilot): around 100 is desirable
- Number of academic tutors / advisors: at least one
- Geographic distribution: aim for wide multi-national (if possible) geographical distribution of learners.
- Development schedule that specifies preliminary dates and milestones

### **Pedagogical model**

- Focus on informal learning methods where learners have the freedom to design his own Learning Path and take it according to his own preferences.
- Encouraging the sharing of resources among learners and the use of these resources in the learning process
- Encouraging and catalysing social interactions and the formation of active learner communities and groups.

### **Develop pilot description and initial plan**

- Providing information on pilot title/domain/aim
- Defining the intended objectives and development process

- Developing a preliminary curriculum that lists the inherent courses and their related competences
- Writing scenarios and use cases that illustrate the pilot
- Specifying special functionalities, tools, or processes that need to be available in the infrastructure
- Communicating / publishing implementation plan for other work packages and partners
- Integrating feedback on pilot description and initial plan

### **Develop academic materials / design learning experience**

- All academic materials should be developed prior to pilot launching
- Learners are free to take the activities, units of learning or courses (actions) in the order they like
- Curriculum designers and material developers suggest an order by which students can following the learning plan in exchange with official accreditation
- Develop competence map
  - Define competences in a consistent manner
  - Contains all relevant competences to the pilot
  - Explains the relationships among competences

### **Develop three types of assessment processes**

- Entrance assessment: evaluates the competences of the learners wishing to enrol in the pilot, in relation with competences addressed in it and their prerequisites.
- Learning unit assessment: evaluates the learners' understanding of the course materials. This is installed at the end of every course.
- Competence assessment: evaluates the learner's acquisition of competences. Installed periodically, less frequently than learning unit assessment.

### **Form learner community**

- Develop advertising / announcement for pilot
- Develop learner registration process
- Take into consideration gender differences and TENCompetence gender action plan when searching for students
- Aim for diversity in age / sex / location / academic background (if possible, depending on the characteristics of the pilot)
- Collect information on learners and develop statistical description



## Infrastructure

- TENCompetence pilots should use the project's PCM (see section 1.3.3). Any required functionality that is currently not addressed in the PCM development plan should be communicated to WP4
- External tools / applications may be used after consulting with WP4 and linked to the PCM
- Each partner can locally host an instance of the PCM server
- Support and training on using the PCM to design pilots is offered by WP9
- Support and help for students to use the PCM is also provided by WP9

## Pilot Evaluation

- As the pilots will be subject to TENCompetence evaluation, participants should be informed of the experimental aspect of the learning experience.
- Questionnaires developed by the evaluation team should be distributed / collected from the students during the time intervals specified by that team in order to insure the success of the evaluation.
- The evaluation team will also measure certain parameters through the analysis of log files and other available information.
- All participants in the pilots, including those who designed and implemented the pilot should participate in the evaluation according to their roles
- The evaluation process is developed and supervised by WP4.

### 1.1.6 Digital cinema pilot implementation and development

The aim of the pilot is to offer training and a hand on Brainstorm software for virtual sets design and production. Transferring knowledge on digital cinema production and technical skills allows producers to use certain complex tools for the production of digital cinema in the context of Virtual Sets production. Students should know have to operate these tools, learn the basic concepts of digital cinema production, and gain experience in design virtual sets. We aim to provide a validation for the TENCompetence approach as it is implemented within the pilot. We expect to identify and understand areas that require further investigations and development in order to support the TENCompetence Life Long Learning objective.

The pilot brings real learning challenges to the TENCompetence approach. The content of the pilot and the learning materials and objectives associated with it generally require live contact with the students because of the need for demonstrations and interaction in order to complete the knowledge transfer process. If successful, the pilot will validate the ability of the TENCompetence approach and infrastructure to maintain teacher-student relationships and assist in maintaining and developing student-student relations for the benefits of the learning process. Knowledge transfer in the case of this pilot does not only consist of an exchange of information between sources and recipients, but also require the acquisition of skills and technical know-how for operating and using complex tools in a production process.

The following six learner goals described in the Domain Model are addressed by this pilot. The D.C. pilot covers goals number 1, 2, 4, and 5:

- 1. Keep up to date within my existing function or job**
- 2. Study for a new function or job or improve my current job level**
3. Reflect on current competences to look which functions and jobs are within my reach or to help me define new learning goals
- 4. Improve my proficiency level of a specific competence**
- 5. Want some support on a non-trivial learning problem**
6. Want to explore the possibilities in a new field (learning network) to help define new learning goals

The pilot also targets the following from the TENCompetence list of seven objectives:

- Realizing competence development, pro-active sharing of resources,
- exchangeable assessment of competences,
- finding solutions to learning problems,
- establishing decentralized, self-organized and competence management.

## **Enrolment requirements**

In order to enrol in the virtual sets curriculum, a learner must possess at minimal set of related competence required to insure that s/he can understand the information inherent in the curriculum and operate the digital environment in which such information will be presented. These two categories of prerequisite competences involve IT background or literature on one side, and stage design expertise on the other (minimal). The IT related competences are: computer operation, classic internet applications, and text editors. All these competences are of a low proficiency level, similar to popular computer-related experience and know-how, and are defined in the general context of computer utilization. No special computer skills are required.

## **Assessment of learning and competence development**

Three types of assessment were developed for the virtual sets courses. A pre-assessment exam checks the ability of learners to understand the inherent materials by measuring familiarity with prerequisite knowledge such as colour systems, camera movements, and others. The pre-assessment helps filter out learners that will find difficulties in grasping the content of the learning materials, which in turn may lead to high dropout rate. Learning unit assessment is integrated in the form of multiple choice short questionnaires at the end of each action to assess the learners' understanding of the materials at hand. A learner might not be accredited for a learning unit without passing the learning unit assessment adjoined to it. On the contrary, competence assessment focuses on testing whether the learners has acquired new competences from the learning experience. Competence assessments are nested after every few units of learning and contain exercises in which learners are required to use their knowledge to complete several tasks.

## Developing pilot materials

In order to develop the pilot's learning materials, curriculum, and the consequent learning units (actions), a vision document was written after an open meeting on the issue. The meeting gathered the pilot development team for a brainstorming session that lasted four hours. During this session different scenarios were developed to describe how to teach challenging aspects of using Brainstorm software in the design and production of virtual sets. The following list is a concise summary of the vision document's recommendations:

- Address a wide range of competences (10-15)
- Develop several learning units (5-10)
- Avoid sequencing the units in the design of the curriculum
- Use several media types (brochures, videos, texts...)
- Design an exercise and a small test for each unit
- Design one final exam, several assignments
- Develop materials for a total of 200 hours approx.

Our efforts to obtain preliminary learning materials from Brainstorm's offices were unsuccessful. Their cooperation did not answer our expectations, partly due to possible competition between our work and their teaching activities that represent a considerable part of the company's income. Such fact meant that the learning materials required for the pilot had to be developed from scratch.

## The virtual sets curriculum

During the design of the digital cinema pilot, we define a Competence Development Programme (CDP) called the "*virtual sets curriculum*" and developed for the learning player of the pilot. This CDP offers to improve the competences related with the virtual sets production process including pre and post production. It is intended for the Television and Cinema industry professionals planning to utilize the newly available digital technology to remotely manage sets. The aim is for the learners to acquire competences in creating a virtual set, assisting the director on shooting tasks by providing him with real-time pre-visualization of the virtual set, and refining, setting up, and rendering the virtual set for the final composition. Conclusively, this CDP mainly targets television and cinema professionals, visual effects students and practitioners, stage designers, and others.

The official curriculum of the Virtual Sets Diploma is composed of 11 actions (or lessons) reaching a total of 150 hours of activities, exercises, quizzes, and exams (see Figure 4). The 11 actions are divided into the following three sections. Quizzes are composed of 5 multiple choice questions that takes less than 10 minutes to answer. Assessments are more complex examinations that usually require practical implementations of pre-defined scenarios.

## "Brainstorm Foundation"

- **LESSON 1: *Getting started with Brainstorm eStudio*** (QUIZ). Get familiar with Brainstorm eStudio basic interface functionalities and concepts, and build a first scenario. Focus includes Mouse modes, Axis views, Desktop panel, Global lists, and others.
- **LESSON 2: *Brainstorm eStudio Primitives*** (QUIZ). Learn how to create and manipulate primitives along with their types and attributes.
- **LESSON 3: *Graphic elements*** (QUIZ). Find out how to design and manipulate virtual graphic objects. Focus includes Creating, renaming, and saving objects; texturing, duplication, extruded primitives, grouping, and text creation.
- **LESSON 4: *Basic animation*** (QUIZ) [REQUIRES LESSONS 1&3]. Learn simple animation methods with timers, bindings, and actions for virtual graphic objects. Focus also includes folder and icon creation, snapshots, object basic states, 1D evolution curve, and production lists.
- **LESSON 5: *Advanced animation*** (QUIZ) + (ASSESSMENT EXAM). Discover advanced animation tools and methods in Brainstorm eStudio. Focus includes creating gradients, blending two materials, group and matrix types, using the presenter and group options, and 3D curves.

## "Virtual Sets Composition and Animation"

- **LESSON 6: *Managing animation variable*** (QUIZ). Learn how to create and assemble variables, Text objects, Curves, grouping and storing simple data methods.
- **LESSON 7: *Building virtual sets*** (QUIZ) [REQUIRES LESSONS 1&3]. Get familiar with integrating complex objects into virtual sets using Brainstorm eStudio. Focus includes clipping and merging databases.
- **LESSON 8: *Sequential actions*** (QUIZ) [REQUIRES LESSON 5]. Learn simple methods to construct and produce series of visual events using Brainstorm eStudio
- **LESSON 9: *Virtual set production*** (QUIZ) + (ASSESSMENT EXAM) [REQUIRES LESSONS 1, 2, 3, 4, 5, 6, 7&8]. Combine virtual objects and animations to produce simulations in a virtual set using Brainstorm eStudio.

## "Advanced Virtual Sets Production".

- **LESSON 10: *Text Effects & Drawing List*** (QUIZ) [REQUIRES LESSON 9]. Learning complex attributes for text and objects by importing and editing 3D max models, Excel sheets, and Word documents, and alpha movie transparency function.
- **LESSON 11: *Object Advanced Attributes and Importing Geometry*** (QUIZ) + (ASSESSMENT EXAM) [REQUIRES LESSON 9]. Acquaint yourself with brainstorm events and conditions for advanced productions, featuring advanced and multiple binding of properties.

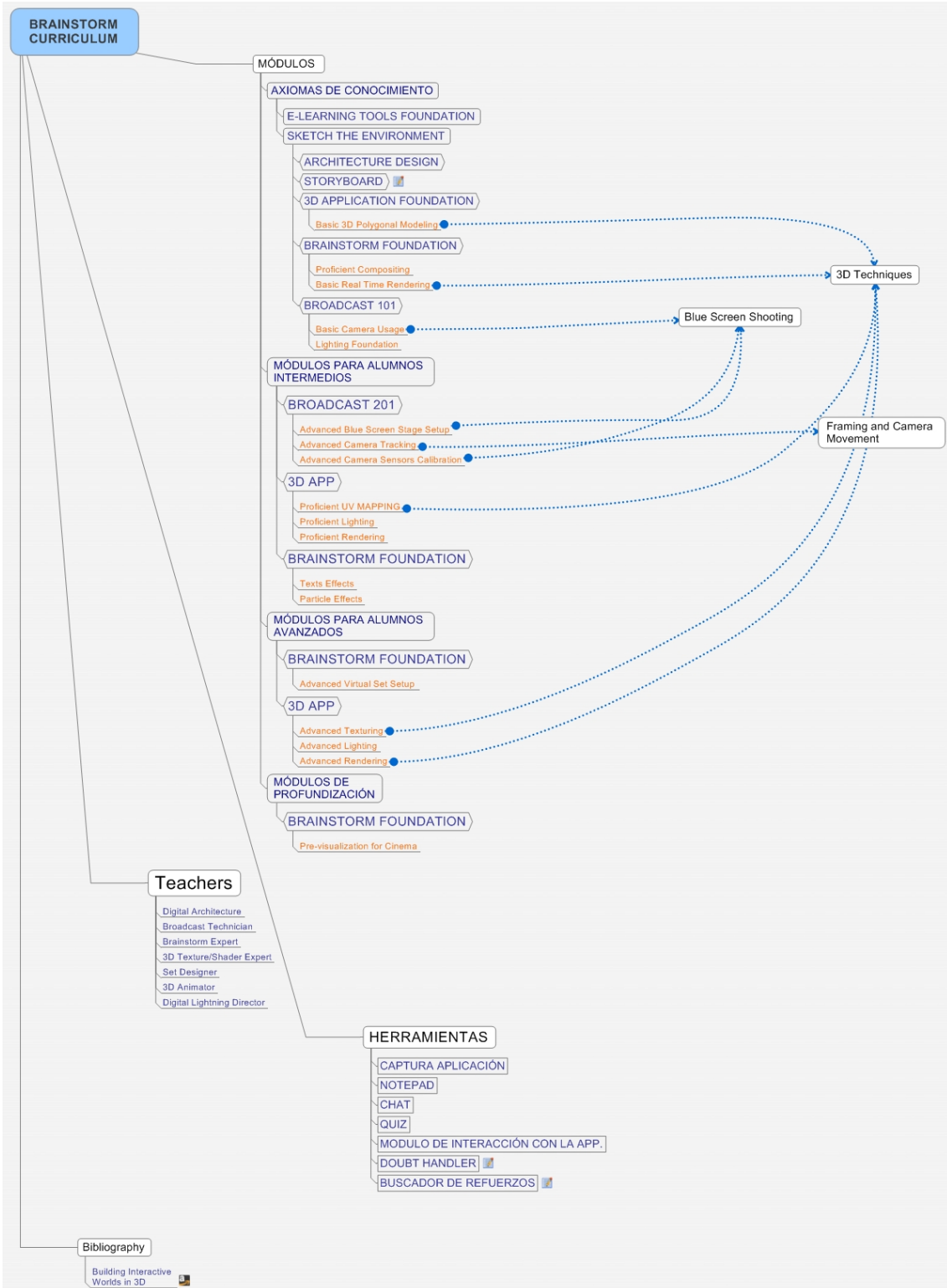


Figure 4 Brainstorm's curriculum schema (partially in Spanish)

### 1.1.7 Challenges encountered during pilot implementation

- **Cost of developing learning materials.** The development of the materials has a cost of approximately six persons/months that was unaccounted for during the planning of the pilot. In previous accounts it was overseen that the cost of this task will not surpass two persons/months.
- **Obtaining software and software licences.** The software licenses that were solicited from Brainstorm are not very adequate for our purpose. This is due to the fact that Brainstorm can only produce specific types of licenses based on corporate agreements between the main office and the international divisions. From the set of available license types, we chose the most adequate for the pilot learners. According to our choice, each license is granted for using the software on exactly one machine by a single learner for one month. Change of platform/machine or use of public computers is thus impossible or complicated. This also means that students who need more than a month to finish the pilot's learning activities will need to renovate their licenses.
- **Delivery of the TENCompetence Antelope release delayed several times.** The initial plans were to launch the pilots directly on the Antelope system (PCM) upon its delivery. However, the delay in delivering the Antelope system release gave us the opportunity to launch earlier versions of the pilots on a CopperCore-SLeD based system provided by WP3. This helped in refining the pilot implementations and test developed materials and the underlying assumptions behind our designs.
- **TENCompetence Antelope release is buggy and suffers stability issue.** After installation and deployment of the PCM, several bugs were discovered and fixed. Moreover, small incompatibilities with pilot requirements, such as the ability to share resources missing in the PCM, had to be addressed or dealt with.
- **Low usability of the Antelope release.** The PCM's complicated interface and low usability provokes a high drop rate in the pilot. Some students become inactive after registration, and a live event needed to be organized to help them install use the PCM, we also increase our direct communication with them on an individual basis.
- **Producing help materials.** The help materials provided by WP9 for the pilots are not fully user-oriented. Some parts of the project's taxonomy is found redundant by the users. Despite this issue, the help information is recompiled and distributed to the learners, and supported by establishing direct communication between them and support personnel.
- **Difficulties in finding/registering students.** These difficulties were partially envisioned while planning the pilot's implementation plan but are actually more severe than expected in the deployment.
- **Challenges in implementing the evaluation plan.** Slitting the students up randomly into experimental groups as required by the evaluation is hampered by the existing social or professional relations among students who consequently asked to be registered in the same group. On the other hand, the students registering for the course form a set of diversified proficiency levels in the field of digital cinema, ranging from primitive background to experts.



## 1.2 ICT pilots

In the following sections the ICT (Information and Communication Technologies) Teacher training pilots are described. These pilots are, implemented at Sofia, Bulgaria. First, a short definition of the pilot domain is introduced. Then, more details regarding the competences and skills involved, the target group, and the main teaching methodologies are provided. It is followed by several example scenarios covering the training domain. Finally, specific description of the pilot implementation is explained.

A number of surveys in the domain of the labour market identify as crucial and essential for the knowledge-based economy the ICT-skills and the so-called “soft skills”, such as information and knowledge articulation and presentation, information search, gathering, evaluation, and effective use, project working, team working, problem solving, and skills for life-long learning. These soft skills can be considered to be an essential part of the ICT skills of every citizen and worker, and in this respect we can speak about **ICT-enhanced skills**.

This pilot shows how TENCompetence framework and approach can be used for the implementation of the innovative and complex training methodology, developed in the frame of the Leonardo project The **Innovative Teacher project (I\*Teach)**. This project develops **practical methodology, approaches and tools** targeted at day-to-day utilization by the **teacher trainers and teachers** of four identified **ICT-enhanced skills** in their work (I\*Teach, 2007). These skills are related to:

- information
- presentation
- working on a project
- working in a team

The goal of the pilot is to prove the significance, usability and effectiveness of TENCompetence software platform and methodology, being used for complex competence development programs in authentic learning settings (Stefanov, 2007). This Competence Development Program aims to develop and implement **practical methodology, approaches and tools** targeted at day-to-day utilization by the **teacher trainers and teachers** of four identified **enhanced ICT competences** in their work. These four enhanced ICT competences are closely related to the information skills, presentation skills, abilities to work on a project, and to work in a team.

The pilot tries to test the whole competence development cycle, starting with the definition of the competences, design and development of the relevant knowledge resources, learning activities, training programs and social networks. And it is also trying to cover the assessment of the competences, especially with the use of new and not standard forms of assessment.

In this respect we expect that this pilot can be used in all the three cycles for testing all versions of the TENCompetence platform, in each cycle stressing more on the issues more relevant for this specific cycle/version of the software platform.

The domain of teacher training in the use ICT provides rich opportunities for testing the TENCompetence system. This pilot project has established a strategic partnership with the Leonardo project I\*Teach, which is addressing the field of teacher training, identifying enhanced ICT skills, development of methodology handbook, and rich set of

training programmes and resources. The main goal of the pilot is to adapt the training methodologies and curricula in order to use the TENCompetence framework, and to evaluate both the I\*Teach methodology, as well as TENCompetence framework.

Thus the ICT teachers training is challenging in a number of ways, which provide rich opportunities for validating the TENCompetence infrastructure, both in the cycle 1 pilot and in later phases of the project.

**1) There is real and urgent need for development of new competences – enhanced ICT skills.** In order to face the challenges of the new education paradigm, the definition of Enhanced ICT-skills needs to be developed, and key pedagogical concepts, methodologies and practices concerning Enhanced ICT-skills teaching has to be identified. On the basis of this new theories and pedagogies, a methodological handbook and a training framework have to be developed and implemented.

**2) Teacher training involves the definition, development and management of a complex recursive set of competences.** First of all, pedagogy experts should be trained on the new education metaphor – enhanced ICT skills. Then, teachers and teacher trainers should explore approaches that enable an effective development of these enhanced ICT skills. And, finally, they should be prepared for teaching others (pupils, other teachers) on acquiring enhanced ICT skills. This recursive process involves different professionals, each with their own set of competences, which are highly inter-related and dependent on each other.

**3) The competences required by the teacher training how best to use ICT are fast developing and changing.** The use of traditional methods is rapidly changing by the inquiry of new methods, based on the use of ICT. In such a way ICT becomes also a new learning and teaching medium.

As these changes become introduced very fast and constantly, the competences definitions for the domain also need to be changed, providing a challenging environment for testing the TENCompetence infrastructure for managing competences.

**4) The training is based on the flexible and learner-centred schemes.** There are several possible training schemes, each one oriented to support on-the job training. The main principle of the training is to be done at the authentic environment, following the needs and abilities of the trainees. The use of e-Learning and distance education infrastructures is a necessity.

**5) The training is oriented to the strong use of community of practices and learning networks.** The social interaction and group work is the main instrument in the training of the new enhanced ICT skills. This means that TENCompetence framework is best suited to meet the training needs of the domain.



### 1.2.1 Articulating the domain of ICT-enhanced competencies

Studies within the EC programme *Education & Training 2010*, progress reports of the European Commission's working groups "Improving education of teachers and trainers" and "ICT in education and training" (2003) identify a broad range of new skills needed for teachers in the knowledge-based economy and life-long learning society. An important part of these skills refer to the competences and abilities of teachers and trainers to design, develop, conduct, facilitate and assess teaching and learning processes aimed at acquisition of productive *soft skills*, supported by ICT.

In response to this demand a pilot project, *Innovative Teacher* (I\*Teach, 2007), was launched in October 2005 under the EC Leonardo da Vinci program. Through the collaborative effort of partners from 7 European countries (the Netherlands, Germany, Italy, Poland, Romania, Lithuania and Bulgaria) the concept of *ICT-enhanced skills* was elaborated and a practical methodology and support tools for building such skills were designed. The final goal is to facilitate the day-to-day utilization of ICT-enhanced skills by teacher trainers and teachers in their professional practice.

In a nutshell, the I\*Teach methodology is based on the idea of teaching ICT-enhanced skills by applying active learning methods. A Methodological Handbook (I\*Teach. Methodological Handbook, 2007) and pilot teacher training curriculum were developed and tested with teachers.

Our main goal is to adapt the training methodologies and curricula developed in I\*Teach Project, which are mainly based on the face-to-face approach, for the use within the integrated online software infrastructure developed by the TENCompetence project. In order to achieve this goal, we design and develop all the training resources and activities in electronic form, ready to be used and re-used through the TENCompetence software infrastructure. As a result, we developed new Competence Development Programme (CDP), implemented as a part of the TENCompetence software infrastructure, for training ICT teachers how to use and utilize the I\*Teach methodology.

The CDP is based on scenarios, involving the learners in activities, related to the real world situations. A lot of research on the learning processes back up the position that learning does not result solely from the provision of knowledge, but from the engagement of the learner in activities into the learning environment (Koper, 2001).

In short, in this context ICT-enhanced skills represent the synergy between soft skills and ICT skills. The following activities are identified as contributing to the acquisition of these skills:

- **Working on specific situation (problem, project)** helps learners build *project working skills*: ability to identify and formulate tasks, divide tasks into subtasks, make a planning, integrate results, keep track of the progress, etc.
- When **researching specific situation (problem)** learners enhance their *information skills*: ability to collect and process appropriate information properly in order to reach a preset goal (determine the information problem, determine the relevance of an information source, search systematically by relevant searching techniques, localize and acquire information, evaluate information, etc.)
- **Working in small groups** during the research contributes to building *team working skills* (communicate internally/externally, give/receive feedback, resolve conflicts, support the team loyally, and take responsibility).

- When **presenting the results** produced during the process of active learning the students practice **presentation skills** (select and order information, structure and build a report, make correct citations, design written, oral and Web presentation, select and use multimedia, etc.)

The methodology for building ICT-enhanced skills is implemented through continuous, repeatable activities and gradually accumulated experiences leading to concrete goals by performing specific tasks. This methodology tries to find the balance between the full freedom of the learners, as one extreme, and the strict following of detailed directions, as another. A series of sample educational scenarios have been designed to support the methodological framework. An I\*Teach scenario represents a composition of tasks (to be implemented in the context of an active learning environment) leading the students to an educational goal by covering intermediate objectives (*milestones* of the learning process). The metaphor behind such a scenario is a *path* (the process) traced by *landmarks* (the milestones) leading to the *peak* (the goal) – **Figure 5**.



Figure 5 The I\*Teach roadmap metaphor (source of picture:<http://www.skivitosha.com>)

The landmarks are positioned by the teachers in such a way that the students could build a set of ICT-enhanced skills naturally interwoven with the predetermined teaching objectives. The density of the landmarks depends on the students' age and experience – the younger and less experienced the students, the bigger the number of landmarks. At each landmark students are expected to have finished a concrete stage of the product development and mastered a specific set of skills. The stage itself consists of completing a task or a list of tasks. Certain segments between landmarks might split into branches – this corresponds to the flexibility of the students when choosing a way to achieve an intermediate milestone.

## 1.2.2 Competence Development Programmes for ICT-enhanced competencies

There are four main competence development programmes developed:

- Teaching information skills using ICT
- Teaching presentation skills using ICT
- Teaching working on a project skills using ICT
- Teaching working in a team skills using ICT

Each one is further sub-divided in other sub-competences:

The first one – how to teach information skills - includes the following sub-competences:

- teaching the ability to determine the information problem
- teaching the ability to identify the relevance of the various information sources
- teaching systematic search by application of relevant searching techniques
- teaching how to localize and acquire the found information
- teaching how to evaluate the found information and (if necessary) to readjust the search
- teaching how to process the found information effectively, in order to reach the preset goal
- teaching how to use the found information ethically and legally

The second one – how to teach presentation skills – includes the following sub-competences (skills):

- teaching how to order and select information
- how to teach language proficiency
- how to teach the building of a presentation
- how to teach presentation design
- how to teach the ability to account for information
- how to teach the ability to use the proper tool properly

Four **sub-domains** have been identified with specifics of the presentation skills.

- a. Written presentation
- b. Oral presentation
- c. Short presentation
- d. Web presentation

Here follows a specification of the presentation skills per domain:

Written presentation:

- how to teach the ability to order and select information
- how to teach the command of the language
- how to teach the ability to build up a report
- how to teach the ability to lay-out a report
- how to teach the ability to make correct references and citations
- how to teach the ability to use a word-processor properly

Oral presentation:

- how to teach the ability to order and select information
- how to teach the fluency in the language
- how to teach the ability to build up an oral presentation
- how to teach the ability to design an oral presentation
- how to teach the ability to make correct references and citations
- how to teach the ability to use a presentation tool properly
- how to teach the ability of public speaking

Short presentation:

- how to teach the ability to order, select, and compress information
- how to teach the command of the language
- how to teach the ability to build up an short presentation
- how to teach the ability to lay out a short presentation
- how to teach the ability to make correct references and citations
- how to teach the ability to use a desk top publishing tool properly
- how to teach the ability to focus on the target group

Web presentation:

- how to teach the ability to order and select information
- how to teach the command of the language
- how to teach the ability to build up an web presentation
- how to teach the ability to design a hyper structure
- how to teach the ability to make correct references, citations, and links
- how to teach the ability to use a web publishing tool properly
- how to teach the ability to select and use multi media

The third one – how to teach working-on-a-project skills – includes the following sub-competences (skills):

- how to teach the ability to identify tasks and subtasks
- how to teach the ability to make a planning
- how to teach the ability to divide tasks
- how to teach the ability to communicate internally
- how to teach the ability to communicate externally
- how to teach the ability to keep track of the progress
- how to teach the ability to integrate results
- how to teach the ability to use the proper tools properly

The fourth one – how to teach working-in-a-team skills – includes the following sub-competences (skills):

- how to teach the ability to communicate internally
- how to teach the ability to communicate externally
- how to teach the ability to give feedback
- how to teach the ability to receive feedback
- how to teach the ability to resolve conflicts
- how to teach the ability to support the team loyally, as a good colleague
- how to teach the ability to take responsibility

In general, communication skills can be seen as the basis for all of the other skills. Most of the presentation skills are also used and are necessary as well as the skills associated to working on a project or working in teams. The last two major skills also share some common sub-skills.

### 1.2.3 Narrative Learning Scenarios

The learning process starts with some short face-to-face meetings that aim to give the main idea of the I\*Teach methodology, to introduce the software environment (TENCompetence set of tools for knowledge sharing, social communications, individual learning and competence development), and to present the time schedule and main actors in the learning process. After that all teachers continue with their learning in their own authentic environment. They have access to the TENCompetence integrated software framework, and through this framework they are able to learn and work co-operatively with their colleagues, having constant connection with their trainers. They use and share all the available knowledge resources for finding useful examples and case studies, for sharing the results of their work with other teachers and with their mentors, as well as to work co-operatively in a team on a project.

There are three main roles involved: **learners** (individual ICT teachers), **mentors** (experts giving help and support to teachers in respect to the I\*Teach methodology) and **moderators** (experts giving help to teachers with respect to TENCompetence framework and other software tools). The learning activities are actively supported by the knowledge resources repository. The repository collects scenarios and tasks (reusable learning resources), which are the main building blocks, used by teachers in their practical activities.

The learning process is composed according to the following schedule:

1. Face-to-face sessions (two days) aiming to (see Figure 6):
  - a) present the main ideas of the I\*Teach methodology (four hours);
  - b) present the knowledge repository, main repository objects, and how to work with the repository (four hours);
  - c) present the TENCompetence framework and client, and short training how to use it (four hours).

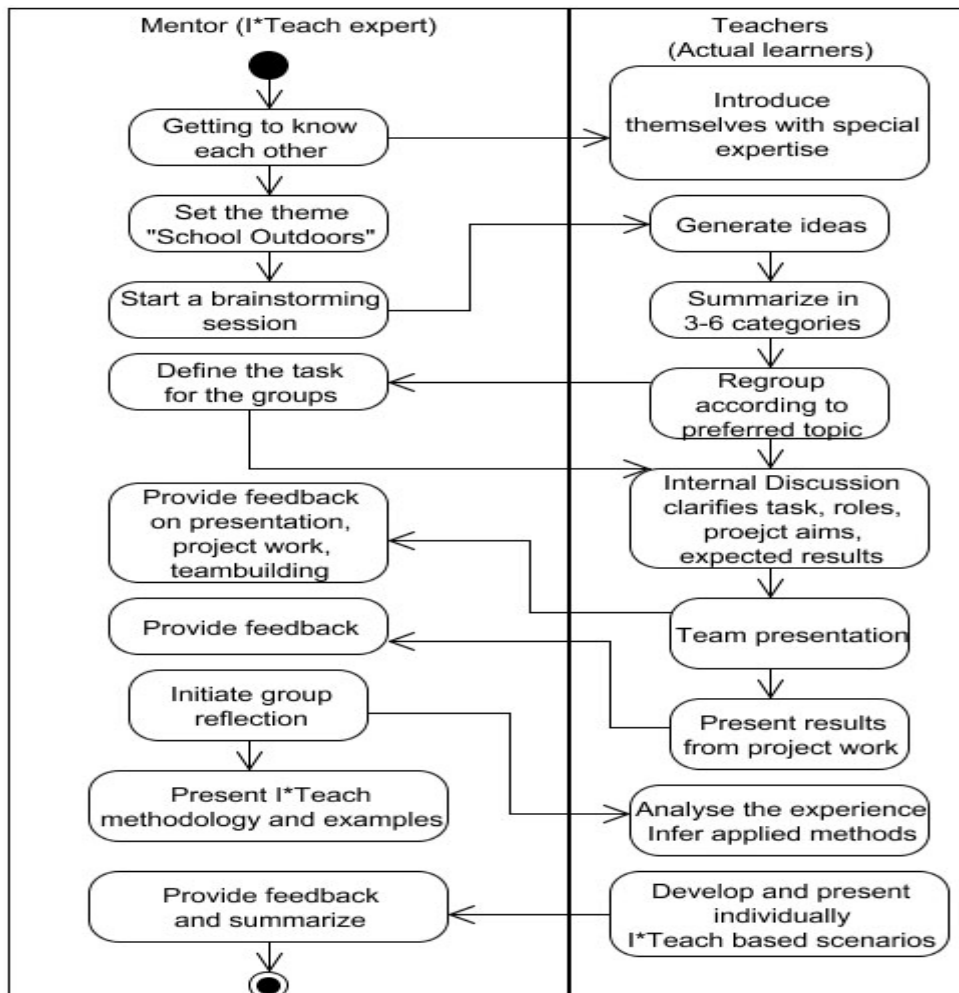


Figure 6 Example of a Face-to-face Session – Introduction to I\*Teach Methodology

2. Individual work in authentic environment using the TENCompetence framework that aims to (see Figure 7):



- a) identify the teacher’s competence level and to define the needed learning path;
- b) follow all required Units of Learning in relation with the individual learning path;
- c) participate in all planned group activities and team work;
- d) use the knowledge repository for inspiration based on some previous developed learning materials, to share results and jointly work on a project with other teachers, to store the final products in a repository;
- e) perform evaluation of their individual results as well as the results of the other teachers.

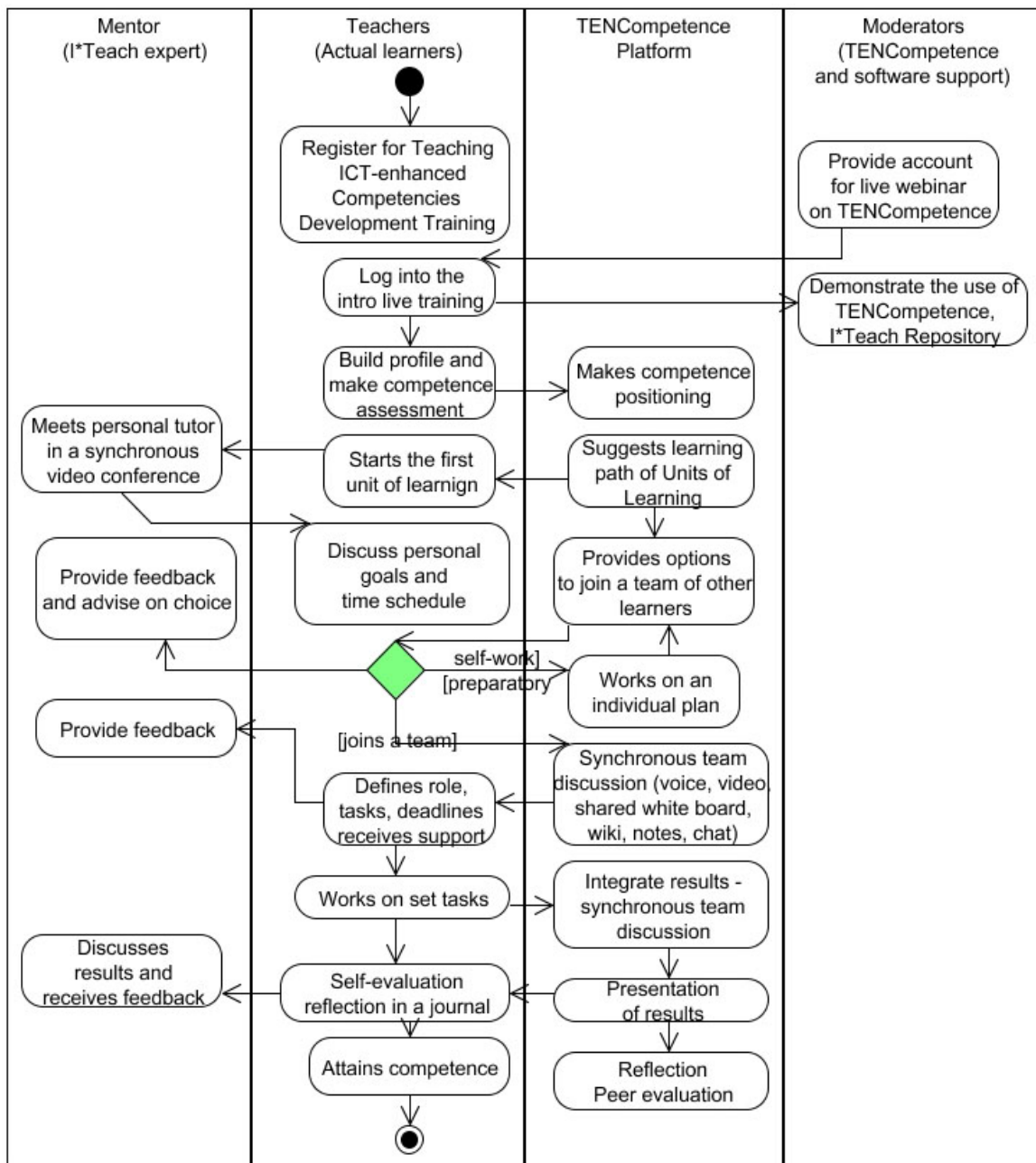


Figure 7 Learning process supported by the TENCompetence Platform and tools and applied in the ICT pilot

3. Final face-to-face session (two days) that aims at:

- a) presenting the main results having been achieved by the teachers;
- b) discussing the strong and the weak points of the methodology and the repository;
- c) discussing the strong and the weak points of the TENCompetence framework;
- d) discussing the plans for the further pilots with teachers that act as trainers in an authentic environment, aiming to train pupils and/or lifelong trainees.

Each individual learner is following her/his learning path as generated by the TENCompetence system. The learners use all the collaborative learning components (for sharing products and documents, for looking for help and orientation, as well as for performing the planned group activities) and most of the individualised learning components (for reading, writing, assessment, personal navigation) of the system. Each stage/phase is completed by completing a task or list of tasks. By passing along the set of milestones the school teachers are building up a set of ICT-enhanced skills naturally interweaved with the predetermined teaching objectives. As a result, the teachers are expected to obtain the envisaged new competences.

#### **1.2.4 ICT Teacher Training Pilot**

The aim of this pilot is to prove the significance, usability and effectiveness of TENCompetence software infrastructure and methodology, being used for complex competence development programmes in authentic learning settings.

The main topic of the training is in the domain of Teacher training how to use ICT in their teaching. The main competences addressed are:

- Teaching information skills using ICT
- Teaching presentation skills using ICT
- Teaching working on a project skills using ICT
- Teaching working in a team skills using ICT

The learners go through orientation phase, and determine the competences to be developed together with the teachers. The learners can choose their own CDP and learning resources to be used, as well as they develop by themselves additional learning resources. Each participant will acquire the level best suited to her/his efforts, background and motivation.

The learner can choose some of the assessment settings (who to be involved, how precise to be the assessment, etc.) The learners are expected to choose their own time frame for learning, with only two short face-to-face sessions fixed, but also has to respect the time frame of her/his peers, when working in a group.

The target group is formed by Teachers, Teacher trainers, Educational experts. Quite a big variations variation exists within the target group, e.g. with respect to the entrance level.

The CDPs are designed in order to support the participants with the lower entrance level, but is flexible enough for more experienced learners to skip some parts depending on their decision. The form of the CDP is rather a workshop, and is following the rules



of the problem-based and project-based learning:

- The members of the audience are from 25 till 55 years of age.
- This form of competence development is assumed to be new to the learners.
- The role of distance learning is rather to give the freedom and flexibility to learners, and to learn at their own pace. The face-to-face will have more the role of orientation, correction, support, building stronger relations.
- In this particular pilot working place (the school) is the place where learners (teachers) can apply what they learned, and to make their practice assignments and projects in their working place.
- Most of the time learners are expected to work in teams (groups from 3 to 5 people) and to solve problems/tasks collaboratively.
- There is no fixed time frame, but some of the learning activities are performed in a group, so the group has to fix some time frame for each such task. For this pilot we specify the starting day and the final day, which are marked with special face-to-face sessions.
- Each group has to develop their own competences, competence profiles, competence development programmes either from the I\*Teach methodology domain, or from one of the following areas - Arts, Family, Software, Language learning, Time management. They have to choose some more specific competences from these broader areas, to plan how to design them, how to describe them in PCM, and how to apply the competence development programmes in order to teach somebody to these competences. But in order to do so, they have to apply the I\*Teach methodology (in order to plan the teaching), so they also have to learn everything about I\*Teach methodology, by following all the competences and skills involved in the competence profile "Teaching ICT-enhanced competences", being described in advance in the PCM.
- People is divided and advised to join one of the groups in order to guarantee that in each group we will have one more or less expert in the field of this group, in order to help others.
- Each participant is free to propose additional resources and individual plans regarding the competence profile "Teaching ICT-enhanced competences". But the main task of each group is to develop all the needed profiles and training plans for the competences they prefer from the area they choose, and to develop/propose some example useful resources to be used in teaching that competences following the I\*Teach methodology.

The learning process is not fixed and is not linked with any specific sequence of lessons. It is rather based on the individual work of learners in groups, supervised (or rather assisted) by experienced experts in I\*Teach methodology. They have to develop their own teaching scenarios, propose how to apply this methodology in their own settings using a rich set of available examples and resources. All learners are completely free to choose what competences to follow, in what order and in what pace. Besides, they can self-evaluate their own competence level using questionnaires.

The PCM is offered as the main instrument to design their own competences, competence profiles, and competence development programmes, which later on can be

used by other (their future students, for example) in order to learn how to obtain these competences.

We also developed initial version of all competences linked with I\*Teach methodology, and for each competence we developed a Competence Development Programme, consisting of several actions (each action corresponding to some important skill related to the competence) and for each action – set of resources including learning units (in the preliminary pilot this units).

So, each learner is expected first to develop her or his own plan (or to use the existing one) in order to get more information about any specific competence related to I\*Teach methodology.

The main task for each learner is to work with PCM in order to develop their own training plans, linked to their own area where they teach. So they first need to explore the existing communities, to join any existing one matching her or his interests (or to develop new one if such does not exist).

After that, in the community they join, the need to develop different competence profiles, and for them - different competence development programmes (either starting from scratch, or using and adapting any existing such profiles and plans).

The groups are formed from the learners themselves and using the PCM (by joining or creating the corresponding community).

So, to some extent we can say that there is no fixed course with clear guidance, but the teaching method is based on the practical work that learners are performing in preparing their own teaching plan (how to teach, for example, the "playing guitar" competence, using the I\*Teach methodology). At the end all learners create such Competence Development Programmes, which actually are shared in all "I\*Teach methodology" community. Of course, knowledge resources linked to the "playing guitar" competence are shared mainly in the "playing guitar" community.

Rating in the I\*Teach pilot was used for learners to express their opinion (1) how useful is any knowledge resource from the "learning I\*Teach methodology" community; (2) how useful is any knowledge resource in any domain-specific community created / joined by learners from the I\*Teach pilot.

### **1.3 Description of the developed system**

The Personal Competence Manager (PCM) is the integrated system in which all software products developed within the TENCompetence project are put together. The aim of the pilots is to measure how well this TENCompetence infrastructure attains the seven TENCompetence project objectives.

The pilots of cycle one use the “Antelope” release (version 1.0 beta2) of the PCM. Being an early release, in which no software products from research work packages have been included yet, it has a number of limitations (in functionality, performance and usability).

Over time the PCM will grow from a limited prototype to a more mature and extensive system. The pilots help in this process by contributing their pilot observations and recommendations to the PCM requirements and development groups.

### 1.3.1 Supported primary use cases

The TENCompetence Domain Model defines six primary use cases. These have been the main guide for creating the first versions of the PCM. In the final version a learner should be able to use the system for all six primary use cases:

1. **Keep up** to date with an existing function or job.
2. **Study** for a new function or job or improve a current job level.
3. **Reflect** on current competences to determine which functions and jobs are within reach, or to assist in defining new learning goals.
4. **Improve** the proficiency level of a specific competence.
5. **Receive** support for a non-trivial learning problem.
6. **Explore** the possibilities in a new field (learning network) to help define new learning goals.

The focus for the development of the PCM to be used in the cycle 1 pilots was on use cases 2 and 4. All other use cases have some support, but are also missing functionality (for instance, there is only simple support for positioning and navigation and there is no mechanism for competence assessment). Use cases 2 and 4 share many similarities as they both define a Competence Development Plan using the learner's current competences.

### 1.3.2 Main PCM entities

The PCM uses a simplified model of the TENCompetence domain model. Using an example from teaching, the main entities and their hierarchy within the PCM are (see table 1):

Community (e.g. Teaching)

=> Competence Profile (e.g. High School teacher)

=> Competence (e.g. didactic skills)

=> Competence Development Plan (e.g. plan to acquire 'didactic skills')

=> Action (e.g. practice: observe a lesson)

=> Resource (e.g. an article about observation techniques)

### 1.3.3 PCM functionality

This section provides a first introduction into the functionality of the PCM. It is meant to give an impression of the system, not to be a complete overview, by introducing the following windows:

- Main application window
- 'Select a Competence Profile' view
- 'Communities' view

Table 1 Main entities of the PCM

Entity	Description
Community	<p>A domain representing a certain profession. Users can collaborate within the context of a certain community. As such, each entity (Competence, Action, ...) exists in the context of exactly one Community.</p> <p>Synonym for Learning Network.</p>
Competence Profile	<p>A set of <u>Competences</u> that define the minimum requirements for a specific function/job.</p>
Competence	<p>A <u>Competence</u> is defined as the ability ('disposition') of an actor to act effectively and efficiently upon the events in an ecological niche (an occupation, a hobby, a market, a sport, etc.). In short: the ability to perform effectively in a situation.</p>
Competence Development Plan (CDP)	<p>A Competence Development Plan (CDP; synonyms: route, learning path, curriculum, programme) is an ordered set of activities and units of learning that have to be (or are) followed to attain a certain <u>Competence</u>.</p>
Action	<p>A building block for a <u>CDP</u>, being either an assessment or a learning activity:</p> <ol style="list-style-type: none"> <li>a. Assessment: classical multiple choice tests to evaluate whether you master certain principles.</li> <li>b. Learning activities: tasks for learners that describe what they are advised to do in order to attain certain learning or assessment objectives, given some prerequisites.</li> </ol>
Resource	<p>Any kind of resource that can be used in learning.</p> <p>Typical resources are:</p> <ol style="list-style-type: none"> <li>a. HTML pages</li> <li>b. Podcasts / Vodcasts</li> <li>c. Digital documents</li> <li>d. Computer programs</li> </ol> <p>A <u>Resource</u> is normally used within one or more learning activities (<u>Actions</u>).</p>

## Main application window

Figure 8 depicts the main application window of the PCM. The main PCM application window can be roughly divided into two areas. The top half area (tabs 1 & 2) contains windows intended for viewing and editing Competence Profiles, Competences, and Actions. The lower half of the main window (tabs 3, 4 & 5) contains windows that help and support the users in their task performed in the upper half. In Figure ‘main application window’ the „How to clean a bike” Competence Development Plan is the active editor (tab 2) and therefore provides the context for all windows in the lower part of the screen (Vogten et al, 2007).

Figure ‘main application window’ represents a snapshot of a situation where a community already has been created and some content has been added to this community. Furthermore any user may decide to start a new community at any moment in time. Communities are not governed by any central authority and can be set up by anyone. The creator of a community is also the owner of the community and determines policies for the community access. This principle of an entity owner controlling its access rights applies for almost all entities. The general idea is that the PCM should tend to openness whenever possible in order to stimulate active participation and contributions of all community members. The PCM relies on the principles of self-organization to regulate this process.

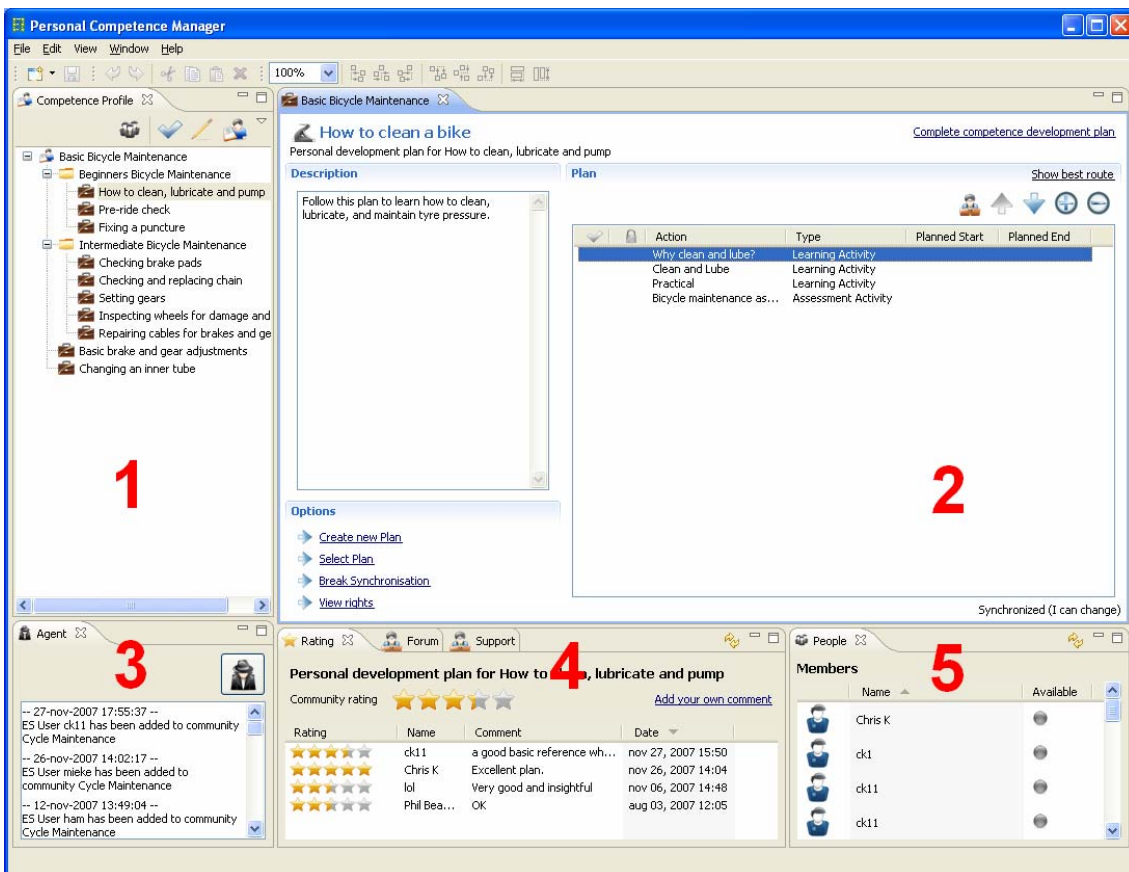


Figure 8 Main application window of PCM

The screen area showing tab 2 is used for all levels of viewing and editing Competence Profiles. When we keep zooming in on a Competence Profile, we encounter Competences, CDP's, Actions (activities and/or assessments) and Resources. Each entity has its own editor (for a content author) and viewer (for a learner). Figure 9 shows the editor for assessments as an example. Other editors and views shown in this screen area look quite similar.

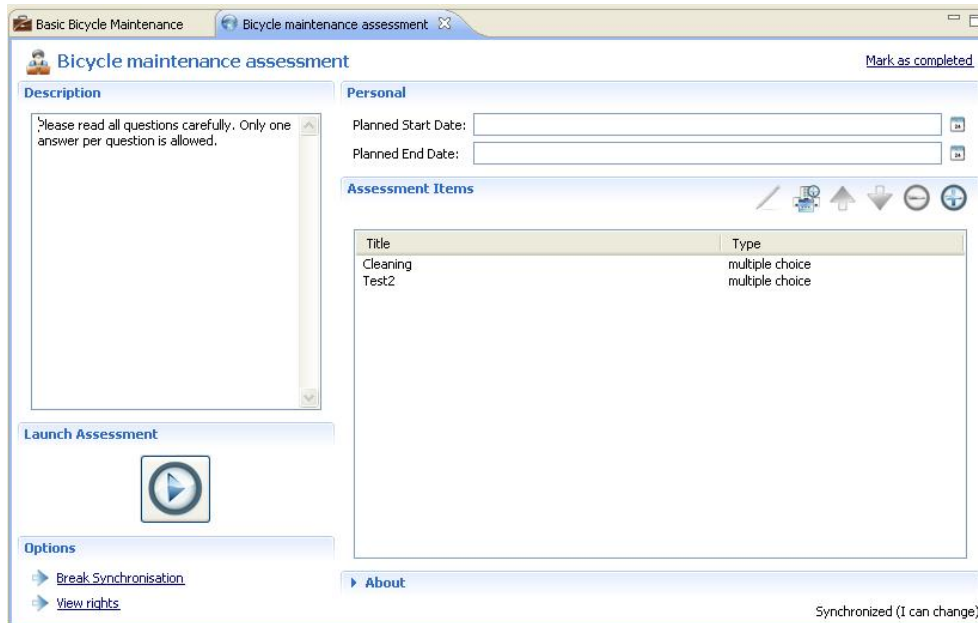


Figure 9 Assessment editor of PCM

Before a Competence Profile can be shown in the main application window, the user needs to create a Competence Profile or register to an existing one. The views 'Select a Competence Profile' and 'Communities' (see sections below) are used to do this.

### 'Select a Competence Profile' view

Being a "Personal" Competence Manager means a user can be using multiple Competence Profiles (e.g. 'Teacher' for work and 'Chess trainer' for a hobby). The 'Select a Competence Profile' view is the view to find or open a Competence Profile (see Figure 10). It shows all the Competence Profiles of the Communities (= Learning Networks) to one has subscribed in the past.

When making a drastic career move or picking up a new hobby, this list could be too constrained. In that case, the 'Discover other communities' functionality can be used to find/discover another Community that does contain better fitting Competence Profiles.

'Discover other communities' will show the view from the next section: 'Communities'.



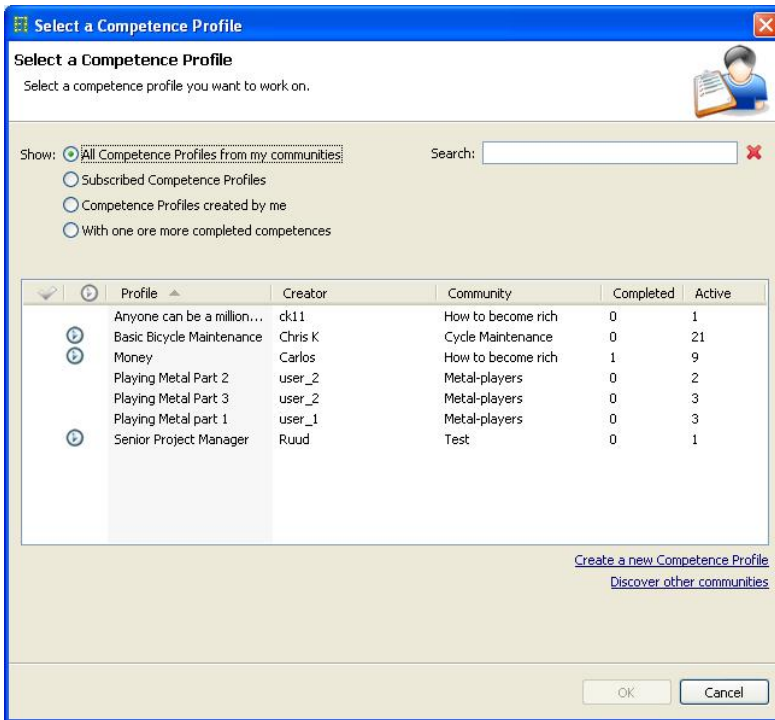


Figure 10 Select a Competence Profile window

### Communities view

This view, as illustrated in Figure 11, shows all known communities. After successfully registering for a Community, a user can use the Competence Profiles contained by that Community. If no suitable Community can be found, the user can choose to start a new Community by their own.

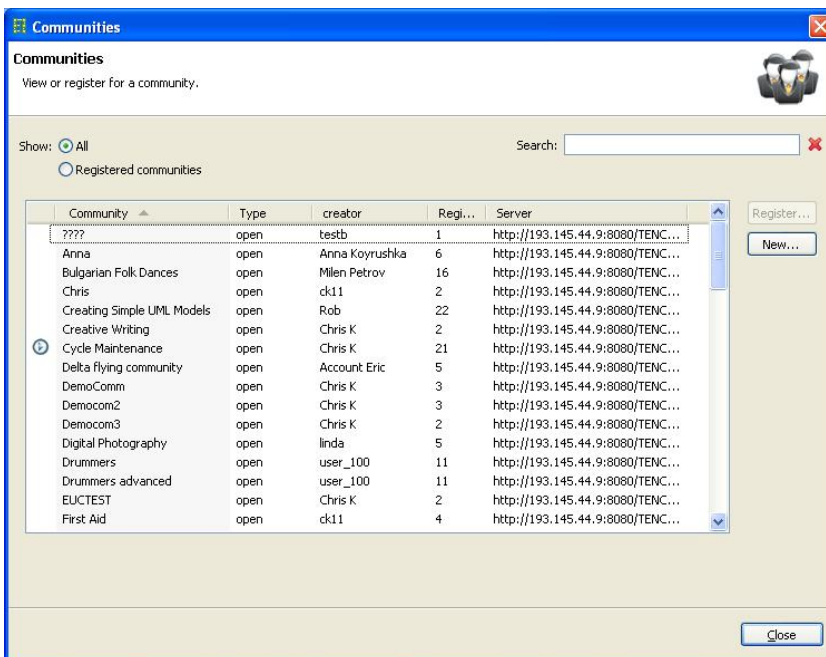


Figure 11 Communities window of PCM



## Deployment (distribution and installation)

To use the PCM, the PCM client is has to be downloaded and installed on a local machine. It is available on the public SourceForge ([www.sourceforge.net/TENCompetence](http://www.sourceforge.net/TENCompetence)) site for download; the [www.TENCompetence.org](http://www.TENCompetence.org) site also links to the download packages.

Users from the Digital Cinema pilot were given the URL of the SourceForge site to download the software (see Appendix 3).

For the users from the ICT Training pilot, all PC's were pre-installed before the first face-to-face meeting (see section 3.7.1). As one of the tasks during this meeting, detailed instructions were given how to download and install the PCM in their native settings. These instructions were also put on a special Web site (<http://e-learning.fmi.uni-sofia.bg/pcm>), where pilot users could download everything needed (not only the PCM, but also other electronic resources and guides).

## User support

For the Digital Cinema pilot issues could be reported by email to a special support mailbox or raised via the forums within the PCM. Besides providing support, users were also asked to provide their own feedback about their experience with the PCM and its contents.

For the ICT Training pilot support was provided through email from the instructors and peers. Some (about one third of all trained) of the trainees were not able to ask a question for help in English. During the pilot we did not encounter any significant error, so we did not pass such message neither to forum, nor to the bug list. There were several server-side problems just before the pilot start, but through the intensive work and communications between support people in FBM-UPF and other people from WP3, all the signaled problems were resolved.

During the pre-pilot several problems were encountered. These were reported to WP3 mainly during the workshop in Sofia in September.

## Bug reporting

During the pilots, no problems were encountered that were so important to require the immediate release of a new patched PCM version.

The only important problem encountered in Sofia is related to performance. When more than 15-20 people start to work at the same time, the response time of the server increases significantly.

Significant bugs found during a pilot are collected and forwarded to the development team after completion of the pilot.

## 2. Launching and evaluating preliminary pilots

Preliminary pilots are test pilots that helped in investigating several aspects of pilot planning and development. Their evaluations have an impact on the way the actual cycle 1 pilots are prepared and launched. The initial goal behind them is to validate our pilot implementation plan with a series of experimentations that test to which extent our hypotheses stand their ground, especially in terms of the utility of the developed learning resources, academic planning, and system design. In the following, our experiences with the preliminary pilots are reported by discussing the planning, launching, and evaluation of each.

### 2.1 Preliminary Digital Cinema pilot

The first digital cinema pilot uses around half of the learning resources initially developed for the digital cinema course.

#### 2.1.1 Launching Digital Cinema pilot

- **Pilot name:** Digital Cinema pilot V1 (virtual sets diploma)
- **Short description** The pilots teaches how to compose and produce virtual sets scenarios using Brainstorm software. It follows a project-based learning approach.
- **Starting date of execution:** 10- June 2007
- **Ending date of execution:** 15- Aug 2007
- **End date of analysis & reporting:** 15- Sep 2007

#### Target group and workload

The target group of the pilot is composed of master's students in digital imaging and cinema at the FBM-UPF. The targeted audience is mainly from Spain and other (mainly European) countries. The course is advertised through the Internet and personal contacts. The total workload generated by the pilot's course is considered to be close to 100 hours of activities, including assessment.

#### Implementation and launching process

(12 January → 14 May) development of learning resources

(24 April) Preparatory workshop for pilot launching, a whole day event in FBM-UPF

(14 May) pilot launching preparations

(1 June) registration opens

(10 June) registration closes, students get access to learning resources

## Description of the implemented system

The Virtual Set diploma is given online to registered students and its academic objectives have been defined in Curriculum as explain in detail in section 1.1. Three online sites are dedicated to the Virtual Sets classroom, the forum (see Figure 12), the blog (see Figure 13) and the lesson player (see Figure 14). The pilot development plan aims at maximizing interaction between the participants. The approach adopted for this task is composed of several design decisions and management policies. To what relates to system design, the choice of including a blog and a forum in the system's design draws from their success in supporting social interaction. Blogs have been used for academic purposes and nowadays count among the classic toolkit used by scientists and graduate students (Schiano, 2004). Forums are also famous for Q&A support services provided by companies to their clientele. In order to evaluate academic interaction, it would be possible to compare it with the usual social interaction that happens in blogs and forums. The role of each of these sites is explained hereafter in the same manner that was communicated to the learners:

- **The Forum:** The forum is used by the students to ask questions and concerns about each lesson and its related materials. The teachers will rapidly answer these concerns and discuss them on the forum. Students regularly check the forum to read the questions raised by others and the responses given to them. Some conversations may involve many students talking to the teacher, especially when all of these students share the same concern.

### Virtual Sets forum

Welcome!

[Home](#) | [Search](#) | [Help](#) | [Admin](#)

.: Forum Index .:

	Forum	Topics	Latest Post
<input type="checkbox"/>	<a href="#">Learning Process, tools, and Requirements</a>	10	03 Sep 2007 @ 10:12 AM by awd
<input type="checkbox"/>	<a href="#">SECTION 1 : Brainstorm Foundation</a>	16	16 Aug 2007 @ 02:06 AM by Jordi Alonso
<input type="checkbox"/>	<a href="#">SECTION 2: V.S. Composition and Animation</a>	1	20 Aug 2007 @ 6:26 PM by Jordi Alonso
<input type="checkbox"/>	<a href="#">SECTION 3: Advanced V.S. Production</a>	1	20 Aug 2007 @ 6:27 PM by Jordi Alonso

**Virtual Sets forum - Forum Statistics**

- Current Forum Date & Time: **Thursday 08 November 2007 @ 10:14:06 AM**

- Our users have posted **28 topics**, containing **114 messages**

- Our forum has been visited **872** times

Powered by SimpleForum v3.9

Figure 12 Forum employed in the preliminary DC pilot

- **The Blog:** Blogging is all about sharing thoughts and information. It is well suited to be the social environment of our class. The Virtual Sets Diploma blog is used by everybody in the class to post information related to the course and comment on it. Some students post their comments on the class materials, others tell about their

own experiences and little discoveries. Every section in the curriculum has a related blog category and students have the right to post and comment in the ones they please. The blog is also used to deliver assignments to teachers. This is done by associating a password to the post that contains the assignment.

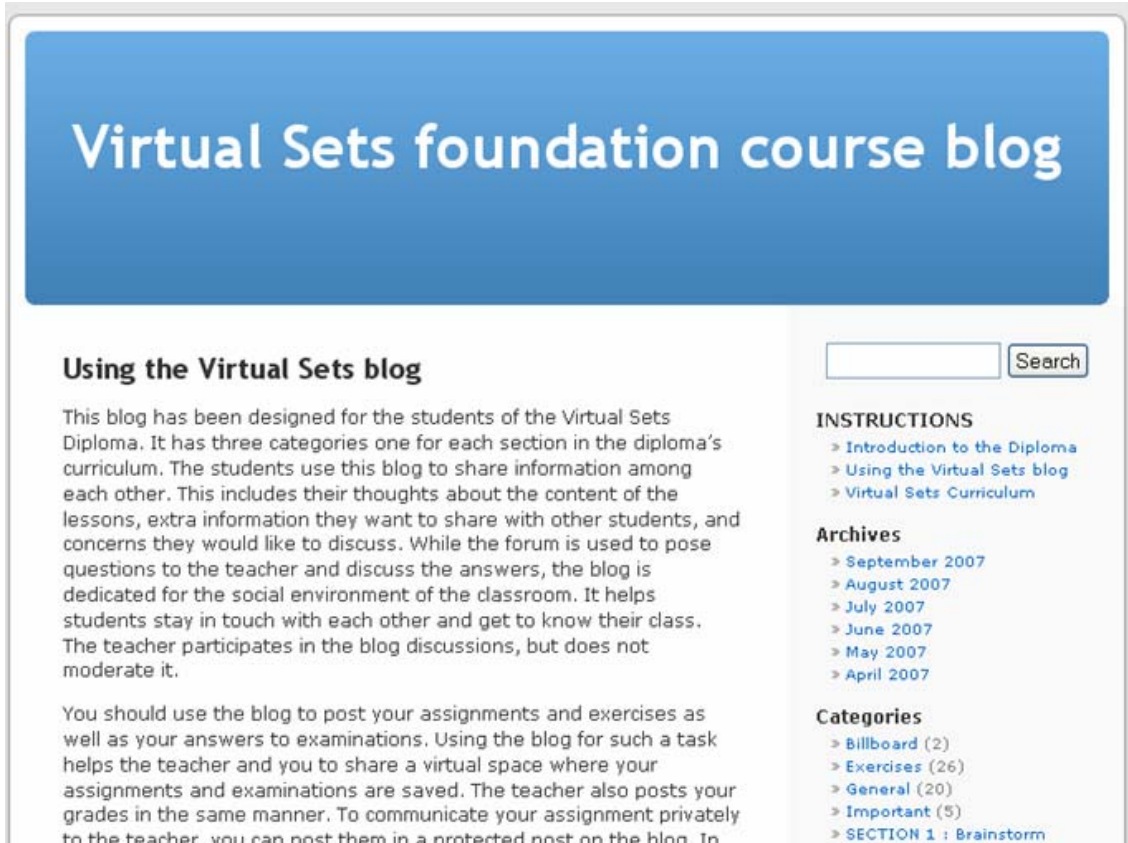


Figure 13 Blog employed in the preliminary DC pilot

- **The Lesson-Player:** The lesson-player Coppercore SLeD (SLeD, 2007) is the site where all the academic materials are published. The lessons are composed of series of steps and the player allows you to progress in the lesson one step at a time. Lessons contain exercises and assessment tests. There are also general examinations at the end of each curriculum section. If you are new to SLeD, we recommend that you take the “Introduction to Virtual Set online Diploma” course in SLeD that teaches you how to work with SLeD and contains the entrance examination to the Virtual Set Diploma.

Universitat Pompeu Fabra - Sled Not logged in Logout

Please use the form below to login

**Username:**

**Password:**

**Welcome to Sled, your friendly Learning player!**

Sled hosts learning courses that are structured as a series of activities, exercises, and assessments (Quizzes and exams).

**Instructions**

After logging in, you will access the Sled course menu that displays a list of available courses. You can select only one at a time for each. You can also leave a course in the middle to finish it later during another Sled session.

**Virtual Set Online Diploma**

For the students registered in the Virtual Sets Online diploma, we have created a blog and a forum at their disposal. The blog is to be used for communication, resource sharing, and interaction among the students, while the forum is set up for questions and answers between students and professors.

Please take a look at the [blog](#) and the [forum](#) before starting the course. More instructions and help information is posted in each of them. **For beginners, Sled offers a small crash course on using the system. If you are new to Sled we recommend that you start by taking this course. The crash course is called "Introduction to Virtual Sets Diploma".**

Figure 14 Lesson-player employed in the preliminary DC pilot

## Roles and support for the learning network

The teacher has the role to support the students in assuming their learning resources published in SLeD and assist them to overcome any difficulties that they might encounter. If the students have questions, they can either solicit the teacher's help by posting a question on the forum, or discuss them on the blog with their peers. The teacher responds to the student when the latter has a question and does not include others in the response. Other students can participate in the Q&A sessions that develop on the forum between individual students and the teacher, increasing the number of involved people in each session. The teacher also broadcasts messages to all the students on the blog when a common theme arises. This model of interaction with the teacher was designed with scalability purposes in mind. When a course is given to a large public, the teacher cannot be involved closely with each student and therefore students have to learn on their own and cooperate among each others. Two support persons were also assigned to help students overcome any technical issue. Students can contact them via email and ask for help on issues related to the pilot system and the brainstorm software (installation, licenses, etc.) When questions raised on the forum have a technical nature, one of the support persons responds instead of the teacher, and follows up on the issue with the inquiring learner(s).

The role of socially outgoing learners can be studied either by identifying them and inspecting their behaviors in an existing learning network, or attempt to simulate their behaviors in a controlled environment and measure the created effects. Fisher et al (2006) are among the researchers who have focused on the first option while studying online societies. We draw on their experience and findings to design our experiments in the controlled environment where the pilot is launched. In their study of roles in Usenet's newsgroups, Fisher et al (2006) describe how different people can assume different roles in different contexts and argue about major roles in social support, hobbyist discussion, and political discussion. Socially outgoing users aim for more involvement in ongoing social interactions by making use of the rules and procedures

the social network. In Q&A groups, these users ask many questions or respond to many of them. They tend to specialize in one usage procedure (such as answering questions, greeting newcomers, mediating between foes, etc...). In a learning context, socially outgoing people usually encourage others to use the system, interact with the resources, and progress on their learning path, and hence can have an effect on the overall user experience of all learners. In order to study the influence that socially outgoing learners can have on the activity of others, we installed in the environment a human agent that we labeled “informer”. The agent’s job is to play a learner’s profile with a socially outgoing personality. To the learners he is known as “Jose Battle” (see Figure 15). His learner’s profile that we created and registered as class member behaved according to certain instruction premeditated during pilot planning and evaluated later during the Barcelona Event. It is directed by a team member who participates in the course in order to show other learners how to use and profit from the system. The informer encourages learners to utilize the system’s features by utilizing ignored tools and services in front of the other learners to demonstrate how they work and encourage the learners to use them. The informer did not offer any academic help as this was left to the teacher. Avoiding interferences can help secure better evaluation results for both roles.

Friday, June 11th, 2007

Hey Everybody!  
My name is Jose Batlle, and I am working on a master in cinema studies at the University Van Amsterdam. I love digital arts and I would like to learn how to compose stuff with Brainstorm. I want to produce digital cinema on the long run, but never had the opportunity to study for that. I have a question for the teacher, I should post it on the forum, right?

Figure 15 First message posted by the informer

### 2.1.2 Evaluation implementation plan

The evaluation plan drafts for this pilot addresses several aspects of pilot implementation and deployment, and tackles early hypotheses made to assume development decisions. In general, the ability of the pilot to instigate and support student activity and interaction among students is the focus of the evaluation. Identifying factors that influence student activity is a task that accompanied pilot development. According to our studies, four main aspects can influence student activities and interaction being: The role of the teacher, the role of socially outgoing students, the influence of adopted educational approach, and the system’s design and components. These four aspects are addressed in the pilot evaluation implementation plan where the focal points of each are identified and related to data collected from several sources for analysis. This is explained in the following table 2.



Table 2 Aspects of evaluation, their foci and methods of evaluation

	<i>Aspect</i>	<i>Focal points</i>	<i>Data Sources</i>
<b>1</b>	Role of teacher	Mediation between students, assistance in assimilating learning resources	Discussions with teacher, time spent on server, progress in SLeD, quality of knowledge in posts
<b>2</b>	Role of socially active students in influencing others	Identifying socially active students, using insiders to instigate interaction	Characteristics of the participants (pre-test questionnaires), discussions in the blog and forum, measuring response to informer's actions, number of blog & forum posts, progress in SLeD
<b>3</b>	Evaluating the educational approach followed	Penetrability of academic resources, curriculum design, adequacy of media utilized, and assessment methodology	Feedback from students, discussions with teacher, time spent on server VS estimate effort, assessment results VS progress in SLeD
<b>4</b>	Evaluating the developed system architecture	Server performance, client-side installations, usability of system components	Time spent on system components, feedback on installations, use of system components

The data sources presented in the table are collected by measuring certain factors and compiling qualitative information. We address them separately, starting with the quantitative measures conducted.

Quantitative data are mined from all available sources of interest. We analyse the blog and forum's databases, and enlisted the help of Statcounter (Statcounter, 2007) to track activities of learners in them and collect data on the visits made. The activities are grouped by IP address. Subsequently, students are identified from the IP addresses they use to access the system's different components. Although two of the learners log-in to the system each from a couple of different destinations, we are able to identify them by looking at the mutual exclusiveness among log-in sessions. This unorthodox method is possible due to the low number of students participating in the pilot. Mapping IP addresses to visitors may be difficult in another event were the number of students is considerably more elevated. In this case, there would be a need to track log-ins and force log-in in order to view the blog and forum content (forums and blogs are usually opened to the public with few exceptions). SLeD also maintains a log file that can be consulted for the frequency of visits and the interaction with the resources. The server logs and Statcounter's data are analysed to measure how much time students spend interacting with the whole system. Table 3 summarizes the factors and the methods or tools used.



**Table 3 Quantitative measures and their corresponding tools/methods**

<i>Factor</i>	<i>Tool/method</i>
Number of blog & forum posts	Analysis of blog and forum DB
Time spent on server	Google Analytics
Time spent on blog	Google Analytics
Time spent on forum	Google Analytics
Results of student assessment	Compilation of exercises and quizzes
Student progress in SLeD	Analysis of SLeD DB

**Table 4 Qualitative information compiled**

<i>Factor</i>	<i>Tool/method</i>
Feedback from student	Logs of messages/emails
Feedback from teacher	Formal discussion with teacher
Informal interviews	Face to face discussions with 2 students

The qualitative data collected are queried from interaction with the people in and around the pilot. We inspect the messages that students posted on the forum about the difficulties that they encountered, from installation of Brainstorm’s software and its licence inquiry, to issues related to academic matters and the functioning of the whole system. Several informal interviews are later conducted with two participating students after they finished the course. The students are asked about their participation in the pilot and whether they feel that competence development is being achieved. They are also asked to evaluate their relation with the teacher and other fellow students. This is also accompanied by an open discussion with the teacher that helps the students through the resources of the pilot. The talks with the teacher focus on his experience with the pilot and the impression he gathered on student awareness, participation, and progress. The whole experience is also addressed during these talks. **Table 4** summaries these activities.



VISITOR ANALYSIS	
Referring Link	No referring link
Host Name	8.Red-88-19-191.staticP.rima-tde.net
IP Address	88.19.191.8 [Label IP Address]
Country	Spain
Region	Baleares
City	Palma De Mallorca
ISP	Telefonica De Espana
Returning Visits	53
Visit Length	Multiple visits spread over more than one day
VISITOR SYSTEM SPECS	
Browser	MSIE 6.0
Operating System	Windows XP
Resolution	1280x1024
Javascript	Enabled

	Page Loads	Unique Visitors	First Time Visitors	Returning Visitors
<b>Total</b>	<b>1,114</b>	<b>246</b>	<b>59</b>	<b>187</b>
Average	186	41	10	31

Month	Page Loads	Unique Visitors	First Time Visitors	Returning Visitors
Nov 2007	67	12	11	1
Oct 2007	64	10	6	4
Sep 2007	134	18	9	9
Aug 2007	190	42	1	41
Jul 2007	353	89	15	74
Jun 2007	306	75	17	58

IP Address	Browser	OS	Resolution	Returning Count	Entries
88.19.247.100	MSIE 6.0	Windows XP	1280x1024	42	47
83.46.110.250	MSIE 6.0	Windows XP	1280x1024	25	40
88.19.191.8	MSIE 6.0	Windows XP	1280x1024	53	36
88.12.190.176	Firefox 2.0.0	Windows XP	1280x1024	16	21
88.12.186.8	Firefox 2.0.0	Windows XP	1280x1024	14	14
80.38.23.208	Firefox 2.0.0	Windows XP	1280x1024	17	9
76.17.97.246	Firefox 2.0.0	Windows XP	1280x1024	11	6
85.50.149.30	Firefox 2.0.0	Windows XP	1280x1024	23	6
88.17.248.237	Firefox 2.0.0	Windows XP	1280x1024	17	5
83.44.66.229	Firefox 2.0.0	Windows XP	1280x1024	15	4
193.145.49.202	Firefox 2.0.0	Windows XP	1280x1024	12	3
88.12.185.195	Firefox 2.0.0	Windows XP	1280x1024	15	3
83.55.96.162	Firefox 2.0.0	Windows XP	1280x1024	16	3
83.44.68.10	Firefox 2.0.0	Windows XP	1280x1024	18	2

**Figure 16 Data on IP addresses used to access the system**

### 2.1.3 Evaluation results

In total, 12 students participated fully in the pilot and one teacher was moderating their learning processes. Using the pre-tests questionnaires collected at the beginning of the preliminary pilot, we can offer the following information regarding the participant characteristics. All the participants in the experience were men of an average age of 29.17 years. The youngest participant was 24 years old and the oldest participant was 33 years old. Most of them came from Spain but there were a participant from Argentina and another from Portugal. In general the participants were highly educated and had high technical skills. All had good or medium-quality computers and Internet connections at home. Their professions range from 3D graphics operators to audiovisual or multimedia designers (some of them working as freelancers).

Two system technicians maintained and serviced the system deployed and helped students with technical issues. The evaluation results are based upon their participation, experience, and feedback, and are addressed by starting with the identification of factors that influence academic interaction. Four main factors were considered to influence interaction among students, and between them and the teacher: the teacher's role as mediator and the role of socially outgoing learners, the influence of academic resources, and the system's affordances.

#### Teacher's role and its influence

The pilot's academic resources were designed for autonomous use or self-tutoring rather than as support information to the teacher's explanations. The teacher was present to clarify any aspect of the resources in case the need arise and to support the learners to finish units of learning and progress on their learning path. We have conducted a prolonged discussion with the teacher in a meeting room where the contributions (postings in forum and blog, exercises, assessment quizzes...) of the learners were printed and sorted by each individual. The objectives of the talk were to receive the feedback of the teacher on the progress of the learners, and to evaluate the whole experience. The following eleven points summarise the findings of the discussion:

- *Learners have shown good levels of autonomy throughout the course*
- *Learners always appreciate the teacher's attention.*
- *Posing questions was a constant phenomenon since the start of the course.*
- *Almost half of the forum discussions incorporate more than one student*
- *Very few questions were repeated (18%)*
- *Questions were divergent in their subjects, sometimes beyond the course's scope*
- *In total, 28 issues were treated on the forum and 21 by email*
- *Questions by email were generally received at the early beginning of the course*
- *Some students used the email later to ask questions*
- *Sometimes it was demanding to communicate help instructions to the students*
- *Compiling help instructions in digital format is a potential overhead*
- *Synchronous communication services like chat can be useful*

The teacher played a decisive role in the success of the learning experience by frequently providing guidance and advice. The learners dealt with the teacher as a central authority. This behaviour was magnified by the repetitive assessment activities and exercises, all of which were addressed to the teacher. The teacher's role in the learning community can contribute heavily in sustaining learner activity and moderating among learners. Whereas learners had the freedom of personalizing their learning experience, they all synchronized their progress in the course to a certain extent. This

shows that the presence of the teacher and its central role create order in the learning network.

### The impact of socially outgoing learners

In order to study the role of socially outgoing people, the actions of the informer and their consequences were analysed. From the discussions that started in the blog and forum, those that involved the informer were identified and isolated. The informer's individual posts were also collected. This whole set of information was analysed and the findings are summarised below:

- The informer was the second most active learner on the system (by number of posts)
- Replies to the informer's post were not exceptional (26% of posts got replies)
- Teacher had an active relation with the informer
- Three learners had visibly more difficulties than others in operating the system
- The informer discussed the matter with these learners and provided help
- Problems discussed were about operating brainstorm interface and posting exercises.

The informer also was the first to use several services provided by the pilot's system, in particular: posting password-protected answers to exercises for the teacher's attention, discussing learning resources on the blog specialized sections, and showing the units of learning that he completed in his profile. Of these three actions, the first two were later used by all students, while three other students showed their progress in their profiles, imitating the informer's action. The interaction between these three and the informer was not exceptionally larger than others.

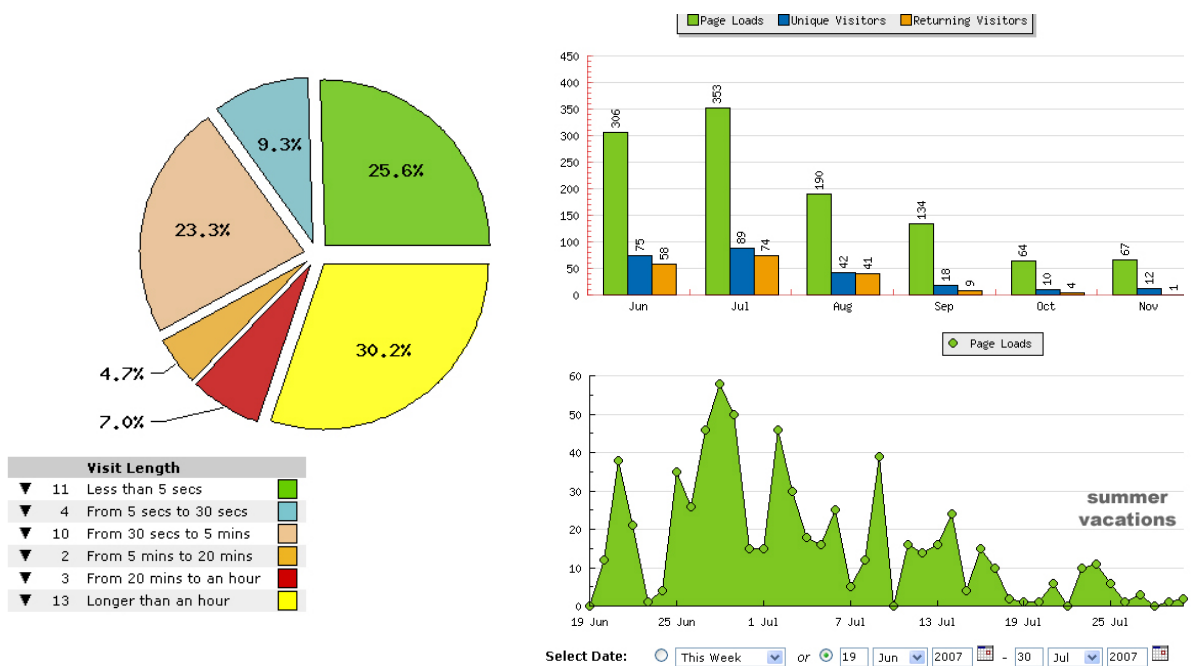


Figure 17 Overall activity in the system

Socially outgoing learners can have a positive effect on their learning networks by helping peers to progress on their learning paths and forge social relations upon which the exchange or transfer of knowledge can take place. In order to empower these learners, it's essential to provide the right environment with the favourable protocols for social interaction around learning. Communal blogs can be exploited in this sense since

they facilitate contact between learners by capturing their presence in the learning network via their posted profiles and contacts. The blogs' online publishing platform also provides an interaction space visible to the learners' community.

### The academic resources' stimulation

The progress of the learners was evaluated with the teacher by discussing the posts and emails sent by the learners and contrasting them to their progress in SLeD. This discussion happened at the end of August 2007 while most learners were finishing the course. In general, it took learners less than three months to finish the course. For each of the 12 learners, the time spent on the server was followed and aggregated by saving each visit made with its date and duration. This information reveals that the learners have similar activity levels, although some a bit more active than others. The following figure shows the evolution of visits per IP as it was aggregated during the first 2 months, black lines being holidays and the red line being a deadline for the first assessment assignment.

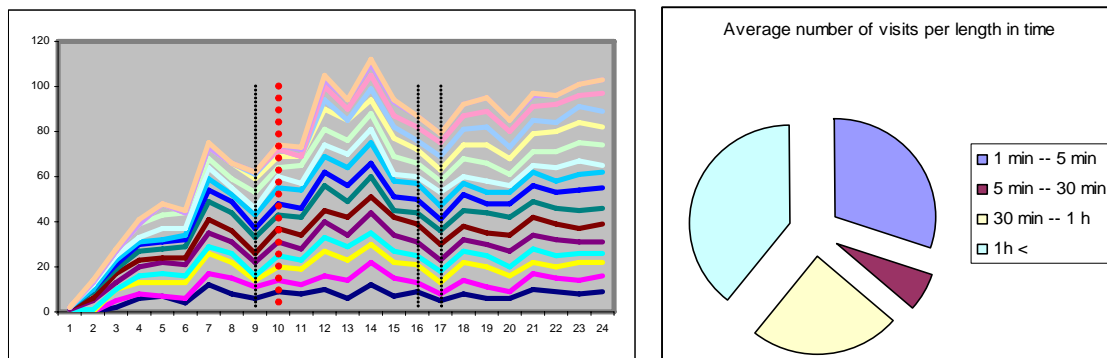


Figure 18 Evolution of number of visits made to the system

The activity of the learners was averaged and revealed that a learner visits the system 33 times on average each month. About 40% of these visits are longer than an hour and 30% of them take less than a minute. Hence, the effort dedicated to assume the materials ranges from 20-30 hours per month or around 6 hours weekly as measured. This is not far from the original estimate for the total required effort at 100 hours. The results of the assessment activities show that the videos and brochures developed were adequate in offering the required knowledge as the latter was reflected in the learners' answers. It's noticeable in the logs that learners sometimes went back to download or open certain resources around the time that they were taking assessment activities.

The academic resources published in SLeD do not contain any group-based activity and can therefore be followed by a single learner entirely without interacting with others. Thus any interaction between learners over the resources is socially innate. The resources can trigger interaction whenever two or more learners identify similar or related interests while interacting with the resources. In fact, all conversations on the blog were about the academic resources, including exercises and teacher's assignments. Learners also sought help from the teacher whenever they found difficult tasks or unclear information, although the teacher did not participate in the conversations on the blog. The learners postings on the forum were frequent at the beginning of the course

because of technical issues that the learners were facing due to their unfamiliarity with the system. Technical issues were never discussed on the blog while academic issues were addressed on both sites.

Hence we compared the discussions started on the forum with those started on the blog in order to examine the learners' reliance on communication between themselves and compare it with their communication with the teacher. In general, the activity in the forum started high and sharply declined later in comparison with the activity on the blog that grew to be come constant before declining at the end of the course. However if the activity related to academic issues was isolated, we can observe that it effectuates parallel trends with different magnitudes on both site. This activity grows logarithmically on average although it has a higher ceiling on the blog.

Overall, the penetrability of academic resources has undoubtedly met the expectation of the development team. The curriculum design of the course as well as the assessment methodology was also positively evaluated. The success of the educational approach derived for the pilot rests upon the diversification in the types of media used to capture knowledge, as well as in the assessment activities designed to evaluate the learner's progress. The high segmentation of materials into units of learning and the latter into learning actions enhanced the ability of learners to design their own learning paths and progress constantly and tangibly upon every completed learning action.

### The system's affordances

According to the technical team responsible for the pilot's infrastructure the server's performance was excellent. During the running period of three and a half months, the server was offline twice for maintenance. The data backup system developed for the pilot was never used, and the repetitive downloads of large videos did not overload the server as it was previously feared. Client-side installations of Brainstorm 3D Studio Max was qualified as complicated and a barrier to the usage of academic resources on in the pilot. Choosing the correct version compatible with each learner platform was prone to errors by the learners that sometimes downloaded inadequate versions, or had to download more than one if working from different machines/locations.

The system's composition of three separate sites creates three different interaction contexts that were dedicated to formal communication with teacher, informal interaction among learners, and pursuit of learning resources. To check the extent to which the learners have segregated between these contexts, we have searched for activities in each site unrelated to its own context. Since SLeD does not host any contribution from learners this task was restricted to the forum and the blog. Of the 28 discussions on the forum, 7 contain exchanges of messages between learners which conceptually should develop on the blog. The blog on the other hand has only 3 messages directed to the teacher out of the 38 posted.

Table 5 Distribution of discussions started on forum and blog

	<i>Social</i>	<i>Technical</i>	<i>Academic</i>	<i>Total</i>
Forum	7	13	8	28
Blog	13	3	22	38

### 2.1.4 Discussion

The teacher's mission can potentially become overwhelmed in large learning networks when the number of learners to attend to challenges the teacher's capacity. The teacher's role as available support for an autonomous learning process can only serve restricted numbers of learners at a time. Alternatives such as adopting peer to peer learning and installing a hierarchy of rights that group learners according to their competence profile can be considered in the future (Rosmalen et al., 2007). In the absence of a centralized authority like the teacher's profile, the decision making process and the assessment activities have to be regulated in a distributed or cooperative manner. The mechanisms for supporting this change are founded on scientific experience built upon research in online societies that resemble learning networks to a certain extent. It is essential to study the characteristics of learning networks and compare them to online societies in order to determine if the solutions devised for online societies are applicable in learning networks. To the extent of our knowledge, such issue is still opened for research.

The experience gathered with the informer role playing shows that individual learners have the capacity to influence their learning networks easily. This led to discuss the possibility of using agents in learning networks for help and support. These agents may assume learner profiles and detect automatically peer learners in difficulties in order to help them. They may also respond to their peers when they are contacted by them. Future research can concentrate on developing prediction models for learners' reactions to certain actions when these are preformed by agents. This can help develop responsive agents that understand the properties of the learning networks where they are deployed. Whether the agent should be fully camouflaged as a learner or reveal its true identity is a matter of discussion. Concerns are raised on the effects that camouflaging the agents can have on the credibility of the learning environment.

The system developed for this pilot is genuine to a certain extent although its components are known and have been used before in a learning context. Loosely integrating blogs, forums, and SLeD can be positioned between the bulk of standalone web applications and composite learning environments such as Moodle. The loose integration of learning-related web applications is inspired by the usage of Web 2.0 services. With the rise of Web 2.0 services and their diversification, it became possible to simultaneously use several services for the same goal, like integrating YouTube videos, del.icio.us bookmarks, and Google maps into a topic oriented blog. This is facilitated by maintaining user accounts in a collection of Web 2.0 services that follow the same protocols in providing information. Research on the potential role of Web 2.0 services in learning contexts has already been explored by several scholars, including (Anderson, 2007). However, their integration into learning environments is still an open problem.

## 2.2 Preliminary ICT pilot

This preliminary pilot is used for some initial testing in real settings of the PCM system, as well as for identifying the real problems that can occur in the actual pilot training. Another goal is to test the learning resources available and to see what form of these resources is most suitable for the real pilot.



### 2.2.1 Launching of ICT pilot

- **Pilot name:** ICT Teacher Training pilot V1 (I\*Teach methodology)
- **Short description** The pilots focuses on learning how to implement the I\*Teach methodology.
- **Starting date of execution:** 25- June 2007
- **Ending date of execution:** 31- July 2007
- **End date of analysis & reporting:** 31-August 2007

### Target group and workload

The target group of the pilot is composed of educational experts, teachers and university lecturers. The targeted audience is mainly from University of Sofia and schools from Sofia, Bulgaria. The total workload generated by the pilot's course is considered to be close to 80 hours of activities, including assessment.

### Implementation and launching process

*(December 2006 → June 2007)* development of learning materials

*(8 July)* Internal preparatory workshop for pilot launching, a half day event in University of Sofia

*(15 July)* pilot launching

### Description of the implemented system

For working on and learning how to implement I\*Teach methodology, we decide to concentrate on PCM and mainly to use its basic features for community development and implementation, group formation and discussions, competence descriptions, creation of competence development program, (personal) competence plan (development program) implementation. The main problem in the implementation of the pilot is related to the missing functionality for resource storing, sharing and exchange (at this stage of the PCM development). We were able only to put a URL, so we decided to use the system and servers already developed for the Digital Cinema preliminary pilot for the implementation of the main learning resources, i.e., Units of Learning.

Therefore, we used almost the same SLeD servers as these used for the preliminary Digital Cinema pilot, without the Blog, with instances installed at the University of Sofia. We used a Moodle site (<http://e-learning.fmi.uni-sofia.bg/Moodle/course/view.php?id=92>) for the general messages and file exchange, and the lesson player (<http://62.44.100.243:8080/SLeD3/>) for playing Units of Learning. This approach is shown in Figure 19 and figure 20.



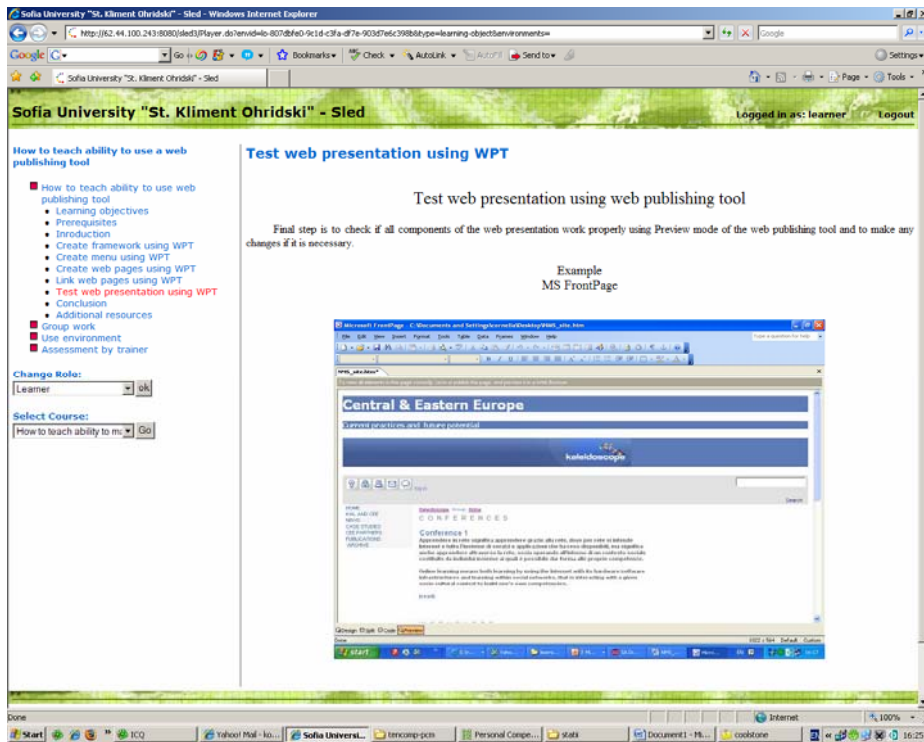


Figure 19 Screenshot (I), use of SLeD server for running Units of Learning in the ICT preliminary pilot

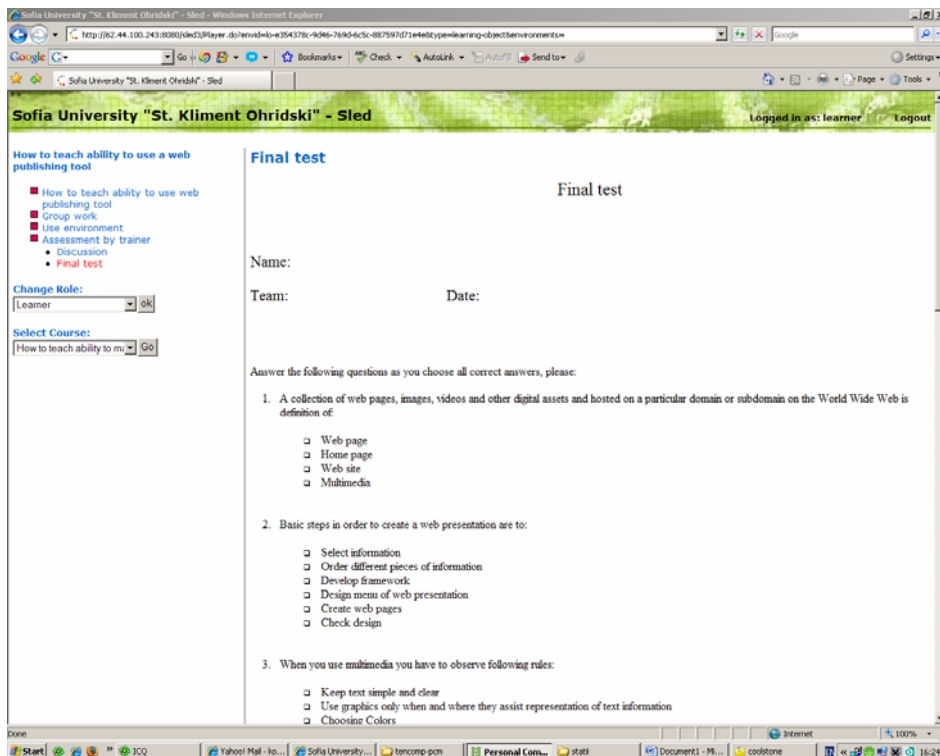


Figure 20 Screenshot (II), use of SLeD server for running Units of Learning in the ICT preliminary pilot

## 2.2.2 Evaluation implementation plan

Informal description of the pilot scenario:

1. Starting face-to-face workshop, 15<sup>th</sup> of July, 09:00 CET  
 This workshop is used in order to introduce all learners with both the PCM and the I\*Teach methodology. The workshop scenario (planned for about four hours):
  - Each learner introduce her/himself, and answers what are the three best competences s/he possess, how acquire these competences, and what additional three competences s/he is willing to achieve.
  - Depending on the learner's answers, we form groups from 2 to 4 participants, each group linked with one particular competence, being sure that in each group we have at least one willing to achieve it, and one regarding herself as an expert.
  - Short PCM introduction and each group has to solve the first task: find/create a community, linked with the desired competence; describe the competence; find/create list of useful resources; find/create simple Competence Development Plan for the desired competence.
  - Each group presents its own solution for the first task and all participants are discussing all the important issues linked with the competences, Competence Development Plans and resources needed for training.
  - After this discussion the I\*Teach methodology is shortly described and presented, its main competences shown. For all the competences and skills related to the I\*Teach methodology, the needed learning resources will be made available through the SLED server for the self-learning are, and linked (the corresponding URL from the SLED server being put as a resource URL related to the skill/competence in PCM).
  - All learners receive their main task, which they have to accomplish during next two weeks. The task is related to their first task – each group have to provide as complete as possible the competence development program(s) related to their chosen competence, based on the use of I\*Teach methodology, and to develop all the needed learning resources (again following the I\*Teach training methodology). For solving this task they have to create all the needed communities, to work together and to communicate using communities and forum.

At the end of the workshop, each participant fills the planned questionnaires, intended to be used for measuring of the pilot success (both the relevance of PCM, as well as how well I\*Teach methodology is actually learned). We are interested in the learner's self evaluation about her or his knowledge regarding all the competences related to I\*Teach methodology, and also in the use of expert evaluation based on the group discussions during the workshop.
2. Individual group work on solving the given tasks, 16<sup>th</sup> – 28<sup>th</sup> of July  
 During this period all learners work individually with the system(s), but solving cooperatively the group tasks to which they are assigned. They use PCM in general for developing all the needed competence development programs. Moreover, they use SLED for having additional information / refining available information for better understanding of specific I\*Teach methodology details. They also use Moodle for the functions missing in both SLED and PCM – (1) for instance messaging; (2)

for group storing space where the group will jointly develop learning resources needed for their competence development program. They need to make a link in PCM putting there for each one competence/skill the learning resources URL (from Moodle) needed for training the corresponding competence/skill.

At the end each group needs to have fully developed Competence Development Program(s) for the competence chosen, together with all needed learning resources (developed following I\*Teach methodology, and put in the Moodle group space, which URL has to be put in the corresponding place in PCM).

3. Final face-to-face workshop, 31<sup>th</sup> of July, 09:00 CET  
This workshop is planned in order to finalize the pilot. All groups represented their final product (CDP). For each product (CDP) there was a group discussion, as well as expert evaluation. We asked again each learner to self-evaluate her/his progress as well as to evaluate the training method.  
Concerning the PCM evaluation, we used the questionnaires prepared and recommended by WP4 evaluation experts.

### 2.2.3 Discussion of the preliminary evaluation results

The main goals of the preliminary ICT teacher training pilot are:

- to test the current version of the PCM,
- to experiment with using PCM as the main training approach chosen for the teacher training

A total number of 30 participants filled the prepared pre-test and post-test questionnaires, and presented their final project at the final workshop. We analysed the filled questionnaires and the final projects submitted, and can make the following conclusions:

- participants in the pre-pilot were well divided according to their ages, sex, education and profession;
- most of them have not heard anything about the I\*Teach methodology;
- most of them declare that they like this training approach, and the idea about PCM at large;
- most of them declared specific user interface problems with using PCM, as well as make proposals for its improvement. All these issues were given to WP3 team and further discussed during the workshop in Sofia, and will be taken into account for the next release of the PCM;
- most of the trainees succeed with the final project and proved the usability of the training approach, and the successful use of the PCM for this specific training;

Overall, the pre-pilot was very useful. It helped to prepare better for the real pilot, to train our trainers for the pilot, as well as to make clear the main difficulties and flaws of the PCM in order to improve it for the ICT cycle 1 pilot.

### 3. Launching and evaluating Cycle 1 pilots

This section includes the model and methodology for the evaluation of the pilots as well as the current stage and evaluation results of cycle 1 pilots.

#### 3.1 A model for pilot evaluation

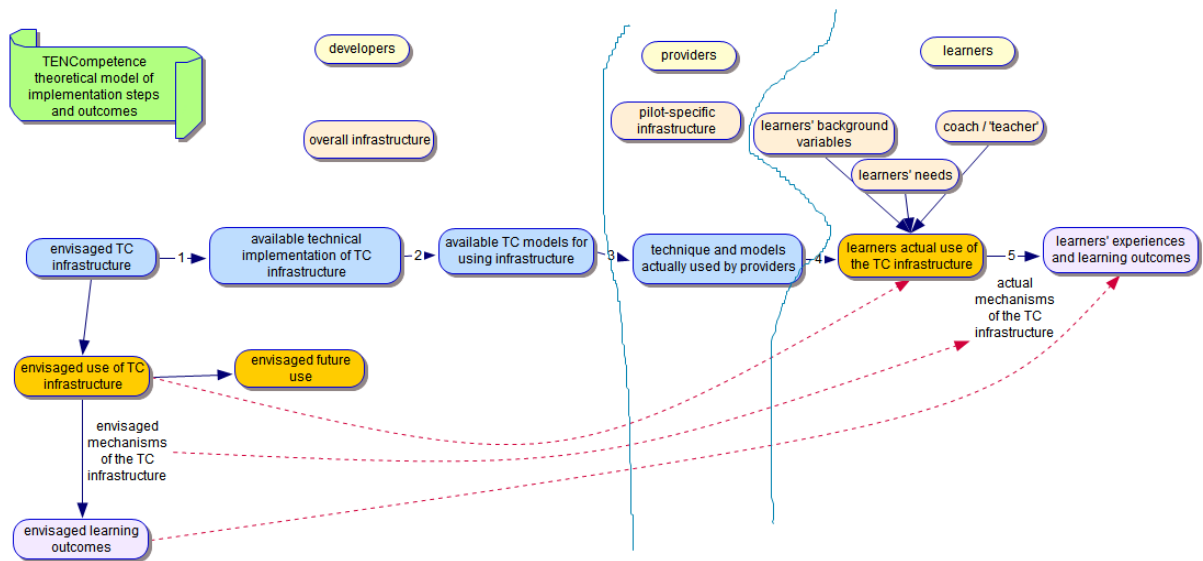


Figure 21 The pilot evaluation model, showing the steps between envisaged infrastructure and ultimate outcomes

The pilot evaluation is a multi-level evaluation (Schoonenboom et al, 2007). Basically, outcomes and experiences of learners in different pilots will be evaluated, thus we expect characteristics of both individual pilots and individual learners to be of influence. Figure 21 presents our model of the pilot evaluation. It is a representation of all variables and processes that are relevant within one specific pilot. The most basic question that the pilot evaluation will answer for each pilot is: to what extent do the actual learners' experiences and learning outcomes match the envisaged learning outcomes? In Figure 21, this question is visualized by the dashed line between the envisaged learning outcomes (entirely to the left) and the learners' experiences (entirely to the right).

The underlying hypothesis is that through their interaction with the TC infrastructure, learners achieve specific outcomes. This interaction may consist of interaction with the learning materials that are available at the network structure; another as important type of interaction is interaction between learners via the network structure. Both are considered to contribute to the learners' outcomes. This hypothesis is visualised as the envisaged mechanisms of the TC infrastructure between envisaged use of TC infrastructure and the envisaged learning outcomes (entirely to the left). **Figure 21** expresses that there are three main reasons why there may be differences between the envisaged outcomes and the actual outcomes:

- (1) differences that occur during the process of implementation
- (2) learners' variables systematically influence the outcomes
- (3) the hypothesis itself is not correct

**Ad 1.** In the process of implementation, elements of the envisaged infrastructure get lost. In research terms, the steps in the implementation process represent a hierarchy of variables that influence the outcomes (Costner, 1989). For example, if the idea is that users can follow their own learning path, but the available technology does not allow this, then the influence of this element on learner outcomes cannot be tested, and the effect of this element cannot be measured.

**Ad 2.** According to the hypothesis, we will measure the influence from the learners' actual interaction with the infrastructure on the learners' outcomes. The outcomes, however, will also be affected by variables that are not related to the TC infrastructure. Most probably, learners' variables, including background and needs, will have an effect, and this effect may interfere with the effect of the infrastructure. For example, part of the hypothesis states that determining one's own learning path will lead to better outcomes. However, this may be true for more experienced learners, but not for novice learners. Thus, we expect an interaction between the variables of the pedagogical model and the learner variables. Note that in the learners section of the model, there is a variable called 'coach / teacher'. It is very likely that in those pilots in which learners have individual coaches, the coach will be of influence on learners' outcomes. In the pilot evaluation we will measure whether there is a coach effect, but not the nature of the effect.

**Ad 3.** Finally, it is possible that the hypothesis is incorrect. For example, it may turn out that learner outcomes do not benefit from the opportunity to choose one's own learning path.

Thus, the model presents what will be tested and measured in the evaluation. It shows both the hypothesis and all variables involved in the evaluation: the *hypothesis* is that learners' experiences and outcomes are affected by their interaction with the TC technical infrastructure and policies and models; the *dependent* variable is the learners' experiences and outcomes; the *independent* variable is the TC technical infrastructure and policies and models in its various stages of implementation; the *alternative hypothesis* is that learners' outcomes are systematically affected by alternative independent variables (the learners' variables).

### 3.2 Model components

This section describes six characteristics of the model in more detail and links these to the literature. Firstly, the model is a form of implementation evaluation (Patton, 1997), in which the chain of steps between vision and implementation is described (King, Morris, & Fitz-Gibbon, 1987; Williams & Elmore, 1976). The following chain is set up: in step one, the envisioned infrastructure is materialized in a technical implementation of the infrastructure, consisting of various pieces of software with different functionalities. In step two, models for lifelong competence development are provided that make clear how the infrastructure can be applied for lifelong competence development. These two steps reside with the developers of the TENCompetence infrastructure. In step 3, providers of competence development programs in the pilots, make a selection out of the available technology and models that fit the needs of their

intended audience. In step 4, learners actually use the materials, models and tools that are made available to them by the pilot providers. Finally, in step 5, out of their use, learners get their experiences and produce specific learning outcomes.

A second characteristic of the model is that it focuses on discrepancies between the ideals and the actual outcomes that result from the implementation process (Provus, 1971). For example, according to the TENCompetence pedagogy for lifelong competence development, learners should be enabled to select their own competence development program. This implies that the route, along which learners reach specific learning objectives, may well be different for different learners. In the technical infrastructure of step 1, this possibility of choosing one's own competence development program has been implemented. However, in step 3, it is conceivable that a provider offers 'one size fits all' competence development programs, which does not allow learners any freedom. In that case there is a discrepancy between the available infrastructure in step 2, and the infrastructure offered by providers in step 3. Discrepancies may arise at other places, for example between the infrastructure offered by providers in step 3, and the use that learners in step 4 make of this infrastructure. If the providers enable sharing of resources between learners, but learners do not use that functionality, then there is a discrepancy between these two stages.

Also, and thirdly, the model focuses on differences. In fact, the discrepancies mentioned above are a special type of differences. They are differences that result from concepts in a specific step not being implemented in the next steps. But there are also more general differences between pilot sites. For example, the model includes differences between learners. Learners may differ in their background and learning needs. And when compared on the content levels, the resources used in separate pilots can be very different. More generally, all variables that are expected to influence the outcomes, are included in the model, rather than 'controlled' by randomization (Chen & Rossi, 1987; Costner, 1989).

Fourthly, the model focuses on outcomes, rather than services delivered. The learning outcomes are explicitly included in the evaluation (Patton, 1997). These learning outcomes included both intended outcomes, as formulated in the hypothesis, and unintended outcomes. Nevertheless the outcomes can be considered on the background of usage data and post-hoc split analysis can help to develop hypotheses about the influence of other variables on the outcome.

Fifth, the model includes the needs of the learners (Scriven, 1993). In the model, learner needs are included as a property of the learner. In the evaluation, they have two functions: firstly, differences in learner needs between learners and between the pilots are measured and are considered to be part of the relevant differences in pilot implementation, which may account for differences in outcomes. Secondly, learner needs are used in measuring the outcomes. Part of the outcomes includes the extent to which the learning experience using the infrastructure meets the learner's needs.

Finally, the model focuses on the program theory and on testing the theory. The envisaged use of the infrastructure and the envisaged outcomes are part of the model (entirely to the left). Also included are the envisaged mechanisms that relate the use of the infrastructure to the outcomes. This is called the program theory, and the corresponding evaluation is called theory-driven evaluation (Chen & Rossi, 1987; Patton, 1997). These are the ideas of its inventors on how they think the TENCompetence infrastructure works. Part of this theory are arguments such as 'if learners can determine their own learning path, the units of learning chosen will better



match their need and if chosen units of learning better match their needs, learners will learn more' or 'if prior learning is assessed, then units of learning can be chosen that better match the learners proficiency level; if chosen units of learning better match the learners' proficiency level, learners will learn more'.

The outcomes, mentioned under point four, play a central role in testing the theory. An important part of the evaluation is testing whether the program theory holds in the pilots. If, for example, at a particular pilot site, learners cannot choose their own learning path, but yet do not learn less than learners who can choose their own learning path, then obviously, there is a problem with the program theory of the last paragraph.

### 3.3 Research question

Our main research question is:

For whom does the TENCompetence infrastructure work in a variety of circumstances?

Our operative definition of the concepts in this research question is as follows.

- By the *TENCompetence infrastructure* we mean the infrastructure as envisaged by the project development team, available in the software, implemented in a specific pilot and used by the learners. It is only the latter two that will 'work' in a strict sense: the implementation in a specific pilot will affect the use that learners make of specific functionalities and the use that learners make will affect the various outcomes described under 'work'.
- By *work* we mean several types of outcomes, namely that learners use functionalities; that they appreciate functionalities; that the use of the TENCompetence infrastructure satisfies learner needs; and that it leads to better competence development;
- By *whom* we mean several groups of people, namely people of different age, sex, educational level, country, profession, years of work experience, distance learning experience, learning style.
- By a *variety of circumstances* we mean the circumstances in the different pilots, and also circumstances that may differ for individual learners, namely amount of time spent, equipment at home/work, and involvement of employer.

Among the many potential variables that could have been chosen under *whom* and *circumstances*, those variables were included that might influence further design or lead to guidelines for use. We do not have the intention to measure every variable that we suppose has a substantial influence on the outcomes. For example, self-efficacy will definitely influence that amount of competence development. However, it is hard to think of measures that will lead to adaptations of the TENCompetence infrastructure for less self-efficacious people.

To further specify this research question, we set up a number of hypotheses. Hypotheses in the pilot evaluation are related to three aspects of the PCM:

- Functionalities
- Effects
- Learning outcomes



The term “*Functionalities*” refers to the use of functionalities in the learning environment.

*Effect* refers to experiences that are the result of using the functionalities, such as discussion, sharing of resources, competence management etcetera.

*Learning outcomes* refers to the ultimate aim that the use of the functionalities aims at: competence development.

## **FUNCTIONALITIES**

### **Rating**

1. in PCM rating will be more important, as this will help people find the learning elements they need for their competence development

### **Forum**

2. the PCM group will show more active use of the forum, where people connect to people, and help each other find their way.
3. PCM will lead to more posting and reading of messages
4. PCM will lead to better appreciation of forum

### **Creation of resources**

5. in PCM it will be easier for participants to create the Competence Development Plan for their students

## **EFFECTS**

### **Awareness**

6. In the PCM it will be easier for participants to become aware of the competences involved, to identify their starting point,

### **More, better exchange and pro-active sharing**

7. in the PCM group, there will be more discussion on the competences that people have to master.
8. PCM will lead to more sharing of resources
9. PCM will lead to more help seeking and providing
10. PCM will lead to more and better discussion
11. PCM will lead to more exchange of data and files

**Better, more decentralized, self-organized and empowered competence management:**

12. PCM will lead to a more control over learning

**LEARNING OUTCOMES****Quality of competence development**

13. Use of PCM will lead to better competence development
14. Use of PCM affects the type of competences that are acquired

**Appreciation of competence development**

15. Use of PCM is more enjoyable
16. Use of PCM stimulates further competence development
17. With PCM, people appreciate the learning route better
18. With PCM, people appreciate the learning resources more

**Better match their learning needs:**

19. The support that PCM offers (learning resources + possibility for choosing own path) is most appreciated

**OTHER VARIABLES**

20. Is there a difference in these outcomes between learners of different age, sex, country, educational level, profession, years of work experience, current proficiency level, distance learning experience, experience with the tools used, learning style, equipment at home / work, learner motivation, or involvement of employer
21. To what extent can outcomes be explained by elements of the treatment other than the TENCompetence infrastructure, namely the tutor, the number of hours spend on the course, and/or technical problems?

The hypotheses are presented in Figure 22 and Figure 23.

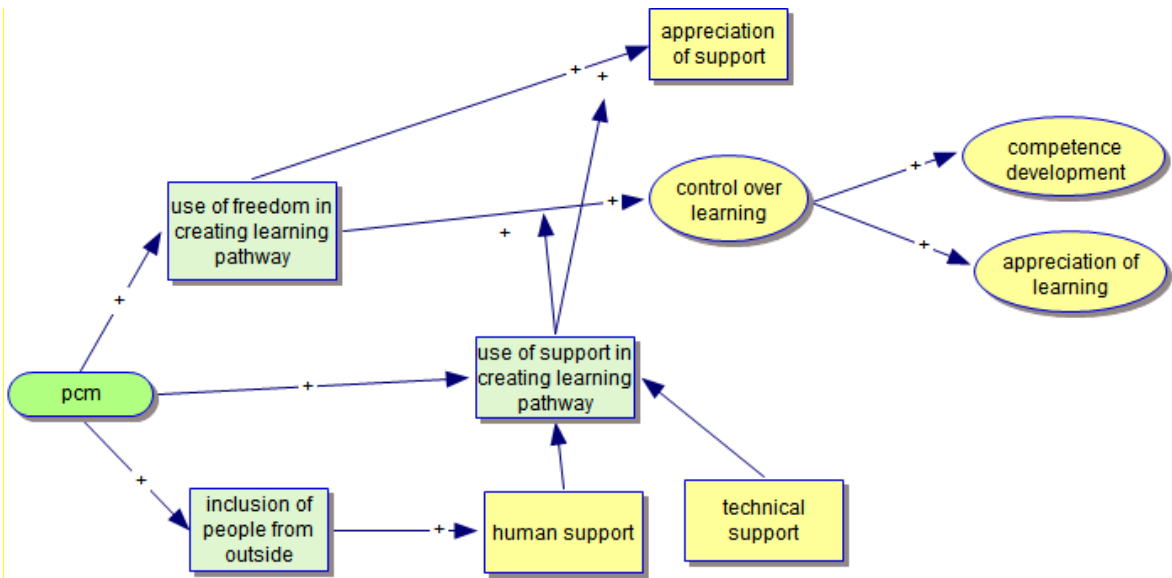


Figure 22 Hypothesis tested in the pilots (I)

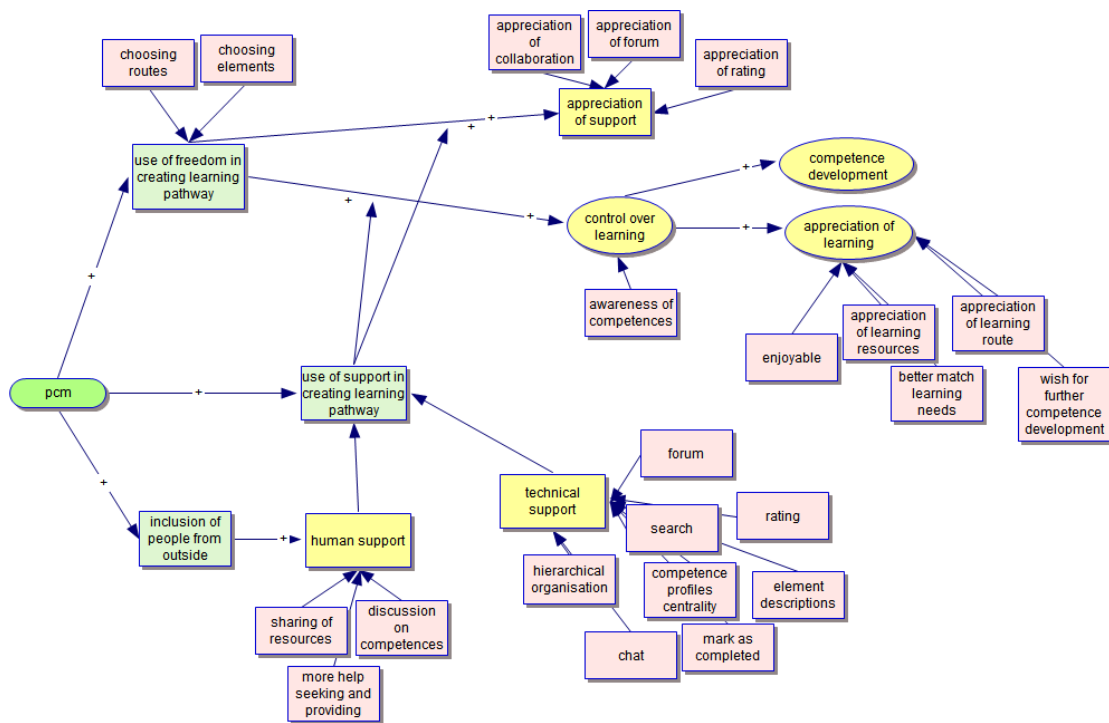


Figure 23 Hypothesis tested in the pilots (II)

### **3.4 Data collection and analysis in general**

Our general analytic strategy for data analysis consists of three activities:

1. description
2. hypothesis testing
3. cross-case synthesis

We will provide descriptions of the use of the TENCompetence infrastructure. Besides that, a few specific hypotheses will be tested. Depending upon the exact outcomes of the pilots, the exact methods for cross-case synthesis will be determined at a later stage.

### **3.5 Data collection methods: descriptions for each research question**

This section describes in more detail which data collection methods are used. The hypotheses are investigated in an experimental design within each pilot, in which the learners who use the TENCompetence infrastructure are compared to learners who do not use the TENCompetence infrastructure, or use it in a restricted way.

TENCompetence offers an infrastructure which, as far as the learner's freedom is concerned, occupies a position halfway in between traditional education with its rigid learning paths and on the other hand communities such as Flickr and YouTube, which provide access to many resources, but do not provide a learning path. Thus, two comparisons are of interest when trying to investigate whether the TENCompetence infrastructure works better than alternative treatments:

- Does the freedom of choice plus the tools to handle that freedom which the TENCompetence infrastructure provides lead to better outcomes than the rigid structures provided by traditional education?
- To what extent are the tools that the TENCompetence infrastructure provides helpful in managing the freedom once learners can choose their own learning path and resources?

The conditions under investigation can be labeled: (1) freedom without support, (2) freedom with support and (3) no freedom. Condition (2) represents the use of the TENCompetence infrastructure. We predict that condition (2) will lead to better results.

To answer these questions, two types of experiments are carried out, with two different control groups:

- one experiment in which one group, using rating, creation of CDPs, the forums attached to specific elements, the embedding of components and the possibility for marking competences as complete within the PCM is compared to another group which has exactly the same resources and assignment for competence development, but without these structuring elements, e.g. one list of URLs + one general forum in Moodle. Both groups have the freedom to create and follow their own learning path, but the end result they are striving for should be the same. This experiment would serve to show that the structuring elements of the PCM are indeed useful.
- one experiment in which one group, having the flexibility in the PCM to follow the parts of an existing CDP in the order they like, to make a selection of the resources

they think are useful and to create their own Competence Development Plan, is compared to another group in which all students have to follow the same path and use the same resources, perhaps also in a tighter schedule. This rigid plan could also be implemented in e.g. Moodle. This experiment would serve to show that learners benefit from having the freedom plus the support for dealing with this freedom which the PCM provides.

As a general rule, participants are randomly assigned to conditions.

## Measures

Participants were given a pre-test and post-test questionnaire. Both are listed in Appendix 1. During the experimentation phase furthermore detailed Log data has been recorded and will allow the post-hoc splits and collection of usage data. Appendix 2 indicates how each hypothesis relates to the questions of these questionnaires.

Furthermore a server log analysis will be conducted in order to compensate the gap between self-recognition and the actual usage of the system. By the time of writing this report the pilots have not finished so the comparatively aggregation of the questionnaires and the log-files has not been completed yet. However, several questions with regard to the log file analysis of different systems and its potential are discussed and analysed next.

## What are log files?

Log files are transcripts of the activity of a server system. For web based systems, the server system is the web server including all components that made available through it. These components can be CGI scripts (e.g. written in PHP) or web services that make more extensive use the server's internal functions.

For web applications two different types of log files are used. The first type of log files is the so called error log or message log. These logs provide insights on the internal activities of the system. Message logs depend on what is reported from the different components of the system. Basically, message logs allow components to report their internal activities in a free form format that depends mostly on the interests and needs of the programmer of a server component. This implies that available data of a component depends on what a component writes to the log. Moreover, the data found in the message logs can be in a completely unstructured format. This makes message logs suitable for debugging components of a system.

The second type of log files is the access log. Access logs are used by web servers to report any request that had been made to the system. These log files provide data about the external activities of a system. For web servers these logs contain data about the requests issued by web browsers or similar systems to a web server. The data that is stored in the access logs is mostly independent from the component that actually served a request. More importantly, the data stored in access logs is clearly structured and well defined. For web systems there exists a limited set of standardised structures for access logs<sup>1</sup>. These structures commonly include the source of the request (the host name or IP address of the machine on which the web browser runs), the type of request, the requested URL, the user name of authenticated users, and the success state of a request.

---

<sup>1</sup> <http://httpd.apache.org/docs/2.2/logs.html>

Such standardised structures make the access logs most suitable for statistical analysis of the actual usage of a system.

Unfortunately, some information in the access logs depends on the components that handle the particular request. This is particularly the case with user information. Particularly, PHP script frameworks make no or little use of the mechanisms for reporting authenticated users that are provided by the server system. I.e. the user information of authenticated users is not stored in the access logs, although users authenticate with these systems. Interestingly, some of these frameworks replicate the server system's logging facilities. An example for such a replication is the internal access log of the Moodle system. If such a component specific access logs is available, it can be (partially) converted into the standardised log formats as they contain basically the same information as the server system's access logs.

*Note: The following subsections explain in detail the use of log file analysis to evaluate the TENCompetence pilot. Although this information is too detailed for the purpose of the analysis, it is provided in this report for the readers who are interested in a complete description of the use of this approach in this context.*

### **Pre-considerations for the TENCompetence pilot's log file analysis**

The server components of the TENCompetence infrastructure and the control group's system are running within an Apache web server environment. This means in principal that both systems can use the same logging formats for the access logs. For the control group's system the Moodle framework is used, which does not support the server system's logging facilities, properly. Moreover, the Moodle framework's internal access logs don't have the same data density as the access logs stored by the underlying Apache web server. Therefore, some data loss is implied in using Moodle's internal access logs. The server components of the TENCompetence infrastructure utilize the underlying logging mechanisms instead of replicating the access logs internally. This allows scaling the logged request information by using the underlying server configuration.

These differences in logging the interactions with the system imply that the log file analysis is constrained by the control group's systems, because the data provided by Moodle cannot be scaled up easily.

In addition to the information that is available in the access logs, the log file analysis has to consider the architectural differences of the two systems. In order to compare the usage of the TENCompetence infrastructure with the control environment, all requests that are specific to the architecture of the system has to get cleaned from the log files. This process is called normalisation.

### **Data extraction of the log files**

The log file analysis can be separated in three phases. The first phase is log file cleaning, the second phase is log file normalisation, and the third phase is the actual analysis of the log files. The cleaning of the log files is necessary for removing so called "noise data" from the log files. This "noise" occurs in the log files because of requests that have been made from outside of the context of the pilot project. Such requests can be initiated from search engines, or users who use the system, but do not participate in the study itself. The normalisation of the log files is required because in case of the

TENCompetence pilots the use of two different systems with very different request patterns has to get compared. The normalisation aims at the harmonisation of the log files of the two systems. Without this step the different log files will lead to incomparable results. After cleaning and normalising the actual analysis of the log files can be conducted.

Because the first two phases of the log file analysis include data reduction activities, data loss is unavoidable. Whereas the cleaning has no impact on the quality of the data that is directly related to the pilot project, normalising the log files across system architectures will certainly reduce the data that is available for analysis. In the following the implications of data loss for the analysis related to the techniques of cleaning and normalising the data of the log files is discussed in greater detail.

During the cleaning phase all requests that are not related to the pilot studies are removed from the log files. This step is necessary because server log files contain some unavoidable requests from external sources. For example, these requests can be traces from web robots as they are used by search engines, from attack trials, or from system users who do not participate in a pilot.

In order to clean these requests from the log files a participant list is needed. This list contains all valid user names for a pilot. For cleaning the log files each request is checked if the related user is on the list of confirmed users. If the user is not on the list, the request is filtered from the log file.

As a side effect the algorithm filters also all requests that were caused by confirmed users just before or while they authenticate, but before the system recognises the user. Although these requests might provide interesting data about the wider use of the system, for the comparison of the TENCompetence infrastructure and the Moodle system this effect occurs only for the log files provided by the TENCompetence infrastructure, as Moodle's internal logs contain only requests caused by authenticated users.

After cleaning all the noise data from the log files, the requests have to get normalised in order to reduce errors caused by architectural differences of the two systems. This is required for creating comparable datasets for the groups using the different systems.

Log file normalisation has to be done on session-user basis. A session includes all requests from one IP address that were handled within a given timeframe. The duration of that timeframe is defined by the time that has passed between two requests. If two requests from the same IP address were handled within a time limit, the two requests are treated as part of the same sessions; otherwise they belong to different sessions. However, IP address and time limit are not sufficient in environments such as Internet cafés or computer labs in universities. For that purpose the user name is taken as an additional constraint. I.e. if two requests from the same IP address were performed within a time limit but associated with different user names, the requests belong to different sessions.

For the comparison of the different systems the use of the different tools provided by each system is of major interest. In order to reduce effects caused by the different architectures, all but the first request of a request sequence to the same tool that belong to the same user session are masked in the log file. That means each time a user accessed a tool of the system, there is one request that indicates the usage available for the analysis, whereas the overall structure of a session is not altered. The masking of



requests means in this context that they are labelled as invisible for analysis, but leave the general conditions of the session boundaries untouched.

For masking the indent field of the log files is used. This field is not used by both systems that are analysed and is therefore always empty. Inserting a defined label for masking in this field would not alter the logic of the log file.

Non sequential requests to the same tool remain unchanged in the log file. Because each usage of a tool of a system is represented by one request, the general structure of a user session remains available for later analysis. However, the number of requests that were invoked on that tool in a sequence depends on the underlying architecture of the system. Because this overhead has been removed, it is possible to compare the user sessions in the different systems directly.

However, this procedure would remove the information for analysis, if a user used a tool only for information gathering or also for information sharing. For this purpose a tool request is inserted to the log file. This request is a copy of the initial request of a tool usage sequence. This copy is altered to indicate the style of tool usage. This is done by altering the HTTP request method. If a tool is used for information gathering only, the request method is set to GET, if a tool is used for information sharing the request method is set to PUT. The original request is masked after the altered copy has been inserted into the log file. This step is necessary, because the initial request might not represent the nature of the entire tool usage sequence.

The user sessions within the normalised log files contain per tool usage within the session one request. For example, if a user used in one session first the document library, then the discussion forum, and returned to the library, the normalised log files of Moodle and the TENCompetence infrastructure will indicate exactly the same pattern. Furthermore, the duration the using the tools can be estimated from the timestamp differences of the requests found in the logs.

The TENCompetence Infrastructure uses a structured URL Schema which identifies the tools and activities and activities that have taken place during a session. The basic structure of the URL is as follows.

```

REQUEST: "http://" SERVERNAME "/" QUERYTOOL ["/" ACTIONTOOL]
SERVERNAME: IP address | DNS CName
QUERYTOOL: "communities" | "messages" | COMMUNITYQUERY
ACTIONTOOL: LISTTOOL | ActionID "." TOOLNAME
COMMUNITYQUERY: CommunityID ".community"
LISTTOOL: "actions" | "competenceprofiles" | "items" | "registration" | "users" |
"
TOOLNAME: "action" | "assessment" | "competencedevelopmentplan" |
"competenceprofile" | "competences" | "item" | "resource" | "user"
  
```

If a user has just used a tool for information gathering only GET requests will be found. If a user contributes to a community, additional POST or PUT requests are found during the usage of the tool.

The normalisation of tool usage sequences is performed on the QUERYTOOL or in case of a COMMUNITYQUERY either the LISTTOOL or the TOOLNAME is used. If a LISTTOOL is found as a tool and the tool is not "registration", the LISTTOOL is

translated into the corresponding TOOLNAME, in order to normalise the log files based on the TOOLNAME that is found in the request.

Moodle uses an internal database to log the requests performed by the users. This log contains an action field in which the tool and the type of action are encoded as a single string. The strings that have been found in the Moodle logs are of the following structure.

ACTION: TOOLNAME “ ” ACTIONTYPE

TOOLNAME: “course” | “user” | “forum” | “resource” | “assignment” | “blog” | “upload”

ACTIONTYPE: “view” | “view all” | “enrol” | “update mod” | “upload” | “user report” | “update” | “view forum” | “view forums” | “view discussion” | “add post” | “add discussion” | “subscribe all” | “add mod” | “add” | “subscribe” | “update post” | “update discussion”

All the ACTIONTYPE values that include the tokens “add”, “update”, or “upload” refer to contribution actions, all other ACTIONTYPE values refer to information gathering activities. Furthermore, the TOOLNAME “upload” is equivalent with “assignment – as far it was reproducible from the log files. This is important to mention, because the TOOLNAME “upload” occurs only as a single statement within assignment activities. Finally, the TOOLNAME “blog” has to be considered as a synonym for the TOOLNAME “resource”.

### Analysing the log files

For comparing the log files across the two systems it is necessary to understand which tools refer to the same kind of activities. The following table shows the relations of the tool names as they are used by the TENCompetence infrastructure and by the Moodle system.

Table 6 Relations of the tools name in the TENCompetence infrastructure and in Moodle

<b>TENCompetence Infrastructure</b>	<b>Moodle</b>
<i>registration</i>	<i>course + enrol</i>
<i>action</i>	<i>?</i>
<i>assessment</i>	<i>assignment</i>
<i>competencedevelopmentplan</i>	<i>course (?)</i>
<i>competenceprofile</i>	<i>-</i>
<i>competences</i>	<i>-</i>
<i>item</i>	<i>?</i>
<i>resource</i>	<i>resource</i>
<i>user</i>	<i>user</i>
<i>?</i>	<i>forum</i>

Given to the structure of the normalised log files, the usage of the two systems can be compared on the following dimensions.

- Tool usage
- Frequency of system use of returning users
- Frequency of tool usage (total and per session)
- Session structure
- Changes of the session structure over time
- User activity (number of distinct activities per session)
  - Independent sessions
  - Access times
  - Actual users
  - Facilitator involvement

Additionally, drop outs can be estimated for users that stop using the system after some time and never used it again within the observation interval.

For the comparison the value of the specialised tools of the TENCompetence Infrastructure for the personal learning process can be estimated by comparing the usage of these specialised tools in relation to the tools that are available in both systems.

The results of the log file analysis can be used for cross validation of the questionnaire study. This kind of cross validation is required because of the gap of self-recognition of activities and opinions, and the actual performed activities within an environment. This provides a more detailed picture on opinion based evaluation variables such as “appreciation of ...”. For example, users may report that they appreciate the availability of a certain tool, but they never use it during their learning activities, or the other way around. Therefore, the log file analysis is used as an instrument that puts the results of the questionnaire study in direct relation with the technical development. This helps the project to identify non-obvious obstacles and improve the provided system with this regard.

### 3.6 Cycle 1 Digital Cinema Pilot

In this section the actual implementation of the cycle 1 Digital Cinema pilot and its current stage is presented.

#### 3.6.1 Launching Digital Cinema Cycle 1 pilot

##### Initial planning

- **Pilot name:** Digital Cinema pilot V2 (virtual sets diploma)
- **Short description** The pilots teaches how to compose and produce virtual sets scenarios using Brainstorm software. It has a project-driven pedagogy
- **Starting date of execution:** 1- October 2007
- **Ending date of execution:** 15- November 2007
- **End date of analysis & reporting:** 15- December 2007

##### Target group and workload

The target group of the pilot is composed of professionals and students in digital cinema, 3D modeling, media production, new media, also students and scholars from professions related to media in general. The targeted audience is mainly from Spain and other European countries. The total workload generated by the pilot's course is considered to be close to 150 hours of activities, including assessment.

##### Experimental (PCM) vs. control (Moodle) groups

The conditions of the experimental and the control groups are identical concerning timing (see *Initial planning*) as well as resources and assignment for competence development (see section 1.1.5). However, the participants using the PCM have available the functionalities of this system: rating, creation of CDPs, the forums attached to specific elements, the embedding of components and the possibility for marking competences as complete (see Figure 24 and Figure 25).

On the other hand, the group of participants using Moodle has one list of resources and the general forum with different threads but not attached to specific elements (see Figure 26). Both groups have the same person as the trainer/teacher.

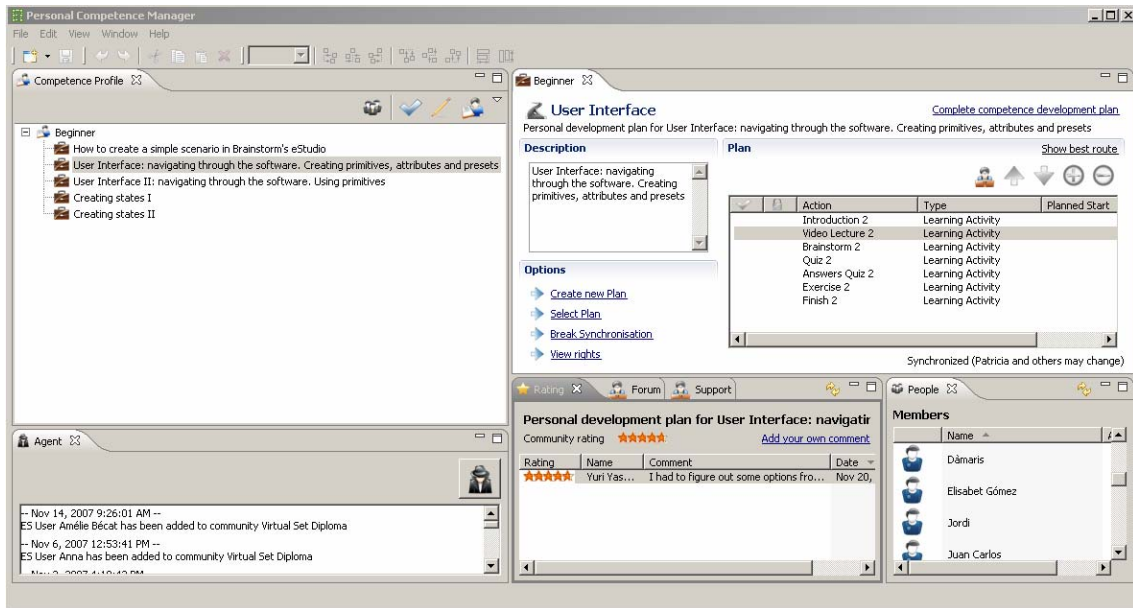


Figure 24 Digital Cinema Diploma, beginner competence profile in PCM

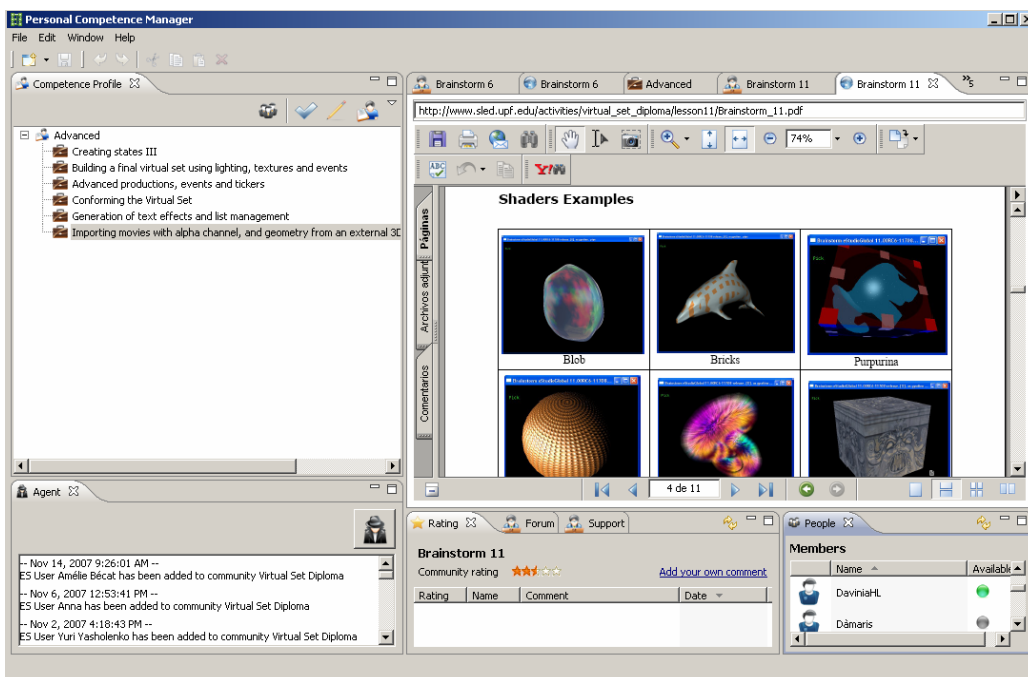


Figure 25 Digital Cinema Diploma, advanced competence profile in PCM

The screenshot shows a Moodle course page for 'Digital Cinema Course' in Mozilla Firefox. The browser address bar shows the URL: <http://galactus.upf.edu:81/course/view.php?id=2>. The page is titled 'Digital Cinema Course' and shows the user is logged in as 'Davinia Hernández-Leo (Logout)'. The course page is organized into several sections:

- People:** Includes a 'Participants' link.
- Activities:** Includes links for 'Assignments', 'Forums', and 'Resources'.
- Search Forums:** A search bar with a 'Go' button and an 'Advanced search' link.
- Administration:** Includes a 'Grades' link.
- My courses:** Lists 'Digital Cinema Course' and 'All courses...'.
- Topic outline:** A list of topics including 'News forum', 'a simple scenario in Brainstorm's Forum', 'User Interface Forum', 'User Interface II Forum', 'Creating states I Forum', 'Creating states II Forum', 'Creating states III Forum', 'Building a final virtual set Forum', 'Advanced productions Forum', 'Conforming the Virtual Set Forum', 'Generation of text effects Forum', and 'Importing movies Forum'.
- Latest News:** A news item from '17 Oct, 15:47' by 'Jordi Alonso' with the text 'Welcome to the training on virtual sets' and links for 'more...' and 'Older topics...'.
- Upcoming Events:** Two 'Submit Exercise' events scheduled for 'Friday, 30 November (12:00 PM)' with links for 'Go to calendar...' and 'New Event...'.
- Calendar:** A calendar for 'November 2007' showing dates from 1 to 30. The 28th and 30th are highlighted in orange.
- Online Users:** A section for 'Online Users' showing '(Last 5 minutes)'.

Figure 26 Digital Cinema Diploma, course in Moodle

The interactions with the participants are completely accomplished on-line. Considering the characteristics of the target group it is not possible to organize any face-to-face session where the pilot is introduced or training on the use of PCM and Moodle is offered. Therefore, participants are provided instead with a welcome package (see Appendix 3) including all the relevant information needed to register in the system and start the course. The welcome package is different depending on whether the participant is assigned to the experimental or to the control group.

As a general rule, participants are randomly assigned to the two different groups. However, when the implementers of the pilot know that some participants come from the same community (they know each other and are expecting to use the same system in order to interact and learn collaboratively), they all are assigned to the same group. This strategy was agreed upon with the WP4 partner in charge of the pilot evaluation. Whether the group is associated to the experimental or the control condition is decided randomly.

## Implementation and launching process according to the initial plan

*(1 September → 30 September)* Launch preparations / implementations

*(3 September → 4 September)* Sofia preparatory workshop

*(30 September)* Antelope release delivered

*(1 October)* Launching digital cinema pilot, the FBM-UPF preparatory workshop

*(1 October)* Registration process opens

*(15 September → 30 October)* Campaigning for students

*(2 November)* Completing the collection of pre-evaluation questionnaires

## Intermediate workshop: event at Universitat Autònoma de Barcelona

FBM-UPF organizes an event at the Universitat Autònoma de Barcelona (<http://www.uab.es/>) on October 2007, 30th (see Figure 27). The objectives of this event were twofold:

- To present the TENCompetence project and its outcomes. The audience was of around 30 participants interested in the impact of Technology and Media on Education. The presentation is available at <http://dspace.ou.nl/handle/1820/1100>
- To enroll participants in the Digital Cinema pilot. The audience comprised future journalists who train skills related to the creation of digital content including videos. At the end of the event, we collected 23 pre-test questionnaires of 23 potentially interested participants.



Figure 27 Workshop at the Universitat Autònoma de Barcelona



## Registering students according to the initial plan

In total, around 200 emails/contacts are initiated ranging from universities and large firms to personal contacts, friends, and acquaintances. The following parties were among those contacted to solicit participation in the Digital Cinema pilot:

- *BBC*
- *CCRTV*
- *Brainstorm Software*
- *FBM-UPF masters program*
- *UAB masters programs*
- *Media Pro*
- *Cinema professional associations*
- *TENCompetence partners & networks*
- *TENCompetence dissemination lists*
- *IP-Racine dissemination lists*
- *AGORA*
- *City of Barcelona*
- *University of Glasgow*

## Marketing strategy and marketing materials

Brochures and posters were produced and distributed both online and in public spaces of relation to digital cinema. They can be found online at the following addresses:

<http://www.TENCompetence.upf.edu/virtualsets/brochure.html>

<http://www.TENCompetence.upf.edu/virtualsets/brochure.pdf>

Next pages include a copy of the online brochure

**Be a privileged insider to the most advanced technologies for e-learning**  
**INTRODUCTORY COURSE TO VIRTUAL SETS**



Virtual Sets are widely used today on TV stations for news, quizzes, sports events, music contests, allowing to reuse a green screen set and be able to hold different programs, thus reducing costs and giving extra flexibility. There are special venues like elections, with real time visualization of data, which extensively leverages this kind of software. The use of this real time technology in movie previsualization of visual effects shot on green screen is extending every year. It started a few years ago on high budget Hollywood movies, but with the reduction of costs in technology, are being spread even for the shooting of commercials. This technology gives the director and even the actors, real time feedback of their interaction with computer generated objects and effects. With this course, you will know and understand how a virtual set is crafted, and for that you will have one of the best tools in the world to learn it: Brainstorm eStudio, and even better, you will be able to take the course for free and from your own home! With your input, we will be able to improve this e-learning platform so more contents would be available for the community.

**Course details**

This is a unique opportunity to be part of a test bed for a new online training platform

- Limited amount of students
- Completely free
- Online training, from your home computer, with the schedule that suites best your needs
- Get an introduction to a professional application, leader on the virtual set market: Brainstorm eStudio
- Understand how the professionals use this product to create TV shows
- This software has been extensively used in most of major TV channels around the world for virtual set broadcasting, specials for elections, and lately in visual effects movie previsualization
- Course contents are in English language
- Start date of the training: October 1st, 2007
- Duration of the course: 6 weeks

**Course methodology**

Two online sites are dedicated to the Virtual Sets classroom, the forum and this lesson player. The role of each of these sites is explained hereafter:

- The Forum:** The forum is used by the students to ask questions and concerns about each lesson and its related materials. The teachers will rapidly answer these concerns and discuss them on the forum. Students regularly check the forum to read the questions raised by others and the responses given to them. Some conversations may involve many students talking to the teacher, especially when all of these students share the same concern.
- The Lesson-Player:** The lesson-player is the site where all the academic materials are published. The lessons are composed of series of steps and the player allows you to progress in the lesson one step at a time. Lessons contain exercises and assessment tests. There are also general examinations at the end of each section.

**Course Contents**

The course provides an introduction to Brainstorm eStudio v11.0 platform, and the basic scope of the tools. Course uses lectures



The introductory course will be free during this limited time e-learning test

- You will learn how to create a simple scenario in Brainstorm's eStudio
- How to navigate through the interface and how to use primitives and attributes
- How to apply different tools inside eStudio for different broadcast needs: news tickers, weather forecast, live data, etc.
- How to create states
- You will build a final virtual set, using lighting, textures and events
- Advanced features like text effects and list management
- How to import geometry from 3D Studio Max
- How to import movies with alpha channel

Technical requirements	Personal requirements
<p>A computer capable of executing 3DS MAX and similar graphic applications in a smooth way, typically a PC with:</p> <ul style="list-style-type: none"> <li>✓ P4 or similar processor</li> <li>✓ 1 GB of RAM minimum</li> <li>✓ NVIDIA, ATI or intel 950 graphic card or similar with OpenGL hardware acceleration</li> <li>✓ 3 button mouse</li> <li>✓ Microsoft Windows 2000 or XP</li> <li>✓ Internet Broadband access (ADSL, DSL or Cable)</li> </ul>	<ul style="list-style-type: none"> <li>✓ You must be at least 18 year old to enroll this course</li> <li>✓ There is a need of proficiency in English to understand and complete the contents and evaluations of the course</li> <li>✓ Experience using 3D products is highly recommended (3DS Max -preferred-, Houdini, Lightwave, Maya, XSI)</li> <li>✓ Experience using web technology - blogs, browsers, chats, email</li> </ul> <p style="text-align: center; font-weight: bold; font-size: 1.2em;">APPLY now!</p> <p style="text-align: center;">Send an email with your Resumé to <a href="mailto:virtualsets@barcelonamedia.org" style="color: white;">virtualsets@barcelonamedia.org</a></p>

Dear

The Universitat Pompeu Fabra is launching a new **distance** learning pilot as part of its **plan** to disseminate digital cinema technology and provide a virtual learning environment where professionals, students, and amateurs can develop their competences and skills in producing and directing digital cinema **productions**.

The **distance** learning pilot we are launching offers an introductory course **on** Virtual Sets **Design** in cooperation with Brainstorm software. The course is around a hundred hours of learning activities **that can be addressed freely by the learners**. This service will be launched in the first of October and will be available for at least two months.

We would like to inform you about this opportunity to increase your digital cinema competences and knowledge, and get to know and cooperate with other professionals and scholars in this domain. **Registration** for the course is free of charge since the pilot will be used to validate the underlying learning infrastructure.

You can find more information in the brochure attached to this mail. If you are interested in registering and participating, please send an email to [virtualsets@barcelonamedia.org](mailto:virtualsets@barcelonamedia.org).

The Virtual Sets distant learning pilot has been developed as part of the TENCompetence project ([www.TENCompetence.org](http://www.TENCompetence.org))

With kind regards,

### 3.6.2 Current stage of the pilot

This section explains the current stage of the pilot. It lists the many efforts accomplished (beyond the initially planned, see the previous subsections) to promote the pilot at the same time that points out the unexpected problems that have emerged. As the consequence of these problems, the Digital Cinema pilot has not finished as initially planned (see *Initial planning*). However, we indicate in this section a set of preliminary conclusions and the follow-up plan that have been already initiated to overcome some of the detected problems.

#### Main efforts accomplished so far and emerging problems

Most of the efforts employed in the deployment of DC pilot so far are related to:

- Communications & marketing
- Technical support services not related to the course
- Support services related to the course

More than 500 emails are sent until early November for different reasons, regarding the three topics above, and also several weeks have had to be dedicated to attract students all over the world.

Contacts with popular websites related to cinema like cine.com, 3D forums like esmaya.org, and dozens of blogs covering the topics of 3D and digital cinema, have received posts in order to attract interest to the course.

Also tracking software was installed into the website of the course, in order to analyze if we had or not any success with our marketing efforts, extent we could not know just by sending emails to lists of candidates.

#### Marketing

- We had to design a brochure, and go through an approval process to finally advertise the course to bring students.
- We had to plan where to distribute the brochure and who to reach with this course. A marketing plan (even a simple one), and a minimal market study (maybe such a course has no interest at all) would be required.
- Different media needs different messages, as well as different audience does. Next course planned would need to allocate budget for marketing, because teachers, platforms and contents are essential for a course, but if there are no students, a course cannot even start.

#### External communications

- Some emails had to be sent in order to clarify some doubts from candidates regarding the course contents.
- Many emails had to be sent in order to get the details of each candidate not sending enough data except “I want to join the course too” and an email address.

- SPAM filtering – an increased amount of SPAM is hitting the published email address, and nowadays, is not so easy to filter SPAM emails from legitimate ones.

### Internal communications

- In order to preserve anonymous the emails of students between themselves, we used the BCC mail field for massive communications to all students of one platform. That proved to bring problems, because many email clients used by students labelled our emails as “SPAM”, so many students did not receive any information.
- Since then, communications must use personalized email, and we don’t have any tool for that, so massive cut&paste has to be used being a painful and time consuming experience.
- Each student receives at least 4 emails:
  1. “Your request is in process”
  2. “You have been selected, please send this pre-assessment”
  3. “Welcome to the course, fill this form and here there are the first PDFs documents to read”
  4. “This is your temporary license of the Brainstorm software”
- Out of this, things went more complicated because the pilot has two platforms, Moodle and PCM, so separate emails must be kept for communications, different PDFs and also a minimal back office with mailing lists and student affiliation to the platform have to be maintained. For future courses, a minimal back office has to be considered (at least recommendations).
- Because of lack of resilience of the already accepted students, we had to perform some PUSH EMAILS to motivate them to advance with the course. That was not planned in advance.

### Technical support – not the course

- One of the most challenging aspects of our experience has been to deal with students with low levels of proficiency in either English language or the Windows platform itself.
- Matters like the different platform-dependent paths for localizing the Brainstorm software and retrieve its license (*C:\Archivos de programa\Brainstorm* or *C:\Program Files\Brainstorm*) have been hard to explain and illustrate for some students. Those were unable to launch command line orders like *CD C:\Program Files ...* and performed *CD C:/Program Files* instead ... and the only input I had was “it doesn’t work in my computer”. Also to note one mistake we got that “after 99% of file downloaded it doesn’t work” ... to figure out that person had the disk full.
- Despite publishing the minimal requirements in the brochure, many students tried to install the software in non supported platforms, like those with Windows Vista or some low level graphic cards. This has been also painful, because this software requires modern computers, and most of them have Vista installed.

- Because of so many issues, at least with 15 students we exchanged between 5 to 20 personal emails, we had to switch from English to their local language, and even to send & receive screen captures, in order to help them move forward with the installation of the software and the advance to the course. Many times, we had to translate the same or similar emails to Spanish and English.
- It is necessary remark too, that those with enough skill were able to complete the process in less than 10 minutes following the directions of the documents provided (see Appendix 3).

### **Technical support – the course itself**

- The difference of level of students joining the course has the effect that some of them are completing lesson 5, while others have problems with lesson 1 or even to access the e-learning platform. That means the tutor needs to be proficient enough to cover doubts of such different levels.
- Most of the communication is been generated offline, with direct emails from students to the course coordinator, and making this task different as planned initially, having to give personalized assistance to those students.
- The technical support of Brainstorm has been excellent, and has made everything go smoother when problems arise.
- We have students in Australia, South America and Europe, making the time planning a 24h task.

### **Current stage**

The current stage of the pilot can be summarized as follows. At the time of writing this document, there are a total of 80 persons that have sent an e-mail indicating their interest in participating in the pilot. They were randomly assigned to the different PCM or Moodle groups (with the conditions explained in section “Experimental (PCM) vs. control (Moodle) groups”) and received in consequence the corresponding welcome package (see Appendix 3).

Attached to the welcome package they also get the pre-test questionnaire (see Appendix 1). In total we have collected 40 pre-tests of the persons assigned to the experimental condition and 19 of the participants associated the control condition. It is necessary to mention also that 23 of the 40 pre-tests questionnaires of the participants assigned to PCM were gathered at the UAB event (see section “Intermediate workshop: event at Universitat Autònoma de Barcelona”). The number of persons actually registered in the systems is 12 participants in PCM and 20 in Moodle.

### **3.6.3 Preliminary conclusions and follow-up plan**

Considering the identified problems together with the current stage of the pilot, this section draws some preliminary conclusions and the follow-up plan is being already accomplished.

## Preliminary conclusions

At this moment is not possible to provide the definite evaluation results of the pilot because the post-test questionnaires have not been already collected. Fortunately this is not the case with the ICT pilot (see section 3.7) which provides an initial set of interesting and encouraging results. However, it is possible to list some preliminary results concluded in the DC pilot. Some of these conclusions are related to the PCM system itself while others concerned the focus of the pilot and its target audience.

- *The PCM system reveals usability problems.* For example, the problem documented in Figure 28 illustrates that a participant cannot find the required competence profile in the corresponding window.

Buenas tardes Patricia. Muchas gracias por tu interés. He llegado a todos los puntos marcados menos el último, te explico el problema. De la explicación en inglés en pdf he llegado a la ventana siguiente: 'Select a Competence Profile', donde tengo que marcar 'All Competence Profiles from my communities' y 'Discover other communities'. Entonces me sale la pantalla que te adjunto en archivo de word.  
No se me adapta a la descripción del paso siguiente del pdf donde pone "Server Registration". ¿Qué tengo que hacer?  
Un saludo y muchas gracias,

-----

Hola XXXX,

he visto en la imagen que me has adjuntado en un word, que puedes ver todas las comunidades que hay. Debes bajar la barra hacia abajo, hasta que encuentres una que se dice "Virtual Set Diploma" Type: Closed Creator: patricia ( tal y como verás en la imagen que te adjunto ), entonces aprietas sobre el botón Register ( que en la imagen sale como marcado pq yo ya estoy registrada ).

Cuando apretes sobre el botón, rellenas los datos de tu cuenta y ya estarás registrada!

Así la proxima vez que entres y aprietas sobre el icono de Competence profile, verás que te salen 2 profile "Beginner" y "Advanced", si aprietas sobre el primero podrás ver las primeras lecciones, y sobre Advanced las siguientes.

Espero que ahora puedas entrar al curso sin problemas, si tuvieras alguna duda escíbeme.

Suerte,

Patricia

Figure 28 One of the problems using the PCM faced by a participant in the DC pilot (in Spanish)

Moreover, it is not trivial for many participants the installation of PCM. The problems in this sense include: they do not download correctly the PCM, do not have the correct version of Java installed or do not understand what the right file to execute the application is (see Figure 29, Figure 30 and Figure 31).



Dear Jordi

Thanks for the licence. I still have an issue tough.  
I downloaded the client to register as it was described in the pdf file.  
I could install it but I can't open it. If I run the .exe the icon pops up but the program won't start.  
Maybe you could help me with this. I tried both version for windows, with and without the java file.

Thanks,

XXXX

-----

Dear XXXX,

My name is Patricia and I've read your problem. I send you an image of the resources that you can view in the tencomp-pcm folder when you unzip it.  
You've to press over the icon of "tencomp-pcm" and you'll view the interface of PCM.  
When the interface appeared, you've to press over the sentence "Start this application...", and then you can follow the registration-guide of the Welcome package.

Note: if you want to have rapid-access to PCM in your Desktop, you've to make a shortcut, don't copy the icon directly in your Desktop because then the program doesn't work.

Patricia

Figure 29 One of the problems installing the PCM faced by a participant in the DC pilot (in Spanish)

I have completed the form but I have other problems with the download of TENCompetence. When I attempt to open the content of zips it says to me that there is an unexpected end or that I haven't the application necessary to open it. On TENCompetence page I see other links for another type of software (perhaps complementary?) but I can't download correctly and I don't know what's its real use. What can I do? Is there any guide (If it's possible, not in english...)?

Thanks again!

Figure 30 Other problems installing the PCM faced by a participant in the DC pilot (in Spanish)

Dear Patricia,

I have the unzipped folder as in the picture you sent me. The problem is when I try to open it the interface won't appear. There just pops up the inicial logo but then the program does not start so I can't make it to the interface to complete the registration. I tried to install it again but that did not solve the problem.

XXXX

-----

Hola XXXX,

te escribo en castellano pq creo que eres de aquí y nos entenderemos mejor así. Pienso que tu problema puede ser causado pq no tengas "java" instalado en tu ordenador, por esa razón el programa no funciona.

Para instalarte el JRE de java, debes ir a la siguiente página:  
<https://sdlc5c.sun.com/ECom/EComActionServlet;jsessionid=1BC29ED697A70E841E40EA9CADAB1E54>

Marcas sobre "Accept" y seleccionas --> Windows Offline Installation, Multi-language ( siempre que tu sistema operativo sea Windows, sino selecciona el tuyo )

Sigues los pasos de instalacion de Java y pruebas de nuevo entonces a apretar sobre el icono que te iniciará el programa del PCM.

Espero solucionar con esto tu problema, si aún no se soluciona, no dudes en escribirme y haremos todo lo posible para solucionarlo cuanto antes.

Sentimos las molestias,

Patricia

Figure 31 Java version problem with the PCM faced by a participant in the DC pilot (partially in Spanish)

On the other hand, the problems regarding registration in Moodle are reduced to the fact the account confirmation e-mail are filtered in some cases by the SPAM systems (see Figure 32).

Hello, I send you ' pre test doc '. I have not received the mail of confirmation of Moodle. I will wait to tomorrow. Thank you

Figure 32 Problem with Moodle faced by a participant in the DC pilot

- *There is a need of training in PCM.* The previous results lead to the conclusion that an initial training in PCM is desirable. These training would overcome to some extend the usability problems of the system until they are solved.
- *The PCM system reveals needs to be internationalized* offering different languages. This problem is explained in the previous section and is also manifested in the communications by e-mail with a number of participants (see Figure 30 and Figure 31).
- *The focus of the pilot should be broad or already have a community of target participants.* The topics selected to the DC pilot results (see section X) results to be too specific to attract a large number of really interested participants who would potentially complete the course. This idea is manifested by the fact that some of the participants initially interested in the course, decided to leave it because the contents do not match with their expectations (see **Figure 33**). Besides, there were not

identified communities of target users, what has hindered to a large extent the enrolment of participants.

Hello Jordi,  
 it seems to be a misunderstanding, the girl that recommended me the course talked about, designing sounds that's my line and I don't have any experience in animations. Sorry for any inconveniences

Figure 33 Problem with the focus of the DC pilot

- *The motivation and profile of the potential participants is critical.* Once participants are interested in the pilot, their motivation is crucial to start and complete the learning process supported by the system. This requirement is even more important when the pilot involves a demanding and large course such as the proposed for the DC pilot. Other factors that affect this motivational proven are the characteristics of the target group, which is comprised of professionals typically very busy, and the fact that the course is not recognized officially.

Moreover, an adequate profile of the potential participants is essential to successfully complete the course. Apart from being motivated, they need to have a minimal set of skills mainly related to their experience with technology and foreign languages. Though these requirements were stated in the brochure of the course (see section “Marketing strategy and marketing materials”), some of the interested people were not proficient in them.

On the other hand, it is important to say that *several participants with adequate profile and motivation have been able to complete all the steps of the registration process (communication of interest, complete the pre-test questionnaire, install Brainstorm and PCM software and start using it) in one day.* This shows that the documentation and the procedure adopted in the pilot is successful when the participants are interested enough in the particular focus of the pilot, are proficient in English and have sufficient technical skills.

## Follow-up plan

Considering the current stage of the pilot, the following decisions are made to adapt to this situation and being able to complete the pilot and obtain further results and conclusions relevant to the objectives of the project. There are two main activities in this follow-up plan:

First, continue with the enrolment of participants extending the collection of post-test questionnaires till February 2008. The first new participants will be assigned to the experimental group in order to reach the same number of members actually using the system in the control group.

The main action in this sense are to elaborate a poster to disseminate the pilot in different universities of Barcelona, in shops and cafeterias close to schools of cinema and 3D and other strategic locations. 30 copies of the poster have been distributed during the last week of November 2007. In the poster, interested people are invited to an event to be celebrated in the Auditori Estació de França (FBM-UPF) on December 2007, 11<sup>th</sup>. 20 of these posters are also sent by mail with an explanatory letter to the secretaries of different universities in Spain which impart audiovisual studies and are invited to announce the course in bulletin boards.

The current participants are also invited to progress in the course beyond the initial planning. This is expected to facilitate the completion of the course by already enrolled busy professionals that do not have much time to devote to the pilot. Post-test questionnaires will be sent to them as soon as they complete the course.

And second, analyze the reasons that lead the participants to leave the pilot. In order to understand these reasons a short test questionnaire for the persons dropping out of the pilot have been prepared (see Appendix 4). It will be send to the participants that are not active in the systems for an important amount of time or that have not even installed them after showing interest. However, the participants that have spent a significant amount of time progressing in the course (though not finishing it) will also receive the post-test questionnaires. This action will be taken progressively until February 2008.

### **3.7 Cycle 1 ICT pilot**

In this section the actual implementation of the cycle 1 ICT teacher training pilot is presented.

#### **3.7.1 Launching ICT Cycle 1 pilot**

##### **Planning**

**Pilot name:** ICT Teacher Training (I\*Teach Methodology)

**Short description (max. two lines)** This pilot tries to show how TENCompetence framework and approach can be used for the implementation of the innovative and complex training methodology, developed in the frame of the Leonardo project The Innovative Teacher project (I\*Teach).

**Start date of execution** 30-September-2007

**End date of execution** 15-November-2007

**End date of analysis & reporting** 30-November-2007

##### **Target group and workload**

The target group of the pilot is composed of teacher trainers and teachers from Bulgarian schools, a total of 65. The targeted audience is mainly from Bulgaria, with representatives from all of the major cities in the country. The total workload generated by the pilot's course is considered to be close to 100 hours of activities, including assessment.

##### **Experimental (PCM) vs. control (Moodle) groups**

The experimental and the control groups have the same time schedule for the whole training period. The participants are randomly assigned to conditions.

During the first face-to-face starting workshop, both groups are introduced first with the I\*Teach Methodology in large, then with their respective software tool (Moodle for the control group, PCM for the experimental group). After that all teachers in the both groups are invited to form groups (2-3 people in a group), to choose a project (with

general objective: applying I\*Teach methodology in the process of teaching in their own specialty), to start to work on a project and to have the first feedback.

After this workshop both teachers from both groups are involved in the developing of their project, using the facilities of the respective software for communication and collaboration, and during the final workshop they presented their project to all other teachers.

So, the main differences for both groups can be summarized as follows:

1. The I\*Teach Methodology is presented in the PCM using the native PCM characteristics and components (competence development program, competence, community, learning plan, learning activity, learning resources, see Figure 34).
2. The I\*Teach Methodology is presented in the Moodle (see Figure 35) as a group of several word documents, describing the I\*Teach methodology and explaining how best it can be used with 3-4 examples, which are called learning scenarios, consisting of several learning tasks, all described in a well predefined templates.
3. The final project in PCM group should be developed and presented to the group using the native PCM characteristics and components (competence development program, competence, community, learning plan, learning activity, learning resources).
4. The final project in the Moodle group should be developed as word document following the structure of the templates for describing scenarios and tasks, and presented to the group using a Power point presentation.

Concerning the communication and collaboration between participants in the both groups, we think that it was more natural in the PCM group, as it is easily linked with their project and their work, while in the Moodle it is not so tight the relation between their project and the need/ability to communicate. These hypotheses are illuminated in the evaluation.

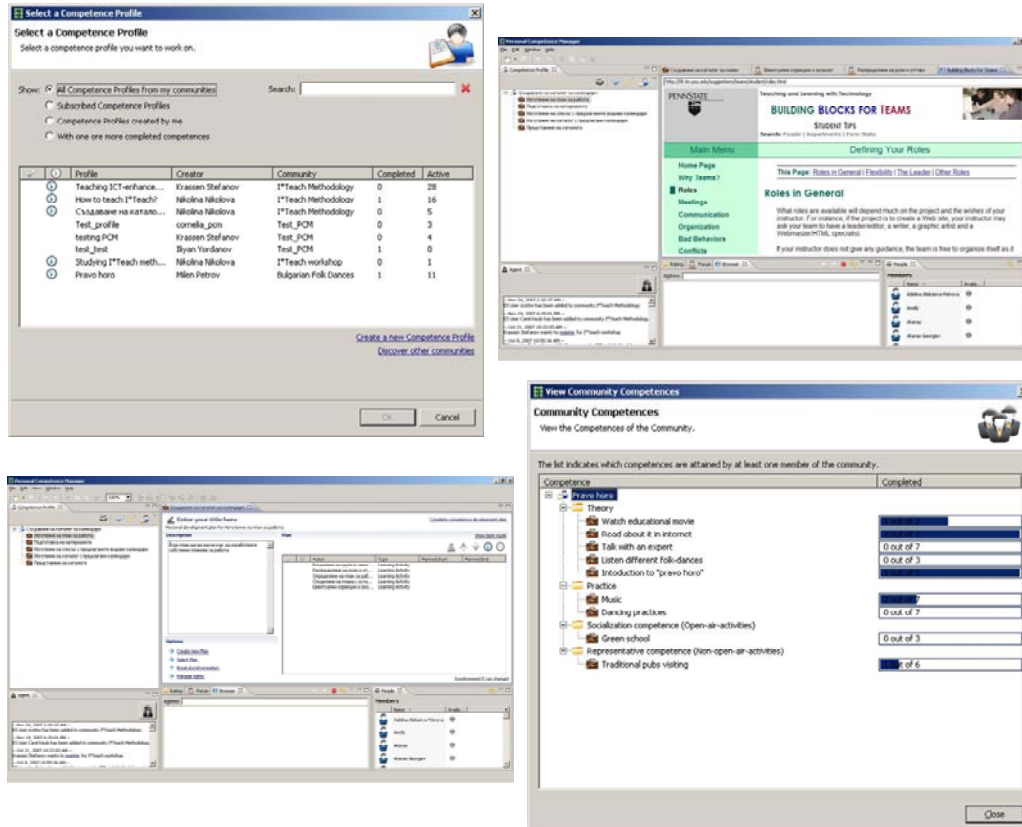


Figure 34 Screenshots of the PCM in the ICT cycle I pilot (experimental condition)

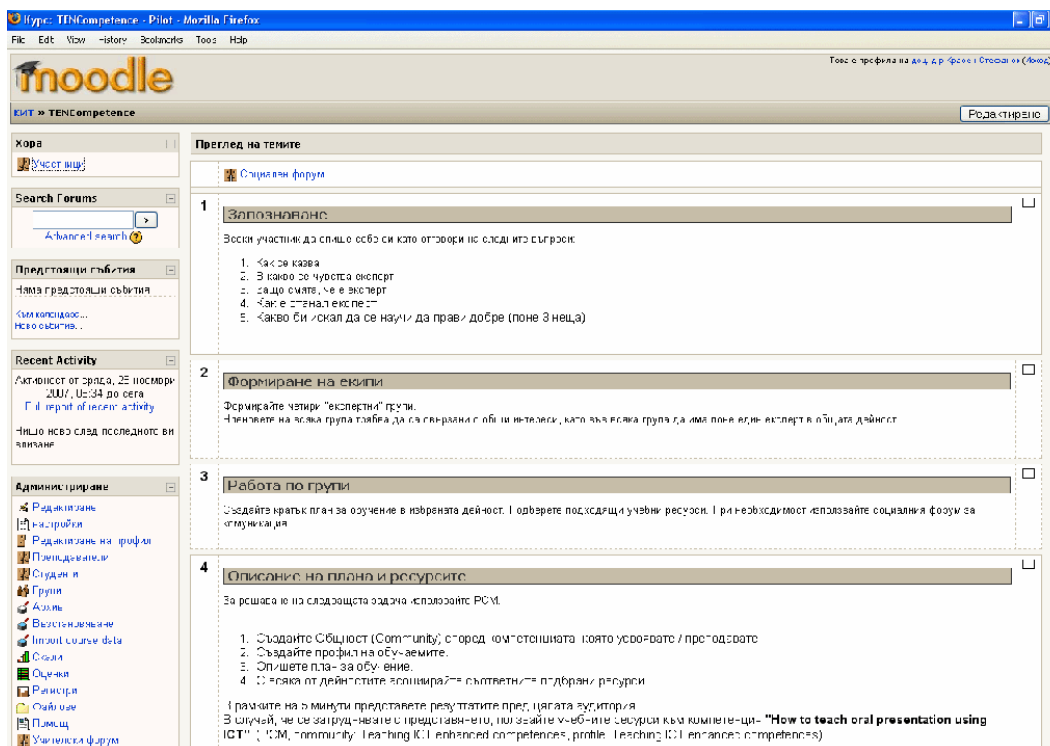


Figure 35 Screenshots of Moodle in the ICT cycle I pilot (control condition)

## Preparatory workshop: the Sofia event

*Proposed Agenda:*

### **Day 1:**

- 9:30 / 1:00: *Discussion of D.C. and ICT pilots launching preparations*
  - = Academic materials & pedagogical approach
  - = Students registration process
  - = Design of learning experience (use of Antelope components)
  - = Assessment
  - = Academic and technical support
- 2:30 / 5:30: *Evaluation plan and implementation*
  - = Discussion of pilot evaluation implementation plans
  - = Milestones for collecting data and analysis
  - = Drafting D4.2

### **Day 2:**

- 9:30 / 1:00: *Training session on using Antelope*
  - = Training from student perspective
  - = Training from curriculum designer / teacher perspective
- 2:30 / 5:00: *Antelope training and Antelope support*
  - = WP4 early feedback on the use of Antelope
  - = Discussion of student training strategy

## Implementation and launching process

*(1 September → 28 September)* Launch preparations / implementations

*(3 September → 4 September)* Sofia preparatory workshop

*(29 September)* Launching the pilot, with first face-to-face session (4 hours) for the first group of 45 teachers.

*(30 September)* Antelope release delivered

*(30 September)* First face-to-face workshop for the first group of 45 teachers (8 hours), and filling the pre-test questionnaires.

*(1 October → 20 October)* Teachers from the first group work on their projects in their authentic environment

*(14 October)* First face-to-face workshop for the second group of 20 teachers and teacher trainers (8 hours), and filling the pre-test questionnaires.

*(15 October → 10 November)* Teachers from the second work on their projects in their authentic environment

*(20 October)* Final face-to-face session for the teachers from the first group, demonstration and defending the final projects, filling and the collecting the post-test questionnaires.

*(10 November)* Final face-to-face session for the teachers from the second group, demonstration and defending the final projects, filling and the collecting the post-test questionnaires (see Figure 36)





Figure 36 Photos from the final face-to-face workshop

## Marketing strategy and marketing materials

We start our marketing campaign with identifying potential motivated teachers from all around Bulgaria, using the contacts we have with the Ministry of Education and Sciences (MES) in Bulgaria. We identify 150 potential teachers and send personal invitations to all of them. We also use posters at main events during this year like National competitions for pupils and students, scientific conferences and other events targeting teachers.

When we have a final list with people who agree to participate and were free during the pilot training period, we needed to organize together with experts from MES, all the logistic about the event (hotel reservations and meal arrangements during the face-to-face workshops, final certificate/diploma preparation and recognition, etc. All such logistic expenses are covered by MES, while all costs related to training provision are covered by TENCompetence project team.

We succeed to create a large database with teachers willing to be trained using PCM how to apply the I\*Teach methodology in their training, and hope to continue with the training during the second phase pilots.

### 3.7.2 Evaluation implementation plan

The first group of teachers (45 in total) is divided into two sub-groups: one to work with PCM (20 people), and the other one to work with Moodle (25 people). Both sub-groups have the same task for their final project: to develop a competence development program related to the use of the I\*Teach methodology in their own training field. Both sub-groups have the same pre-test input questionnaire, but different post-test output questionnaire for understanding their own satisfaction and evaluation of the training and training outcomes.

The second group of 20 teachers and teacher trainers work only with the PCM.

### 3.7.3 Evaluation results

This section describes the outcomes of the evaluation, the set-up of which has been described in section 3.1. In the implementation, there is one important deviation from the original plan. In practice, it turned out to be impossible to assign participants randomly to the two conditions. Although this means that alternative explanations for the outcomes cannot be ruled out, participants in the two conditions turned out not to differ systematically with respect to relevant characteristics, as we will see in the next section.

## Participants characteristics

A total of 45 participants attended the ICT Training pilot. Of these participants, 44 were included in the analyses. The reason for excluding one of the participants was that this participant had spent 7 hours on the pilot, whereas the other participants spent between 36 and 60 hours. Therefore the results of this participant would not be comparable to the other participants.

Of the remaining 44 participants, 37 were women and 7 were men. All came from Bulgaria. Most of them were middle-aged people, with a mean age of 44.63 years and a standard deviation from this mean of 7 years. The youngest participant was 23 years old and the oldest participant was 57 years old. In general the participants were highly educated. A large majority of 38 people had a university masters degree, 5 had a bachelor degree and 1 person had a degree in secondary vocational education.

When asked for their profession, 34 people considered themselves a teacher. This includes one person who considered him/herself both a teacher and an engineer. 8 people were engineers, and the participants included furthermore 1 philologist and 1 physicist. The current job function of most participants was teacher (40 people, including 5 IT teachers). Three people were school directors and one person was a university lecturer. There was a considerable spread in the number of years of experience in the teaching profession, especially when compared to the moderate spread in age. Years of experience ranged from 0 to 31 years, with a mean = 15.73 years and a standard deviation of 9,5 years.

### *Competence development*

Their own proficiency level with respect to the "Teaching ICT-enhanced skills" competence was rated by almost all people as either intermediate (21 people) or advanced (17). Three people were beginners and two were experts.

Table 7 Scores on importance attached by participants to the six aspects of competence development

How important is it for you to acquire the following types of competences? 1 = completely unimportant, 5 = very important	Mean	SD	Min	Max	N
Knowledge	4,40	,660	2	5	43
Functional skills, know how to do things	4,64	,487	4	5	44
Social skills	4,55	,504	4	5	44
Knowing how to behave according to the rules and values of the profession	4,55	,627	3	5	44
Knowing how to guide my future use by reflection on current practice	4,52	,505	4	5	44
Knowing how to find creative solutions for problems related to this competence	4,66	,479	4	5	44

There was hardly any difference in how important participants judged the acquisition of the several aspects of the ICT teaching competence. All aspects were considered by almost all participants as either important or very important (see **Table 7**).

### *Experience with web-based learning*

To most people, following a course through distance learning is a new experience. The large majority has not followed any course or module through distance learning (34 people). 5 people followed 1 course, 3 people followed 2 courses and 3 people followed 3 courses.

The use of search functions such as Google was most familiar. Almost everyone used search often (11 people) or very often (31 people); only one person used search sometime. With respect to the sharing of data in online communities, both for professional and leisure purpose, still a large majority of 31 resp. 34 people used it often or very often, but here there was a larger spread. Ratings are used slightly less, with answers being equally divided between sometimes (14 people), often (16 people) or very often (12). There are large differences in how often people use chat, with all options having a reasonable share. The least used option is online discussion forums, which almost all people use never (18 people), occasionally (11 people) or sometimes (10 people).

Table 8 Scores of participants on frequency of use of several forms of web-based tools relevant to the PCM functionalities

Use of tools related to web-based learning 1 = never, 5 = very often	Mean	SD	Min	Max	N
How often have you used / do you use search functions for finding information, such as Google or database search?	4,70	,513	3	5	43
How often have you shared / do you share sharing data and files with other people in online communities <i>for leisure (free time) purposes?</i>	4,05	1,056	1	5	44
How often have you shared / do you share sharing data and files with other people in online communities <i>for professional purposes?</i>	3,93	1,208	1	5	44
How often have you used / do you use ratings by others for selecting information for your own use?	3,84	,939	1	5	44
How often have you participated / do you participate in online chats?	3,48	1,320	1	5	44
How often have you participated / do you participate in online (web-based) discussion forums?	2,02	1,080	1	5	43

### *Facilities*

The large majority of people have a computer which is neither new nor old (36 people). 4 people have a new computer (less than one year old), and 4 people have an old

computer (more than a few years old). There are more differences with respect to the internet connection. Most people have a fast (25) or very fast (3) connection, yet 6 people have a slow connection and 10 people have a connection of medium speed.

### *Motivation*

For a large majority of the people, their motivation is related to job or proficiency improvement: they wish to keep up to date within their existing function or job (36 people), they wish to improve their proficiency level of a specific competence (31 people) or they wish to study for a new function or job or improve their current job level (27 people). Only a minority of people wish to define new learning goals for themselves, rather by reflecting on their current competences (17 people) or by exploring the possibilities in a new field (15 people). Only 11 people look for support on a non-trivial learning problem.

Table 9 Frequency with which possible reasons for following the pilot apply to participants' situation

Which of the following reasons for following the ICT Training pilot apply to your situation?	N
I want to keep up to date within my existing function or job	36
I want to improve my proficiency level of a specific competence	31
I want to study for a new function or job or improve my current job level	27
I want to reflect on my current competences to look which functions and jobs are within my reach or to help me define new learning goals	17
I want to explore the possibilities in a new field (learning network) to help define new learning goals	15
I want some support on a non-trivial learning problem	11

Table 10 Frequency with which several forms of involvement of participants' employers in the pilot occur

Which of the following describe(s) the involvement of your employer?	N
My employer is not involved in my following this course	40
Following this course successfully is necessary for me to obtain a new job function at my current employer.	4
My employer pays this course's fee	3
Following this course successfully is necessary for me to keep my current job function	3
My employer has allocated part of my working hours for following this course	2
My employer has obliged me to follow this course	0
I follow this course as part of a trajectory for people who are unemployed or who are in danger of becoming unemployed.	0

With almost all participants, the employer is not involved in their following the ICT Training pilot (40 people). Only with 4 people there is involvement of the employer, with following the course being necessary for either keeping their current job (3 people) or acquiring a new job (4 people). The employer of 3 people pays the pilot fee, and 2 people have been allocated working hours for following the pilot. In none of the cases had following the pilot been obliged by the employer. No people follow the course as part of a trajectory of people who are unemployed.

## Appreciation of PCM functionalities

The first part of the research was an evaluation of how people evaluated the several functionalities that the PCM offers. These functionalities include:

*The forum* - The forum is where discussion with other participants takes place. In the forum participants can read and post messages, which stay on the forum. Participants can react to individual messages of the forum at any time they like. Each element of the PCM has its own forum. Thus there is a forum with each competence profile (=set of connected competences), with each Competence Development Plan (=plan for acquiring one specific competence), with each action (= a learning activity) and with each resource (= a web resource used within a specific action).

*People / chat* - In the PCM people view, participants can see who is online, and they can start a chat with other people who are online at the same time. The PCM chat enables people to chat and to send files to each other. A chat history can or cannot be saved and kept. Contrary to a forum, a chat has a limited duration, and it is not possible to react to individual chat messages afterwards.

*Search* - In the PCM the search function can be used to find communities and competence profiles that match your learner needs.

*Rating* - Learners can provide ratings to each competence profile, Competence Development Plan, action or resource, to express their appreciation of that element. These rating can be used by others, e.g. in deciding whether or not they will use that element.

*Choosing elements and routes* - At different levels, the PCM allows the learner to take their own route and/or to make their own selection of elements, best fitting their learning needs.

*Marking elements as attained or completed* - The PCM allows learners to mark competence profiles, Competence Development Plans and actions as attained or completed. This possibility gives learners an overview of how their learning has progressed.

*Element descriptions* - All competence profiles, Competence Development Plans and actions can be supplied with a description, allowing developers to put in information on the element. A good description gives the learner an impression of how useful the element will be with respect to their learning needs.

*Hierarchical organisation* - The elements of the PCM are structured hierarchically, which will make it easier for learners to find their way to the learning resources.

## Forum

Of the 19 PCM participants, 11 indicated that they didn't use the forum at all. People who used the forum, did so to seek help on the course content (4) or on the course organisation (2), for sharing learning resources (2) or socializing (2). There were no participants who used the forum for providing help on the course content to others, discuss course contents, discuss competences they had to master, provide help on the course organisation to others, make appointments and make organisational decisions.

Most important reasons for not using the forum were lack of time (7) or that people didn't have problems with the course content or organisation (7). Incidentally, the reasons for not using the forum included the fact that there were no messages to which one could react (3) or that people didn't see the forum tab (2). Finally, one person saw messages by others, but could not provide help. There were no participants who didn't know how to post a message or who had lack of interest.

Two people posted one message to the forum, three people posted two messages and another three people posted three messages to the forum.

Four people read all posts in the forum, three only those posts that were relevant to them, and two people didn't read the posts in the forum. One person indicated that there were (almost) no posts in the forum.

The PCM has one separate forum for each resource, action, competence and other elements. Eight people indicated that they found it harder to find discussions because of this attachment to specific elements. Two people liked the fact that discussion on one resource or one action or one other element were concentrated and attached to that specific element. One person didn't know there were separate forums, and one person thought having separate forums didn't make a difference to having one forum. There were no participants who used only (almost) one forum exclusively.

Five people preferred having only one forum, 3 people preferred having separate forums, attached to specific elements, and 3 people had no preference.

The forum was considered useful by 14 people. Two people found it very useful, and 3 people found it not useful or useless.

### *Discussion*

Although almost all people considered the forum (very) useful, it was used only sparingly. The reasons for this were mostly not related to the forum itself: almost all non-use was because of lack of time or simply lack of problems to be discussed.

Some of the non-use or suboptimal use is related to the forum itself: 1 out of 5 people either didn't see the forum tab or didn't know how to post a message. The set-up of having one separate forum for each element might need further consideration: almost half of the people indicated that they found it harder to find discussions because of this set-up, and of the people indicating their preference there were more people who would prefer having only one forum over having separate forums than vice versa.

## Chat

Half (10 of the 19) PCM participants didn't use the chat at all. Of the participants who used the chat, options which were used by two or more people include to share learning resources (3), discuss course contents (2), for socializing (2).



There were two reasons for not using the chat that applied for one third of all participants: not having problems with the course content or organisation (7) or lack of time (7). Second most important were usability issues: people who either didn't see the people tab from which they could start a chat (2) or who didn't know how to start a chat (3). For one person, lack of interest was a reason for not using the chat.

Of the people using chat, two people used it twice, two people used it three times, and one person used it six times. Of the two types of chat, chat with one other person was used by 7 people and the group chat was used by three people.

Almost all people rated the chat as useful (15) or very useful (2). For two people, the chat was neither useful nor useless.

### *Discussion*

The outcomes are very comparable to the outcomes on the forum: although almost all people considered the chat (very) useful, only half of them used it. Like the forum, most important reasons for non-use are not related to the chat functionality itself: people didn't use the chat mainly because they didn't have problems or because of lack of time. A comparison to the Moodle group shows that in that group nine people used the group chat and only one person used chat with one person. This might indicate that there are usability issues with the group chat in PCM. This point deserves further research.

## **Rating**

Of the 19 participants, 11 indicated that they didn't look at ratings provided by others. Of the people who used ratings by others, eight looked at the ratings and three of them used the ratings for the purpose of selecting elements, by selecting elements with a positive rating.

The most important reason for not using the ratings was lack of time (10). Besides, four people indicated that they didn't want to base their decision on using a learning element on the rating by others. Five people mentioned a reason related to usability: they didn't notice the rating tab (4) or they didn't understand what the ratings meant (1). There were no other reasons which were marked by more than one person.

For six people, the ratings provided by others turned out to match their own judgement well, for three others it matched neither badly nor well. Three people indicated that by using ratings provided by others, the time it took them to find learning resources has fallen. Two people provided one rating themselves and three people provided two ratings.

All people, except for one (17) considered the rating system useful.

## **Discussion**

Again, the pattern already found with the forum and the chat is repeated: almost all people consider it useful, but less than half uses it. Again, the most important reason is lack of time. Comparable to chat, the second most important reasons relates to a lack of need for using ratings: four people who indicated that they didn't want to base their decision of using learning elements on the ratings by others. Equally comparable, 1 out



of 4 people provided a reason related to usability. The use of ratings might have a beneficial effect, but more research is needed to draw any conclusions.

### **Choosing elements and routes**

The PCM offers the possibility for users to make their own selection of elements and to follow their own route. Around half of the participants made use of these options by making their own selection (12) and/or choosing their own order of elements (10).

The effects of making these choices are comparable for both options. In both cases five people enjoyed making their own choices and following their own order respectively. Increased efficiency of their learning is mentioned by four and three people respectively. There were only two people who afterwards thought that proceeding through all elements would have led to a better learning experience, but more people thought that following the prescribed order would have been better (4).

Nine people created their own Competence Development Plan, and of these eight people made use of the Competence Development Plans of others. All people marked their Competence Development Plan as shared; half of them know that someone else has used their plan (9), the other half doesn't know if anyone has used their plan (10).

#### *Discussion*

In general, making one's own selection of learning elements and/or following one's own route seems to be evaluated positively. However, the fact that 4 out of 10 indicate that it would have been better to follow the described order instead, is an indication that more research on this is needed. It also becomes clear that people didn't understand the questions on the Competence Development Plans well. Although half of them indicate that they didn't create their own Competence Development Plan, all of them provide an answer on what they know others did with the Competence Development Plan they created.

### **Marking elements as attained or completed**

Only one third (6) people made use of the option to mark elements as attained or completed. Non-use is clearly related to usability issues. Six people didn't notice the option was available, whereas seven people indicated they noticed the option was available, but they didn't know how to use it.

People used marking competences as complete at different points in time, namely when they had performed all actions related to the competence (3), when they had performed all action that were relevant to them for their mastery of the competence (3) or when they had the feeling that they mastered the competence, regardless of the use of actions within the competence (2).

The most cited effect of using marking elements as complete was the learning progressed more efficiently (5); besides that, two people enjoyed having this type of overview. Strangely enough, none of the respondents marked any of the options on how they used the completion marks. Overall, marking elements as complete is considered useful by half of the people (10), five people found this option not useful neither useless, and two found it useless.

### *Discussion*

It is clear that many if not most people do not know how to use the option to mark elements as complete. This might be due to the fact that they didn't notice the option. The fact that this option is seldom found in learning environments might be an alternative explanation. Most probably the relatively low overall rating of this option is related to this.

## **Element descriptions**

With all learning elements of the PCM, detailed descriptions can be provided. All participants indicated that they used these descriptions in selecting learning elements that matched their own need. To the extent that they did not use the descriptions, the mostly cited reason was lack of time (7). Four people indicated non-use because they did not understand the descriptions, and three people provided as reason for non-use that they wanted to pass through all parts of the competence profile anyway.

For a majority of the people, descriptions were (completely) detailed and accurate (11), for seven people they were in between, and to one person they were not detailed and accurate. For half of the people, the descriptions provided matched their own impression well (10) or completely (1), for eight people the match was not badly nor well. Thanks to the descriptions, the time to find resources has fallen (6) or even fallen sharply (13).

### *Discussion*

It is well-known that good descriptions are very important in finding the right resources, and our outcomes strengthen this conclusion. At the same time, providing detailed and accurate descriptions is not something which can be taken for granted.

## **Hierarchical organisation**

The PCM has a hierarchical organisation of resources within actions, actions within Competence Development Plans, and Competence Development Plans within competences. For the participants, this organisation has two main functions. For the majority of the participants, it provides a natural order in which to proceed through the learning resources (13). For half of the people, it makes it easier for them to find their way to the learning resources (9).

## **PCM and Moodle: the experiment**

There were two conditions (see description on section "Experimental (PCM) vs. control (Moodle) groups"). 19 of the participants worked in the experimental condition, using the PCM system and 25 participants worked in the control condition, using the Moodle system.

## Results

In general, there were no differences between the two conditions. Only two results reached the required significance level of 0.005<sup>2</sup>. First, in the experimental condition, more participants passed the final competence assessment (see Table 11). Second, in the experimental condition, participants felt more in control of their own learning (see table 12). Both the original data and the log-linear transformation of these data yielded a significance level below 0.005.

Table 11 Number of participants who passed or failed the final competence assessment

	learning condition			
		PCM	Moodle	Total
final competence assessment passed	didn't pass	6	19	25
	passed	13	6	19
Total		19	25	44

Pearson Chi-Square = 8,682 (df = 1, p = 0.003)

Table 12 Scores of participants on the hypotheses' indicators (see Appendix 2)

		N	Mean	SD	Min	Max		df	F	Sig.
appreciation of control	PCM	19	1,8333	,37268	1,17	2,50	Between Groups	1	9,905	,003
	Moodle	25	2,3733	,67234	1,33	3,83	Within Groups	42		
	Total	44	2,1402	,61939	1,17	3,83	Total	43		
appreciation of control (converted to natural logarithms)	PCM	19	,5850	,21553	,15	,92	Between Groups	1	10,648	,002
	Moodle	25	,8291	,26614	,29	1,34	Within Groups	42		
	Total	44	,7237	,27190	,15	1,34	Total	43		
number of messages posted to forum	PCM	8	2,13	,835	1	3	Between Groups	1	5,764	,047
	Moodle	1	,00	.	0	0	Within Groups	7		
	Total	9	1,89	1,054	0	3	Total	8		
acquired knowledge and skills	PCM	19	3,8772	,54953	2,67	5,00	Between Groups	1	3,489	,069
	Moodle	25	3,4767	,80130	1,83	4,75	Within Groups	42		
	Total	44	3,6496	,72461	1,83	5,00	Total	43		
number of times chat used	PCM	5	3,20	1,643	2	6	Between Groups	1	4,473	,072
	Moodle	4	10,00	7,071	5	20	Within Groups	7		
	Total	9	6,22	5,740	2	20	Total	8		
appreciation of learning resources	PCM	19	2,0877	,57566	1,33	3,00	Between Groups	1	,922	,343
	Moodle	24	1,9167	,58359	1,00	3,33	Within Groups	41		

<sup>2</sup> In hypothesis testing the significance level (or p) refers to the probability that the obtain results indicate there is an effect (in this case the effect of the learning environment, i.e., the PCM vs. Moodle) erroneously. In social science hypothesis testing, this value is often fixed at 5 %, or p < 0.05. However, if multiple hypotheses as tested - as it is done in this case- then there is an increasing probability that some of the hypotheses will produce something significant at the 5 % level, whereas the result is in fact the result of pure chance. A rule of thumb is to divide a significance level of 0.05 by the number of hypotheses that are tested.

		N	Mean	SD	Min	Max		df	F	Sig.
	Total	43	1,9922	,57958	1,00	3,33	Total	42		
appreciation of learning route	PCM	19	1,8947	,59111	1,00	3,50	Between Groups	1	,378	,542
	Moodle	25	2,0000	,54006	1,00	3,50	Within Groups	42		
	Total	44	1,9545	,55843	1,00	3,50	Total	43		
overall rating of chat	PCM	19	2,00	,471	1	3	Between Groups	1	,361	,553
	Moodle	10	1,90	,316	1	2	Within Groups	27		
	Total	29	1,97	,421	1	3	Total	28		
overall rating of forum	PCM	19	2,05	,524	1	3	Between Groups	1	,093	,763
	Moodle	9	2,11	,333	2	3	Within Groups	26		
	Total	28	2,07	,466	1	3	Total	27		
appreciation of collaboration	PCM	19	1,8947	,49756	1,00	3,00	Between Groups	1	,036	,849
	Moodle	25	1,8667	,47140	1,00	2,67	Within Groups	42		
	Total	44	1,8788	,47735	1,00	3,00	Total	43		

The data thus lend support to our hypotheses that use of the PCM will lead to better competence development, and that use of the PCM will lead to more control over learning. The other hypothesis are not supported, but neither rejected by these data.

## Discussion

From the experiment it became clear that more people in the PCM condition passed the competence assessment, and people in the PCM condition felt more in control of their own learning. An important question then arises how feeling in control can be related to the opportunities that the PCM offers to put people in control: forum, chat, rating, choosing elements and routes, marking elements as attained or completed, element descriptions, hierarchical organisation of elements.

First, it must be noted that, when asked, people indicate that the supportive elements are useful. This applies to forum, chat and rating. Only marking as complete is rated in between useful, and not useful nor useless, but this is probably related to the fact that a large majority either didn't see the mark as complete option, or didn't know how to use it.

Despite the fact that almost all participants considered these facilities useful, only half of the participants make use of the forum, chat and ratings, and even less make use of the marking as complete option, probably for the reasons mentioned above. The most important reasons for using these facilities were lack of time. Thus, it seems as if many participants view these facilities as useful, but their use takes time, so you use them only if you have got time.

The question is whether people are right in their estimation that using these facilities takes time. The most often mentioned effect of marking elements as complete is that learning becomes more efficient. Increased efficiency is also mentioned with other facilities offered by the PCM: making one's own selection, and the hierarchical organization, which makes it easy for people to find their way to the learning resources.

The PCM offers people the possibility to follow their own path through the learning resources. There seems to be a divide between people in their appreciation of this opportunity. On the one hand, there are people who at the beginning already preferred to follow their own path, and there were people who enjoyed following their own path. On the other hand there were people who concluded afterwards that it would have been better to follow the prescribed order instead and there were also people who appreciated the fact that the hierarchical organization of elements provided a natural path to be followed. Interestingly, the proportion of people who prefer to follow their own path after the pilot has risen compared to the situation before the pilot.

There were some usability issues with the use of the facilities, but they were not predominant. There were almost no people who didn't know how to use the forum, but there were slightly more who didn't know how to use the chat. Perhaps this is related to the fact that the chat has no separate tab, but a chat can only be started by clicking on a participant who is online. It might be that the group chat is difficult to use: in the Moodle condition more people made use of the group chat than individual chat, and for the PCM this ration is reversed. There are clearly usability issues with the marking as complete option: a large majority either didn't know it was available or didn't know how to use it. There is one problem with the PCM forums: almost half of the people found it harder to find discussions as separate forums were attached to individual elements. Related to this, there were more people who had a preference for one forum than for separate forums for each element.

Undoubtedly, these results are influenced by characteristics of the participants. The pilot participants were highly educated middle-aged teachers, who in general were more used to using the internet for searching for information than for discussion and data sharing. Although not sent or obliged by their employers, their motivation was job improvement and improvement of their proficiency level, and not defining learning goals for themselves. Outcomes may well be substantially different for different target groups.

## 4. Conclusions and Recommendations

The aim of this section is to summarize the results obtained so far from the cycle 1 pilots and formulate recommendations for future development of pilots and system applications. As previously elaborated in this document, the evaluation of the cycle 1 pilots is still ongoing and will probably last until the end of February. Although the evaluation activities conducted so far and their results have revealed important aspects about the TENCompetence approach, other planned activities will further our knowledge about its validity. These activities will concentrate on the aspects that were weakly covered so far and capitalize on the analysis of log files to understand the interaction with the systems in depth. This can reveal specific causes behind certain problems encountered while learners performed learning related operations on the deployed systems. Hence, the second version of this document will argue more precisely about the aspects and components of these systems (mainly PCM) and help prepare the cycle 2 evaluation plans and activities.

In the following, we present a summary of the results reported so far, both on the preliminary pilots whose evaluations have concluded, and on the cycle 1 pilots whose evaluations is still ongoing. Then we draw recommendations for future pilot development as well as for the developers of eLearning systems and applications. Finally, we argue about current plans for future works on pilots and related tasks.

### 4.1 Summary of results

The summary of results is organized in two sections differentiating the conclusions obtained from the preliminary pilots and those from the actual cycle 1 pilots.

#### 4.1.1 Results of preliminary pilots

Preliminary pilots represent an important step previous to actual cycle 1 pilots. They provided an initial environment for testing in real settings preliminary versions of the scenarios to be further implemented and evaluated in actual cycle 1 pilots. These authentic experiences helped to identify the problems that may emerge in the pilots and offered a set of results which were considered in the design and implementation of actual cycle 1 pilots. These useful results can be summarized as follows.

*The educational activities and resources designed and developed for the Digital Cinema pilot are adequate.* The participants in the preliminary pilot were mainly students of a master in digital imaging and cinema. Most of them are professionals working in the areas of 3D graphics or audiovisual design. They used these resources following a set of Units of Learning running in a SLeD server. The results indicated that these resources can be used autonomously or in a self-tutoring fashion and that the support of the tutors is not critical in this respect. The positive results of the assessment also showed the validity of the activities and resources. A fact to be considered in the evaluation of actual pilots was that in this preliminary experience most of the learners followed the same learning path, though the segmentation of material into different units. What was interesting is that learners came back to previously accomplished activities according to their own criteria. Though not proposing specific group-based work, the resources and

activities were able to trigger interactions between several learners when they identified similar or related interests.

*Support for communication* (between learners and between tutors and learners) is *essential*. The infrastructure implemented for the preliminary DC pilot, which integrated a blog and a forum, tried to simulate the behaviour, to a modest extent, of the envisaged TENCompetence infrastructure (that aims, among many other aspects, at integrating knowledge sharing tools such as Web 2.0 blogs) which were going to be available in future pilots. The forum and the blog were significantly used in the preliminary experience, which decreased the workload of the tutor since some questions were not repeated by the learners. Learners always appreciated the teacher's attention, which provided guidance and became important in assessment activities. Moreover, learners adequately differentiated and used the forum (communication including the teacher) and the blog (communication not involving the teacher). The e-mail was also largely employed but its use was mainly concentrated at the beginning of the course. Some drawbacks that were found in this preliminary pilot and that are expected to be solved in actual pilots because of the use of the TENCompetence infrastructure are: synchronous communication services like chat can be useful, questions in the forum and comments in the blogs were divergent in their subjects, sometimes beyond the course's scope.

Though it seemed that some learners imitated the actions of the informer or animator (emulating a learner), we do not have enough evidences to state that his participation significantly influence the behaviour of the participants. TENCompetence infrastructure and future pilots should consider as a focus of study this phenomenon and *investigate how motivation in this type of communities can be supported with favourable protocols or environments so that more effective effects are achieved*. In this sense, alternatives such as adopting peer to peer learning according to their competence profile could be considered in the future.

In average, learners required almost *three months to complete the course* (with a weekly effort of 6 hours). The performance of the preliminary pilot infrastructure was satisfactory. Client-side *installations of Brainstorm 3D Studio Max* was qualified as *complicated*. This result should be considered in future pilots so that adequate support regarding Brainstorm software installation is offered.

Moreover, the preliminary version of the ICT Teacher Training pilot also involved testing the very initial version of PCM. *The implementers of this pilot valued as very positive the accomplishment of the preliminary experience to train the tutors and trainers for the actual pilots. Furthermore, the participants appreciated the training approach and the general perspective implemented in the PCM.* They also obtained good assessment regarding the I\*Teach methodology. However, most of them declare specific *PCM usability problems*. These problems were reported to WP3 and discussed during a workshop in Sofia for their consideration in future realises of the PCM.

On the other hand, these results are not only interested for the input they represent to cycle 1 pilots, but they can be also used to be comparatively analyzed with the results of these and further pilots as is initially drawn in next section.

#### **4.1.2 Results of Cycle 1 pilots**

In general, it is hard to predict how users will utilize a computer system, especially if the latter is being developed upon the basis of a novel approach such as TENCompetence PCM. Evaluation of preliminary versions of the system in



development can help validate its approach and pinpoint potential defects or weaknesses early in the development process. Hence, the goals of the evaluation activities conducted with cycle 1 pilots can be clustered into two categories: validation of the system's approach, and the identification of potential problems.

*The results of the cycle 1 pilots evaluations have validated to a large extent the approach of TENCompetence in providing a platform for lifelong learning.* It shows that it is possible to connect learners with learning materials through digital communication. The design and implementation aspects of this communication channel influence its success on a large scale. As seen in the results of the pilots' evaluations, learners in fact make academic progress in acquiring the competences that they seek. Competence development is indeed possible but is faced by a number of barriers that might endanger its efficiency. Most of these barriers can be addressed by designing a suitable platform for the transmission of knowledge and the support of lifelong competence development. *The learning curve associated with operating the platform (in this case, the PCM) should be lowered to allow universal access.* The usability of the platform itself should also be augmented and extended toward universal usability (including age, gender, culture, and race). The complexity of content design should be abated in order to allow non-experts to produce learning resources in a fast and adequate manner. The availability of support and help on demand increase the learner's confidence in the system and his or her reliance on it. Finally, the provision of the right form of digital communication medium re-establishes the social and collaborative connections that learners utilise in the classroom.

The experimentations with the PCM and the cycle 1 pilots have shown that these challenges were addressed in the implementation in different depths and on different levels. *The PCM support for the development of learning resources and their deployment remains limited while future plans anticipate its extension.* The schema used to organize the learning resources into actions was intuitively captured by the learners as the results so far demonstrate, but further inquiries on the issue is still pending the final evaluation and the results of the log-files analysis. The learning curve associated with operation the platform can be lower much further with the inclusion of guides, help materials, and the development of a clearer registration process, all of which are being addressed in the project in the time of writing this report. On the other hand, *customization of the PCM interface in terms of language preferences will also contribute in lowering this learning curve.* *The PCM interface in its current state suffers a number of usability problems.* First, there is a lack of context for the different functionalities as they are all grouped into small numbers of windows. Inconsistencies exist in the display features of functionalities and their locations on the interface as some are implemented as links while others as buttons. Some are located in a top menu while others are placed on the bottom of the window. The learners have complained repetitively about aspects of usability, but their experiences and feedback helped in drawing the next steps in the iterative design of the PCM interface and its interaction contexts.

Our experience with the preliminary pilots and the cycle 1 pilots have shown that the provision of digital communication mediums such as a chat tool, a forum, and a blog, can trigger the formation of social relations and interaction between the learners around the learning resources. However, it's still unclear to which extent these mediums can support the development of lifelong learning societies in the manner in which they are

designed, integrated, and presented to the learners. *Specific aspects of investigations include the development and support of social relations among learners without previous acquaintances outside the learning network.* Factors that influence the development of these relations and the subsequent rising of learning networks are being studied. These include the role of hierarchical relations within the society and the development of such roles and authorities, and the existence of a private communication channel between learners.

The extent to which the PCM supports the development of lifelong learning networks has been investigated. Although the sustainability of the pilots as a running experience depended mainly on the learners' involvement and the system's design, the evaluation team has found that direct interventions from support personnel and teachers were sometimes necessary. This is partly due to usability problems in the PCM interface and the lack of adequate digitalized help paradigms. Although such interventions have successfully conserved the continuity of the learning experience and the development of social relations and consequently learning networks, they came at a cost that challenge their scalability towards supporting large lifelong learning networks. Help and support paradigms for large learning networks need to be developed with scalability as one of the main target factors.

## **4.2 Recommendations**

Based on the evaluation results obtained so far, several recommendations can be drafted for the deployment of experimental pilots and future system development. The following section discusses these recommendations by concentrating on the two aspects separately.

The recommendations on the deployment of experimental pilots draw on our experience in designing, implementing, and deploying pilots for evaluating eLearning systems within TENCompetence. They are aimed at future activities within WP4, especially the design and implementation of the second cycle pilots. On the other hand, the recommendations for developers of system applications are meant to clarify design and implementation aspects of eLearning infrastructures that were classified as important or influential during the running of the pilots. These recommendations focus on the development activities associated with the planned PCM's extension and improvement in cycle 2.

### **4.2.1 Recommendations for future pilot development**

Pilot design and conceptualization depend on the procedural experimentations sought after and the available infrastructure at hand. There are several requirements that must be provided in order to make pilot deployment possible, and it is recommended to analyse the availability of these requirements before initiating the pilot implementation plan. These requirements have been classified into four major categories or clusters and are presented in the following table:

**Table 13 Clustering of pilot pre-development requirements**

Accessible repository for learning resources and assessment activities	Makes possible the publishing of competence development resources and their distribution to the learners.
Available asynchronous (synchronous are optional) communication tools, resource sharing services, and other functional requirements	Provides the necessary infrastructure for maintenance of learning activities. Connects learners with each other, their tutors, and available support personnel.
The existence of interested learners and learner communities	Facilitates the formation of the experimental and control groups required for the evaluation, and interaction among the participants of the pilot.
Possibility for acquiring basic learning materials in digital format (better if already standard compliant).	Affects the cost requirements of developing competence development programs that serve the pilot's academic theme.

After studying how these four clusters of requirements are met within the experimental scope elected for pilot deployment, the priority is delegated to the development activities. Usually, attention is given to the composition of the competence development programs required by the learners first. For that, it has been found that smaller granularity in dividing the resources into learning activities and actions can facilitate the process of taking them in the customized order of personal preferences and achieving progress in competence development. The smaller the activities are, the better they are managed by the learners whom compose personalized learning paths by determining the order of the activities to take in accordance with their personal preferences and their individual needs. On the other hand, precedence relationships among learning activities instigate the learners to follow an order where knowledge is acquired progressively by addressing primitive sections before resorting to composite ones. It is important to avoid excessive chaining in the design of the curriculum where learning activities are arranged in accordance with their precedence order. Chaining forces learners to follow a strict progressive path along their competence development and prevents them from having options to customize their path in accordance with their personal preferences.

System deployment and installation do not fall within the responsibilities of the pilot development team as the latter is meant to test the first one. However, the early testing and validating the system from the perspectives of the learners and by the pilot development team can help identifying inconsistencies between the available functionalities and the pilot's functional requirements. Such activity can help preventing large complications upon the launching of the pilot, especially if possible inconsistencies between procedures explained in the learning activities and the system are discovered and treated. This testing and evaluation procedure usually puts the system to the test by performing several random learning activities and actions. It also verifies that the functional requirements are met by giving a hand-on testing to each functional component (chat, forum, resource sharing tools, etc.) The system also has to be evaluated according to the functional properties of the pilot's environment in order to make sure that the infrastructure supports the number of learners involved and their proper actions.

Finally, gathering or forming a learning community may sometimes become the most challenging task in pilot development and deployment. A pilot requires a minimal number of learners that should be contacted, informed, and registered within a relatively short amount of time to guarantee a successful launch. The time that is usually available for this task does not exceed two weeks (average maximum waiting time before learner gets disinterested). Two major factors influence the formation of learning communities: the size of the targeted learner-base and the marketing and advertising campaign devised to inform them. Sometimes it is difficult to bring the targeted learner-base to trust the learning approach advertised, especially if the pilot covers specific fields with intensive organization like medical disciplines. It's hence recommended to evaluate the cost of forming the required learning community in advance. The development team can send mass mails or broadcast announcements on the pilot's theme in order to estimate the responsiveness of the targeted learner-base. It can also invite existing networks (scholars, professionals, and others) to participate in the pilot in order to capitalize on the already-developed social relationships among their members. When possible and appropriate, live events can be organized to interact face to face with the potential participants and explain the workings of the pilot and its associated platform.

#### **4.2.2 Recommendations for developers of system applications**

Our experience with the pilots shows to what extent the system's design and implementation properties affect the competence development processes undertaken by the learners. The learners' functional requirements are diverse, and subject to personalization and customization. However, there are certain generic constraints that the developers of eLearning system applications and services need to take into consideration. The following table summarizes these constraints and clusters them into four categories:

Table 14 Constraints for developers of system applications

Proper interaction design	Definition of interaction contexts and integration of context-specific services.
Proper Interface design	Design for universal usability and customization. Adopting minimalism in interface design.
Relationship types and roles in learning networks	Empowerment of different roles and their discern ability, support for the development of social relationships in LLL networks.
Properties of learning environments	Using subtle notification techniques, providing help in context and help on demand.

The evaluation activities conducted so far show the relevance and importance of these constraints to the design of eLearning systems such as TENCompetence PCM. According to the learners' feedback received and analyzed, the current interaction design schema can be largely bettered by defining specific and independent contexts where services are clustered according to their roles. This can expand the contact that learners aim to maintain with learning resources by providing it in the right context and at the right time. Based on the learners' interaction with the system and the system's features, three contexts of interaction can be directly identified: learner-entered

overview, search and retrieval, and manipulation. Learner-centred overview is the context where the learner logs in and retrieves his/her personal data (registered courses, profile, contacts, notes...). The search and retrieval context capture the learner's quest for new resources, knowledge, or people. The information retrieved or appropriated is manipulated in the third context where learners engage in learning activities, develop their competences, produce materials themselves, and take assessment tasks. The three-context explained here is a simple proposal or a starting ground for work on interaction contexts (identification, isolation, and engineering). We recommend that similar investigations are conducted as part of the design process of future systems or future versions.

On the subject of interface design, our engagement with the pilots have revealed that further work is required to bring the interface design of the PCM to address the requirements of universal usability. Universal usability calls for designing interfaces in a manner that makes it possible for learners of all ages, genders, and cultures to operate them comfortably. In the case of the TENCompetence PCM, the focus of usability has a European range. However, in view of the diversity of learner-bases within the European continent, the challenges of achieving a wide usability disposition remain considerable. In this standpoint, we recommend to adopt a minimalistic approach in the design of the interfaces in order to alleviate them as much as possible. Customization in terms of interface choice of language, colours, text-size and others can help learners converge the interfaces toward their preferred operational settings. For example, this allows elderly people to adapt the interfaces used to the physical constraints that these people have acquired with age.

In learning networks relationships among learners, participants, and moderators can vary noticeably from social networks of interests that have become popular on the web. In large social networks, moderators are elected or selected to manage interaction and maintain the rules of engagements. The role of the teacher or tutor covers similar duties but extends to the provision of knowledge, assessment, and professional feedback. On the other hand, learners can act like experts whenever they reach high proficiencies in certain competences and subsequently can advice other novice learners and provide them with expert feedback or peer assessment on the relevant competences. Hence, learning networks may potentially differ from social networks by hosting a varied and specialized roles and authorities, besides the usual social relationships based on mutual acquaintance and interchange of discussions on the digital medium. We recommend that the tools and services designed for supporting the development of lifelong learning networks

Learning environments have specific characteristics that should be taken into consideration while designing learning platforms. These characteristics are based upon the settings that learners need to have in order to perform learning activities and to assimilate the materials involved. The design of the learning platforms should promote moments of reflection and concentration by providing an immersive experience that respects the pace of each learner and adapt accordingly. Several design practices have been identified during our experimentations and we recommend these practices to be integrated in later developments. First, it is imperative to use subtle notifications to pass information to the learners instead of the classic notification techniques that disturb the learning process by interrupting learners while they are involved in learning activities. Second, help and guidance sometimes becomes of prime importance to the learning

process, especially if the learner is stuck in using the system or assimilating the learning materials. Help on demand should be made available when the learner asks for it. Using prior training or an introductory crash course on the system benefits the learner, but does not anticipate individual problems that can be encountered later. Finally, learners use visual and social cues when they are physically reunited in a classroom. Emulating these cues in social communications empowers social interaction and helps learners understand the status of each other, their availability, and their availability for interruption.

### **4.3 Future Works**

This deliverable shows the first encouraging results of cycle 1 pilots. These results are mainly provided by ICT Teacher Training pilot since it has been already finished. Besides, the implementation of both pilots (Digital Cinema and ICT Teacher Training) have also jointly offered a series of valuable lessons learned that have enable the formulation of a set of conclusions and recommendations for future pilot developments and system developers. Nevertheless, future works in the short term includes of course the completion of the DC pilot and its evaluation. Moreover, aggregating the results obtained from the questionnaires with the findings provided by the log files is also a priority. The result of these efforts will be included in an updated version of this deliverable.

In addition, the planning of cycle 2 pilots considering the conclusions offered by cycle 1 has already started. These conclusions are being used in form of a reality-check test to analyze whether the already pre-planned pilots are feasible. In this analysis it is also heavily considered the aim of increasing scale, volume and involvement of partners in the pilots. One of the actions that is being performed in this sense is to cooperatively work with WP10 so that specific potentially interested associated partners are invited to conduct their own pilots. WP9 will be also involved in this process as far as training the involved stakeholders is concerned. An important element here will be the pilot development and evaluation methodology that is planned to be elaborated within WP4 based upon the experience gathered from cycle 1 and cycle 2 pilots. An internal version of this methodology will be available for partners and associated partners of the project in the coming months. Overall, cycle 2 pilots will be devoted to validate the integrated system achieved so far in meeting the seven objectives of TENCompetence.

Finally, the focus of the third cycle will be on preparing the business model pilots for validating/evaluating the complete TENCompetence environment, which will be comprised of the finalized components developed by the aspect WPs as well as the functionalities defined in WP2 and implemented in WP3.



## References

- Anderson, P., (2007) "What is Web 2.0? Ideas, technologies and implications for education" JISC Technical Report, Retrieved 23rd November, 2007, from <http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf>
- Brainstorm. (2007). "Brainstorming website." Retrieved 23rd November, 2007, from <http://www.brainstorm.es>
- Chen, H.-T., & Rossi, P. H. (1987). The theory-driven approach to validity. *Evaluation and Program Planning*, 10(1), 95-103.
- Costner, H. L. (1989). The validity of conclusions in evaluation research: A further development of Chen and Rossi's theory-driven approach. *Evaluation and Program Planning*, 12(4), 345-353.
- Fisher D., et al (2006) You are who you talk to: detecting roles in usenet newsgroups, In Proceedings of the 39<sup>th</sup> Annual Hawaii International Conference on System Sciences, Washington, DC, USA.
- Griffiths, D., et al (2007) "TENCompetence D4.1 Pilot evaluation plan" Retrieved 23rd November, 2007, from <http://dspace.ou.nl/handle/1820/684>
- EC WG Improving education of teachers and trainers Progress Report (2003) *IMPLEMENTATION OF "EDUCATION & TRAINING 2010" WORK PROGRAMME*, Retrieved 28<sup>th</sup> November 2007 from [http://ec.europa.eu/education/policies/2010/doc/working-group-report\\_en.pdf](http://ec.europa.eu/education/policies/2010/doc/working-group-report_en.pdf)
- EC WG ICT in Education and Training Progress Report (2003) *IMPLEMENTATION OF "EDUCATION & TRAINING 2010" WORK PROGRAMME*, Retrieved 28<sup>th</sup> November 2007 from [http://ec.europa.eu/education/policies/2010/doc/it-technologies\\_en.pdf](http://ec.europa.eu/education/policies/2010/doc/it-technologies_en.pdf)
- IP Racine. (2007). "Project website." Retrieved 23rd November, 2007, from <http://www.ipracine.org/>
- I\*Teach. (2007). "Project website." Retrieved 23rd November, 2007, from <http://i-teach.fmi.uni-sofia.bg/>
- I\*Teach. Methodological Handbook (2007) Methodology Handbook on ICT-enhanced skills, ISBN: 978-954-92146-2-8, Published by Faleza-office 2000, Sofia, Bulgaria.
- King, J. A., Morris, L. L., & Fitz-Gibbon, C. T. (1987). *How to assess program implementation* (2nd ed ed.). Newbury Park, Calif.: Sage Publications.
- Koper, E.J.R. (2001). Modeling units of study from a pedagogical perspective: the pedagogical meta-model behind EML. Retrieved 23rd November, 2007, from <http://hdl.handle.net/1820/36>
- Koper, E.J.R. (2007). Building Learning Networks for Lifelong Learning [keynote at the 23rd dies natalis of the Open University of the Netherlands, 28 September 2007]. Heerlen: Open University of the Netherlands.
- Patton, M. Q. (1997). *Utilization-focused evaluation: the new century text* (3rd ed ed.). Thousand Oaks, CA: SAGE.
- Provus, M. (1971). *Discrepancy evaluation: for educational program improvement and assessment*. Berkeley, CA: McCutchan.



Rosmalen van, P., Brouns, F., Sloep, P., Kester, L., Berlanga, A., Bitter, M., Koper, R., Question-Answering connecting and supporting the learner, TENCompetence Open Workshop on Current research on IMS Learning Design and Lifelong Competence Development Infrastructures, Barcelona, Spain. Retrieved 23rd November, 2007, from <http://dspace.ou.nl/handle/1820/1095>

Schoonenboom, J., Sligte, H., Moghnieh, A., Specht, M., Glahn, C. & Stefanov, K. (2007) Pilot evaluation in TENCompetence: a theory-driven model, TENCompetence Open Workshop on Current research on IMS Learning Design and Lifelong Competence Development Infrastructures, Barcelona, Spain. Retrieved 23rd November, 2007, from <http://dspace.ou.nl/handle/1820/1078>

Scriven, M. (1993). *Hard-won lessons in program evaluation*. San Francisco: Jossey-Bass.  
Williams, W., & Elmore, R. F. (Eds.). (1976). *Social program implementation*. New York; London: Academic Press.

Schiano, D. Nardi, B. Gumbrecht, M. Swatz L. (2004) Blogging for the rest of us. Proceedings of ACM CHI04, Vienna, Austria.

Statcounter (2007). "Website." Retrieved 23rd November, 2007, from <http://www.statcounter.com/>

Stefanov, K., Naskinova, I. & Nikolov, R. (2007) ICT-enhanced Teacher training for Lifelong Competence Development, IMICT 2007, Boston, USA.

SLeD. (2007). "Project website." Retrieved 23rd November, 2007, from <http://SLeD.open.ac.uk>

Vogten, H, Koper, R., Martens, H. & Van Bruggen, J. (2007). Using the Personal Competence Manager as a complementary approach to IMS Learning Design authoring. International Learning Environments.

## **Appendix 1: Learner's pre- and post-test questionnaires**

### **Learner's pre-test questionnaire**

*Important remarks for those who implement the pre-test questionnaire.*

- With each question, the first column refers to the question ID (identification number) as it should be visible in the data file that will be send to the evaluators. The second column shows the question number as it should be visible to the person who fills in the questionnaire.
- With each possible answer on a particular question, the number between square brackets ([ ]) refers to the value that should be filled in with that question in the data file. The text of the answer refers to the label that the participant should see on the input form.

E.g. participants see on their input form question (6) and they can choose between 'primary school, secondary school' etc. If a participant chooses 'secondary vocational education' on the input form, in the data file question P010 obtains value 3.

Dear participant in the xxx Pilot,

Thank you for participating in the xxx Pilot. The xxx Pilot is a pilot within the TENCompetence project, which aims at establishing an infrastructure for life-long competence development. As the infrastructure is under development, it is very important for us to evaluate how the infrastructure is used in the xxx Pilot. As part of the evaluation, we have set-up this questionnaire. Your participation in this evaluation would be highly appreciated, as feedback from the pilot participants is our main source for improving the infrastructure. We would therefore like to ask you to fill in this questionnaire.

We like to stress that by returning this questionnaire, you only grant the researchers permission to use your answers for the evaluation of the pilot. The data you provide will be made completely anonymous before data analysis. They will be used by the evaluation researchers only and not be distributed to anyone else. Thank you for your participation!

The questionnaire contains 28 short questions in total; answering the questions will take about 10 minutes.

#### *Explanation on the questionnaire*

The questionnaire includes several question types:

- \_\_\_\_ asks for a short answer
- \_\_\_\_\_ indicates that you can type in longer text.
- \_\_\_ / \_\_\_ indicates that you have to choose one of several answers; you can

either circle the correct answer, or strike-through or remove the incorrect answer.

- a round box ‘o’ indicates that you have to choose one of the available answers
- a square box ‘□’ indicates that you can choose several answers; tick all answers that apply.

<b>Background information</b>		
P001	(1)	Date: ___ / ___ / 2007
P006	(2)	Name: _____ Note: your name is needed only to combine the information you provide before and after the pilot; your answers will be processed anonymously.
P007	(3)	Age: ___ years
P008	(4)	Sex: [1] Female / [2] male
P009	(5)	Country in which you live: _____
P010	(6)	Highest educational degree that you earn: ○ [1] Primary school ○ [2] Secondary school ○ [3] Secondary vocational education ○ [4] Higher vocational education ○ [5] Bachelor’s degree ○ [6] University master’s degree ○ [7] PhD
P011	(7)	Profession: I am a _____
P012	(8)	Current job function: _____
P013	(9)	Number of years of experience in the [ <i>relevant profession, to be filled in by pilot coordinator</i> ] profession: ___ years
<b>Competence development</b>		
P010	(10)	How would you describe your current proficiency level with respect to [ <i>name of competence to be filled in by pilot coordinator</i> ] competence? [1] Novice / [2] beginner / [3] intermediate / [4] advanced / [5] expert
		How important is it for you to acquire the following types of competences?
P017	(11)	- Knowledge [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
P018	(12)	- Functional skills, know how to do things [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
P019	(13)	- Social skills [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
P020	(14)	- Knowing how to behave according to the rules and values of the profession [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
P021	(15)	- Knowing how to guide my future use by reflection on current practice [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
P022	(16)	- Knowing how to find creative solutions for problems related to this competence [1] Completely unimportant / [2] unimportant / [3] not unimportant nor important / [4] important / [5] very important
<b>Experience with web-based learning</b>		
P023	(17)	How would you describe your experience with distance learning? I have followed ___ courses / modules etc. through distance learning.
P024	(18)	How often have you participated / do you participate in online (webbased) discussion forums? [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P025	(19)	How often have you participated / do you participate in online chats?

		[1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P026	(20)	How often have you used / do you use search functions for finding information, such as Google or database search? [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P027	(21)	How often have you used / do you use ratings by others for selecting information for your own use? [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P028	(22)	How often have you shared / do you share sharing data and files with other people in online communities <i>for leisure (free time) purposes</i> ? [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P029	(23)	How often have you shared / do you share sharing data and files with other people in online communities <i>for professional purposes</i> ? [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often
P030	(24)	Which of the following reasons for following the xxxx pilot apply to your situation? Tick all of the answers listed below that apply to your situation. <input type="checkbox"/> [1] I want to keep up to date within my existing function or job <input type="checkbox"/> [2] I want to study for a new function or job or improve my current job level <input type="checkbox"/> [3] I want to reflect on my current competences to look which functions and jobs are within my reach or to help me define new learning goals <input type="checkbox"/> [4] I want to improve my proficiency level of a specific competence <input type="checkbox"/> [5] I want some support on a non-trivial learning problem <input type="checkbox"/> [6] I want to explore the possibilities in a new field (learning network) to help define new learning goals
P031	(25)	Which of the following describe(s) the involvement of your employer? Tick all of the answers listed below that apply to your situation. <input type="checkbox"/> [1] My employer is not involved in my following this course <input type="checkbox"/> [2] My employer pays this course's fee <input type="checkbox"/> [3] My employer has obliged me to follow this course <input type="checkbox"/> [4] My employer has allocated part of my working hours for following this course <input type="checkbox"/> [5] Following this course successfully is necessary for me to keep my current job function <input type="checkbox"/> [6] Following this course successfully is necessary for me to obtain a new job function at my current employer. <input type="checkbox"/> [7] I follow this course as part of a trajectory for people who are unemployed or who are in danger of becoming unemployed.
P032	(26)	The course will provide you with a diversity of web-based learning resources. In addition, your learning can be supported in several ways. We can outline a path for you, we can ask you to follow a specific learning path, or we can give you the freedom to follow your own path. What would be most supportive for your learning: <input type="radio"/> [1] Support me with learning resources only <input type="radio"/> [2] Support me with learning resources + an outlined path + the possibility to choose my own learning path <input type="radio"/> [3] Support me with learning resources + a path that I need to follow
		<b>Facilities</b>
P033	(27)	The computer you use most for accessing the course is best described as <input type="radio"/> [1] New (less than one year old) <input type="radio"/> [2] Neither new nor old <input type="radio"/> [3] Very old (more than a few years old)
P034	(28)	The Internet connection you use most for accessing the course can best be described as <input type="radio"/> [1] Slow <input type="radio"/> [2] Medium <input type="radio"/> [3] Fast <input type="radio"/> [4] Very fast

Thank you for your participation!

## Learner's post-test questionnaire – experimental group

Dear participant in the xxx Pilot,

Thank you for participating in the xxx Pilot. The xxx Pilot is a pilot within the TENCompetence project, which aims at establishing an infrastructure for life-long competence development. As the infrastructure is under development, it is very important for us to evaluate how the infrastructure is used in the xxx Pilot. As part of the evaluation, we have set-up this questionnaire. Your participation in this evaluation would be highly appreciated, as feedback from the pilot participants is our main source for improving the infrastructure. We would therefore like to ask you to fill in this questionnaire.

We like to stress that by returning this questionnaire, you only grant the researchers permission to use your answers for the evaluation of the pilot. The data you provide will be made completely anonymous before data analysis. They will be used by the evaluation researchers only and not be distributed to anyone else. Thank you for your participation!

In the questionnaire, we will start by asking a few questions on your overall appreciation, and after that we will zoom in on the separate elements of the Personal Competence Manager. The questionnaire contains 77 short questions in total; answering the questions will take 15 – 20 minutes, depending on your use of the Personal Competence Manager.

### *Explanation on the questionnaire*

The questionnaire includes several question types:

- \_\_\_\_ asks for a short answer
- \_\_\_\_\_ indicates that you can type in longer text.
- \_\_\_ / \_\_\_ indicates that you have to choose one of several answers; you can either circle the correct answer, or strike-through or remove the incorrect answer.
- a round box 'o' indicates that you have to choose one of the available answers
- a square box '□' indicates that you can choose several answers; tick all answers that apply.

<b>Background information</b>		
E002	(1)	Date: __ / __ / 2007
E003	(2)	Start date: __ / __ / 2007
E006	(3)	Name: _____ Note: your name is needed only to combine the information you provide before and after the pilot; your answers will be processed anonymously.
E014	(4)	<i>[if applicable]</i> Who was your teacher/coach/guide? <i>[alternatives to be provided by the pilot coordinator]</i>
E015	(5)	How many hours did you spend on the course? __ hours
E016	(6)	Was your learning process hindered by technical problems?

		[1] Not at all / [2] no / [3] neither yes nor no / [4] yes / [5] absolutely
		<b>I. Overall appreciation</b> The first part of the questionnaire is aimed at your overall appreciation of your learning experience.
		<b>Competence development</b>
E035	(7)	Did you complete your Competence Development Plan / the course [ <i>formulation depending upon the situation</i> ]? <input type="radio"/> [1] Yes <input type="radio"/> [2] No
E036	(8)	Did you pass the final competence assessment? <input type="radio"/> [1] I didn't take the final competence assessment <input type="radio"/> [2] I did not pass <input type="radio"/> [3] I passed
		How much have you learned with respect to the following types of competences?
E037	(9)	- Knowledge [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E038	(10)	- Functional skills, know how to do things [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E039	(11)	- Social skills [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E040	(12)	- Knowing how to behave according to the rules and values of the profession [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E041	(13)	- Knowing how to guide my future use by reflection on current practice [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E042	(14)	- Knowing how to find creative solutions for problems related to this competence [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
E043	(15)	I enjoyed this way of learning [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E044	(16)	I wish to continue developing this competence further [1] Certainly / [2] yes / [3] perhaps, perhaps not / [4] no / [5] certainly not
		<b>Appreciation of learning route</b>
		The learning route I followed was:
E045	(17)	[1] Very efficient / [2] efficient / [3] not efficient nor inefficient / [4] inefficient / [5] very inefficient
E046	(18)	[1] Very exciting / [2] exciting / [3] not exciting nor boring / [4] boring / [5] very boring
E047	(19)	The course provided you with a diversity of web-based learning resources. To support your learning, a learning path has been outlined, but you were free to choose your own learning path. What, in hindsight, would have been the most supportive for your learning process: <input type="radio"/> [1] Learning resources + the outlined path + the possibility to choose my own learning path was fine <input type="radio"/> [2] Learning resources only <input type="radio"/> [3] Learning resources + a path that I needed to follow
		<b>Appreciation of learning resources</b>
E048	(20)	How many of the available learning resources did you use? [1] 0 – 20 % / [2] 21 – 40 % / [3] 41 – 60 % / [4] 61 – 80 % / [5] 81 – 100 %
		The learning resources were:
E049	(21)	- [1] Very difficult / [2] difficult / [3] not difficult nor easy / [4] easy / [5] very easy
E050	(22)	- [1] Very interesting / [2] interesting / [3] not interesting nor uninteresting / [4] uninteresting / [5] very uninteresting
E051	(23)	- [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless

E052	(24)	The learning resources matched my learning needs [1] Not at all / [2] no / [3] neither yes nor no / [4] yes / [5] completely
		<b>Appreciation of control</b>
E053	(25)	In the beginning, I quickly got an overview of the competences involved and my current proficiency level [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E054	(26)	I had a good overview on what I had done and what I had to do [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E055	(27)	I had insight into how my learning progressed [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E056	(28)	I had the feeling that I learned exactly what I wanted to learn [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E057	(29)	I had the feeling that I could plan my own learning [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E058	(30)	I felt in control of my own learning [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
		<b>Appreciation of collaboration</b>
E059	(31)	Did you (also) work in a small group? ○ [1] Yes -> go to next question ○ [2] No -> go to (34)
E060	(32)	In our small group we had a lively and stimulating discussion [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E061	(33)	In our small group we had a lively and stimulating exchange of data and files [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E062	(34)	In the larger group of all people following this course, we had a lively and stimulating discussion [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
E063	(35)	In the larger group of all people following this course, we had a lively and stimulating exchange of data and files [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
		<b>II. Use of the Personal Competence manager</b> In the second part of the questionnaire we ask you about your use and appreciation of the several elements of the Personal Competence Manager.
		<b>The forum</b> The forum is where discussion with other participants takes place. In the forum participants can read and post messages, which stay on the forum. Participants can react to individual messages of the forum at any time they like. Each element of the PCM has its own forum. Thus there is a forum with each competence profile (=set of connected competences), with each Competence Development Plan (=plan for acquiring one specific competence), with each action (= a learning activity) and with each resource (= a web resource used within a specific action).
E064	(36)	To the extent that you did not post messages to the forum, what were your reasons? Please tick all that apply: <input type="checkbox"/> [1] I didn't see the forum tab <input type="checkbox"/> [2] I did not know how to post a message.



		<input type="checkbox"/> [3] I did not have problems with course content or organisation <input type="checkbox"/> [4] Lack of time <input type="checkbox"/> [5] Lack of interest <input type="checkbox"/> [6] There were no messages by others to which I could react <input type="checkbox"/> [7] There were messages by others, but I could not provide any help <input type="checkbox"/> [8] Other, namely _____
E065	(37)	<p>What did you use the forum for? Please tick all that apply:</p> <input type="checkbox"/> [1] I didn't use it at all -> go to (42) <input type="checkbox"/> [2] Seek help on course content <input type="checkbox"/> [3] Provide help on course content to others <input type="checkbox"/> [4] Discuss course content <input type="checkbox"/> [5] Discuss the competences that I had to master <input type="checkbox"/> [6] Share learning resources <input type="checkbox"/> [7] Seek help on course organisation <input type="checkbox"/> [8] Provide help on course organisation others <input type="checkbox"/> [9] Make appointments, e.g. for chat meetings <input type="checkbox"/> [10] Make organisational decisions <input type="checkbox"/> [11] Socializing <input type="checkbox"/> [12] Other, namely _____
E066	(38)	<p>How many messages did you post to the forum (approximately)?</p> <p>_____</p>
E067	(39)	<p>Did you read posts from others</p> <input type="radio"/> [1] No, there were (almost) no posts in the forum. <input type="radio"/> [2] No, there were posts in the forum, but I didn't read them <input type="radio"/> [3] I read (almost) all posts in the forum <input type="radio"/> [4] I read only those posts in the forum that seemed relevant to me.
E075	(40)	<p>What is your experience with having one separate forum for each resource, action, competence etc.? Please tick all that apply:</p> <input type="checkbox"/> [1] I didn't know there were separate forums <input type="checkbox"/> [2] I liked that discussions on one resource or one action were concentrated and attached to that specific resource or action <input type="checkbox"/> [3] It was harder to find discussions, as they were attached to specific elements <input type="checkbox"/> [4] It didn't make a difference compared to having one separate forum <input type="checkbox"/> [5] We used only one forum (almost) exclusively
E076	(41)	<p>Which do you prefer?</p> <input type="radio"/> [1] Having separate forums, attached to specific elements <input type="radio"/> [2] Having only one forum <input type="radio"/> [3] No preference
E068	(42)	<p>What is your overall rating of the forum?</p> <p>[1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless</p>
E069	(43)	<p>Did you use means other than the forum for group communication? Please tick all that apply:</p> <input type="checkbox"/> [1] No <input type="checkbox"/> [2] Email <input type="checkbox"/> [3] Chat <input type="checkbox"/> [4] Skype <input type="checkbox"/> [5] Telephone <input type="checkbox"/> [6] Video-conferencing <input type="checkbox"/> [7] Face-to-face meetings <input type="checkbox"/> [8] Other, namely _____
		<p><b>People / chat</b></p> <p>In the PCM people view, participants can see who is online, and they can start a chat with other people who are online at the same time. The PCM chat enables people to chat and to send files to each other. A chat history can or cannot be saved and kept. Contrary to a forum, a chat has a limited duration, and it is not possible to react to individual chat messages afterwards.</p>

E070	(44)	To the extent that you did not use the chat, what were your reasons? Please tick all that apply: <input type="checkbox"/> [1] I didn't see the people tab <input type="checkbox"/> [2] I did not know how to start a chat. <input type="checkbox"/> [3] I did not have problems with course content or organisation <input type="checkbox"/> [4] Lack of time <input type="checkbox"/> [5] Lack of interest <input type="checkbox"/> [6] Other, namely _____
E071	(45)	What did you use the chat for? Please tick all that apply: <input type="checkbox"/> [1] I didn't use it at all -> go to (48) <input type="checkbox"/> [2] Seek help on course content <input type="checkbox"/> [3] Provide help on course content to others <input type="checkbox"/> [4] Discuss course content <input type="checkbox"/> [5] Discuss the competences that I had to master <input type="checkbox"/> [6] Share learning resources <input type="checkbox"/> [7] Seek help on course organisation <input type="checkbox"/> [8] Provide help on course organisation others <input type="checkbox"/> [9] Make organisational decisions <input type="checkbox"/> [10] Socializing <input type="checkbox"/> [11] Other, namely _____
E072	(46)	Which types of chat did you use? Please tick all that apply <input type="checkbox"/> [1] Chat with one other person <input type="checkbox"/> [2] Group chat
E073	(47)	How many times did you use the PCM chat (approximately)? _____
E074	(48)	What is your overall rating of the PCM chat? [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless
		<b>Search</b> In the PCM the search function can be used to find communities and competence profiles that match your learner needs.
E077	(49)	Did you use the search function for finding communities and competence profiles? <input type="radio"/> [1] Yes -> go to the next question <input type="radio"/> [2] No -> go to (51)
E078	(50)	Using the search function, did you find communities and competence profiles that in the end proved useful for your learning? <input type="radio"/> [1] Yes <input type="radio"/> [2] No
		<b>Rating</b> Learners can provide ratings to each competence profile, Competence Development Plan, action or resource, to express their appreciation of that element. These rating can be used by others, e.g. in deciding whether or not they will use that element.
E079	(51)	To the extent that you did not use the ratings provided by others, what reasons did you have? Please tick all that apply: <input type="checkbox"/> [1] I didn't notice the rating tab <input type="checkbox"/> [2] There were no or hardly any ratings available <input type="checkbox"/> [3] I didn't understand what the ratings meant <input type="checkbox"/> [4] Lack of time <input type="checkbox"/> [5] Lack of interest <input type="checkbox"/> [6] I wanted to pass through all parts of the competence profile anyway <input type="checkbox"/> [7] I don't want to base my decision on using a learning element on the rating by others <input type="checkbox"/> [8] I do not consider ratings of others useful in judging the quality of a learning element
E080	(52)	Did you look at ratings provided by others? <input type="radio"/> [1] Yes <input type="radio"/> [2] No -> go to (57)

E081	(53)	Did you use ratings by others for the purpose of selecting learning elements? <input type="radio"/> [1] Yes -> go to the next question <input type="radio"/> [2] No -> go to (56)
E082	(54)	Which type of learning elements did you select using the ratings by others? Please tick all that apply: <input type="checkbox"/> [1] I selected learning elements with a positive rating <input type="checkbox"/> [2] I did not select learning elements with a negative rating
E083	(55)	By using the ratings provided by others, the time it took me to find the learning resources I needed has: [1] Fallen sharply / [2] fallen / [3] stayed the same / [4] gone up / [5] largely gone up
E084	(56)	The ratings provided by others turned out to match my own judgement... [1] Not at all / [2] badly / [3] not badly nor well / [4] well / [5] completely
E085	(57)	How do you value the rating system overall? [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless
E086	(58)	How many times did you provide ratings yourself to a learning element? ___ times
		<b>Choosing elements and routes</b> At different levels, the PCM allows the learner to take their own route and/or to make their own selection of elements, best fitting their learning needs.
E087	(59)	In general, did you work through all competences, actions, resources that were presented in an existing competence profile? <input type="radio"/> [1] I did not make use of any existing competence profile -> go to (63) <input type="radio"/> [2] Yes -> go to (61) <input type="radio"/> [3] No, I made my own selection -> go to the next question
E088	(60)	What effect did making your own selections from existing Competence Development Plans have on your learning? Please tick all that apply: <input type="checkbox"/> [1] None – using all elements would have had the same effect <input type="checkbox"/> [2] I enjoyed making my own choices, <input type="checkbox"/> [3] My learning was more efficient <input type="checkbox"/> [4] I think that proceeding through all elements instead would have led to a better learning experience.
E089	(61)	In general, did you work through competences, actions and resources in the order in an existing competence profile in which they were presented? <input type="radio"/> [1] Yes -> go to (63) <input type="radio"/> [2] No, I chose my own order
E090	(62)	What effect did proceeding in your own order within existing Competence Development Plans have on your learning? <input type="checkbox"/> [1] None –following the prescribed order would have had the same effect <input type="checkbox"/> [2] I enjoyed following my own order <input type="checkbox"/> [3] Following my own order made my learning more efficient <input type="checkbox"/> [4] It would have been better to follow the prescribed order instead
E091	(63)	Did you create your own Competence Development Plan? <input type="radio"/> [1] Yes <input type="radio"/> [2] No -> go to (66)
E092	(64)	In creating your own Competence Development Plan, did you make use of the Competence Development Plans of others? <input type="radio"/> [1] Yes <input type="radio"/> [2] No
E093	(65)	Did you share the Competence Development Plan you created with others? <input type="radio"/> [1] No, I didn't mark it as shared <input type="radio"/> [2] I marked it as shared, but I don't know if anyone else has used my plan <input type="radio"/> [3] I marked it as shared, and I know that someone else has used my plan
		<b>Marking elements as attained or completed</b> The PCM allows learners to mark competence profiles, Competence Development Plans and actions as attained or completed. This possibility gives learners an overview of how

		their learning has progressed.
E094	(66)	To the extent that you did not make use of marking complete, what reasons did you have? Please tick all that apply: <input type="checkbox"/> [1] I didn't notice that the possibility was available <input type="checkbox"/> [2] I noticed that this possibility was there, but I didn't know how to use it <input type="checkbox"/> [3] I didn't consider marking competence profiles as complete as helpful <input type="checkbox"/> [4] I didn't consider marking Competence Development Plans as complete as helpful <input type="checkbox"/> [5] I didn't consider marking actions as complete as helpful
E095	(67)	Did you make use of the possibility to mark learning elements as complete? <input type="radio"/> [1] Yes <input type="radio"/> [2] No -> go to (71)
E096	(68)	When did you mark <i>competences</i> as complete? Please tick all that apply: <input type="checkbox"/> [1] When I had done all actions related to the competence <input type="checkbox"/> [2] When I had done all actions within the Competence Development Plan which for me contributed to my mastery of the competence <input type="checkbox"/> [3] When I had the feeling that I had mastered the competence, regardless of the use of the actions within the competence
E097	(69)	How did you use the complete marks? Please tick all that apply: <input type="checkbox"/> [1] To see how many competence profiles, competences and actions I already mastered <input type="checkbox"/> [2] To see how many competence fields, competences or actions I still had to master <input type="checkbox"/> [3] To see where exactly I was in the learning process and to follow my way from there
E098	(70)	What effect did the use of possibility to mark elements as complete have on your learning? Please tick all that apply <input type="checkbox"/> [1] None <input type="checkbox"/> [2] I progressed more efficiently <input type="checkbox"/> [3] I enjoyed having this type of overview
E099	(71)	How would you rate the possibility to mark elements as complete? [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless
		<b>Element descriptions</b> All competence profiles, Competence Development Plans and actions can be supplied with a description, allowing developers to put in information on the element. A good description gives the learner an impression of how useful the element will be with respect to their learning needs.
E100	(72)	To the extent that you did not use the descriptions provided with Competence Development Plans and actions, what reasons did you have? Please tick all that apply: <input type="checkbox"/> [1] They were too short or too vague <input type="checkbox"/> [2] They were detailed, but I didn't understand them <input type="checkbox"/> [3] I wanted to pass through all parts of the competence profile anyway <input type="checkbox"/> [4] Lack of time <input type="checkbox"/> [5] Lack of interest <input type="checkbox"/> [6] I do not consider descriptions useful in judging the usefulness of a learning element
E101	(73)	Were the descriptions detailed and accurate? [1] Not at all / [2] no / [3] in between / [4] yes / [5] completely
E102	(74)	The descriptions turned out to match my own impression.... [1] Not at all / [2] badly / [3] not badly nor well / [4] well / [5] completely
E103	(75)	I used the descriptions in <i>selecting</i> learning elements that matched my own learning needs: <input type="radio"/> [1] Yes -> go to next question <input type="radio"/> [2] No -> go to (77)
E104	(76)	By using the descriptions, the time it took me to find the learning resources I needed has: [1] Fallen sharply / [2] fallen / [3] stayed the same / [4] gone up / [5] largely gone up
		<b>Hierarchical organisation</b> The elements of the PCM are structured hierarchically, which will make it easier for

		learners to find their way to the learning resources
E105	(77)	<p>How do you judge the value of the hierarchical organisation of resources within actions, actions within Competence Development Plans, and Competence Development Plans within competences? Please tick all that apply:</p> <p><input type="checkbox"/> [1] This organisation made it easy for me to find my way to the learning resources</p> <p><input type="checkbox"/> [2] This organisation provided a natural order for me in which to proceed through the learning resources</p> <p><input type="checkbox"/> [3] This organisation hindered me in getting an overview of all resources available</p> <p><input type="checkbox"/> [4] This organisation hindered me in sharing resources with other learners, as I could only share the high-level Competence Development Plans</p>

Thank you for your participation!

### **Learner's post-test questionnaire – control groups**

Dear participant in the xxx Pilot,

Thank you for participating in the xxx Pilot. The xxx Pilot is a pilot within the TENCompetence project, which aims at establishing an infrastructure for life-long competence development. As the infrastructure is under development, it is very important for us to evaluate how the infrastructure is used in the xxx Pilot. As part of the evaluation, we have set-up this questionnaire. Your participation in this evaluation would be highly appreciated, as feedback from the pilot participants is our main source for improving the infrastructure. We would therefore like to ask you to fill in this questionnaire.

We like to stress that by returning this questionnaire, you only grant the researchers permission to use your answers for the evaluation of the pilot. The data you provide will be made completely anonymous before data analysis. They will be used by the evaluation researchers only and not be distributed to anyone else. Thank you for your participation!

In the questionnaire, we will start by asking a few questions on your overall appreciation, and after that we will zoom in on the separate elements of the Personal Competence Manager. The questionnaire contains 46 short questions in total; answering the questions will take about 10 minutes.

#### *Explanation on the questionnaire*

The questionnaire includes several question types:

- \_\_\_\_ asks for a short answer
- \_\_\_\_\_ indicates that you can type in longer text.
- \_\_\_\_ / \_\_\_\_ indicates that you have to choose one of several answers; you can either circle the correct answer, or strike-through or remove the incorrect answer.
- o a round box 'o' indicates that you have to choose one of the available answers

- a square box ‘’ indicates that you can choose several answers; tick all answers that apply.

		<b>Background information</b>
C002	(1)	Date: __ / __ / 2007
C003	(2)	Start date: __ / __ / 2007
C006	(3)	Name: _____ Note: your name is needed only to combine the information you provide before and after the pilot; your answers will be processed anonymously.
C014	(4)	<i>[if applicable]</i> Who was your teacher/coach/guide? <i>[alternatives to be provided by the pilot coordinator]</i>
C015	(5)	How many hours did you spend on the course? __ hours
C016	(6)	Was your learning process hindered by technical problems? [1] Not at all / [2] no / [3] neither yes nor no / [4] yes / [5] absolutely
		<b>Competence development</b>
C035	(7)	Did you complete your Competence Development Plan / the course <i>[formulation depending upon the situation]</i> ? <input type="radio"/> [1] Yes <input type="radio"/> [2] No
C036	(8)	Did you pass the final competence assessment? <input type="radio"/> [1] I didn't take the final competence assessment <input type="radio"/> [2] I did not pass <input type="radio"/> [3] I passed
		How much have you learned with respect to the following types of competences?
C037	(9)	- Knowledge [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C038	(10)	- Functional skills, know how to do things [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C039	(11)	- Social skills [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C040	(12)	- Knowing how to behave according to the rules and values of the profession [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C041	(13)	- Knowing how to guide my future use by reflection on current practice [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C042	(14)	- Knowing how to find creative solutions for problems related to this competence [1] (Almost) nothing / [2] little / [3] not little, not much / [4] much / [5] very much
C043	(15)	I enjoyed this way of learning [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
C044	(16)	I wish to continue developing this competence further [1] Certainly / [2] yes / [3] perhaps, perhaps not / [4] no / [5] certainly not
		<b>Appreciation of learning route</b>
		The learning route I followed was:
C045	(17)	[1] Very efficient / [2] efficient / [3] not efficient nor inefficient / [4] inefficient / [5] very inefficient
C046	(18)	[1] Very exciting / [2] exciting / [3] not exciting nor boring / [4] boring / [5] very boring

C047	(19)	<p>The course provided you with a diversity of web-based learning resources. To support your learning, (1) we provided you with learning resources only, and you had to create your own learning path or (2) we outlined a learning path that you needed to follow [pilot coordinator: please select the option that applies to your situation]. What, in hindsight, would have been the most supportive for your learning process:</p> <ul style="list-style-type: none"> <li>○ [1] Learning resources + the outlined path + the possibility to choose my own learning path</li> <li>○ [2] Learning resources only [was fine; if applicable]</li> <li>○ [3] Learning resources + a path that I needed to follow [was fine; if applicable]</li> </ul>
		<b>Appreciation of learning resources</b>
C048	(20)	<p>How many of the available learning resources did you use?</p> <p>[1] 0 – 20 % / [2] 21 – 40 % / [3] 41 – 60 % / [4] 61 – 80 % / [5] 81 – 100 %</p>
		The learning resources were:
C049	(21)	- [1] Very difficult / [2] difficult / [3] not difficult nor easy / [4] easy / [5] very easy
C050	(22)	- [1] Very interesting / [2] interesting / [3] not interesting nor uninteresting / [4] uninteresting / [5] very uninteresting
C051	(23)	- [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless
C052	(24)	<p>The learning resources matched my learning needs</p> <p>[1] Not at all / [2] no / [3] neither yes nor no / [4] yes / [5] completely</p>
		<b>Appreciation of control</b>
C053	(25)	<p>In the beginning, I quickly got an overview of the competences involved and my current proficiency level</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C054	(26)	<p>I had a good overview on what I had done and what I had to do</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C055	(27)	<p>I had insight into how my learning progressed</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C056	(28)	<p>I had the feeling that I learned exactly what I wanted to learn</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C057	(29)	<p>I had the feeling that I could plan my own learning</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C058	(30)	<p>I felt in control of my own learning</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
		<b>Appreciation of collaboration</b>
C059	(31)	<p>Did you (also) work in a small group?</p> <ul style="list-style-type: none"> <li>○ [1] Yes -&gt; go to next question</li> <li>○ [2] No -&gt; go to (34)</li> </ul>
C060	(32)	<p>In our small group we had a lively and stimulating discussion</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C061	(33)	<p>In our small group we had a lively and stimulating exchange of data and files</p> <p>[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely</p>
C062	(34)	<p>In the larger group of all people following this course, we had a lively and stimulating discussion</p>



		[1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
C063	(35)	In the larger group of all people following this course, we had a lively and stimulating exchange of data and files [1] Agree completely / [2] agree / [3] neither agree nor disagree / [4] disagree / [5] disagree completely
		<b>The forum</b> The forum is one place for discussion with other participants. In the forum participants can read and post messages, which stay on the forum. Participants can react to individual messages of the forum at any time they like.
C064	(36)	To the extent that you did not post messages to the forum, what were your reasons? Please tick all that apply: <input type="checkbox"/> [1] I didn't see the forum <input type="checkbox"/> [2] I did not know how to post a message. <input type="checkbox"/> [3] I did not have problems with course content or organisation <input type="checkbox"/> [4] Lack of time <input type="checkbox"/> [5] Lack of interest <input type="checkbox"/> [6] There were no messages by others to which I could react <input type="checkbox"/> [7] There were messages by others, but I could not provide any help <input type="checkbox"/> [8] Other, namely _____
C065	(37)	What did you use the forum for? Please tick all that apply: <input type="checkbox"/> [1] I didn't use it at all -> go to (40) <input type="checkbox"/> [2] Seek help on course content <input type="checkbox"/> [3] Provide help on course content to others <input type="checkbox"/> [4] Discuss course content <input type="checkbox"/> [5] Discuss the competences that I had to master <input type="checkbox"/> [6] Share learning resources <input type="checkbox"/> [7] Seek help on course organisation <input type="checkbox"/> [8] Provide help on course organisation others <input type="checkbox"/> [9] Make appointments, e.g. for chat meetings <input type="checkbox"/> [10] Make organisational decisions <input type="checkbox"/> [11] Socializing <input type="checkbox"/> [12] Other, namely _____
C066	(38)	How many messages did you post to the forum (approximately)? _____
C067	(39)	Did you read posts from others <input type="radio"/> [1] No, there were (almost) no posts in the forum. <input type="radio"/> [2] No, there were posts in the forum, but I didn't read them <input type="radio"/> [3] I read (almost) all posts in the forum <input type="radio"/> [4] I read only those posts in the forum that seemed relevant to me.
C068	(40)	What is your overall rating of the forum? [1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless
C069	(41)	Did you use means other than the forum for group communication? Please tick all that apply: <input type="checkbox"/> [1] No <input type="checkbox"/> [2] Email <input type="checkbox"/> [3] Chat <input type="checkbox"/> [4] Skype <input type="checkbox"/> [5] Telephone <input type="checkbox"/> [6] Video-conferencing <input type="checkbox"/> [7] Face-to-face meetings <input type="checkbox"/> [8] Other, namely _____
		<b>Chat</b> Using chat, you can talk to other people when you and the others are online at the same time. A chat history can or cannot be saved and kept. Contrary to a forum, a chat has a limited duration, and it is not possible to react to individual chat messages afterwards.

C070	(42)	<p>To the extent that you did not use the chat, what were your reasons? Please tick all that apply:</p> <p><input type="checkbox"/> [1] I didn't see the chat</p> <p><input type="checkbox"/> [2] I did not know how to start a chat.</p> <p><input type="checkbox"/> [3] I did not have problems with course content or organisation</p> <p><input type="checkbox"/> [4] Lack of time</p> <p><input type="checkbox"/> [5] Lack of interest</p> <p><input type="checkbox"/> [6] Other, namely _____</p>
C071	(43)	<p>What did you use the chat for? Please tick all that apply:</p> <p><input type="checkbox"/> [1] I didn't use it at all -&gt; go to (46)</p> <p><input type="checkbox"/> [2] Seek help on course content</p> <p><input type="checkbox"/> [3] Provide help on course content to others</p> <p><input type="checkbox"/> [4] Discuss course content</p> <p><input type="checkbox"/> [5] Discuss the competences that I had to master</p> <p><input type="checkbox"/> [6] Share learning resources</p> <p><input type="checkbox"/> [7] Seek help on course organisation</p> <p><input type="checkbox"/> [8] Provide help on course organisation others</p> <p><input type="checkbox"/> [9] Make organisational decisions</p> <p><input type="checkbox"/> [10] Socializing</p> <p><input type="checkbox"/> [11] Other, namely _____</p>
C072	(44)	<p>Which types of chat did you use? Please tick all that apply</p> <p><input type="checkbox"/> [1] Chat with one other person</p> <p><input type="checkbox"/> [2] Group chat</p>
C073	(45)	<p>How many times did you use the chat (approximately)?</p> <p>_____</p>
C074	(46)	<p>What is your overall rating of the chat?</p> <p>[1] Very useful / [2] useful / [3] not useful nor not useless / [4] useless / [5] very useless</p>

Thank you for your participation!

## Appendix 2: Operationalisation: matching hypotheses to questions in the questionnaires

Appendix 2 indicates for each hypothesis tested in the cycle 1 pilots how it fits to the questions in the questionnaires of Appendix 1.

Hypothesis	Measure in both control groups
<b>FUNCTIONALITIES</b>	
<b>rating</b>	
1. in PCM rating will be more important, as this will help people find the learning elements they need for their competence development	<p>E073 To the extent that you did not use the ratings provided by others, what reasons did you have? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> I didn't notice the rating tab</li> <li><input type="checkbox"/> There were no or hardly any ratings available</li> <li><input type="checkbox"/> I didn't understand what the ratings meant</li> <li><input type="checkbox"/> Lack of time</li> <li><input type="checkbox"/> Lack of interest</li> <li><input type="checkbox"/> I wanted to pass through all parts of the competence profile anyway</li> <li><input type="checkbox"/> I don't want to base my decision on using a learning element on the rating by others</li> <li><input type="checkbox"/> I do not consider ratings of others useful in judging the quality of a learning element</li> </ul> <p>E074 Did you look at ratings provided by others?</p> <ul style="list-style-type: none"> <li><input type="radio"/> Yes</li> <li><input type="radio"/> No</li> </ul> <p>E075 Did you use ratings by others for the purpose of selecting learning elements?</p> <ul style="list-style-type: none"> <li><input type="radio"/> Yes</li> <li><input type="radio"/> No</li> </ul> <p>E076 Which type of learning elements did you select using the ratings by others? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> I selected learning elements with a positive rating</li> <li><input type="checkbox"/> I did not select learning elements with a negative rating</li> </ul> <p>E077 The ratings provided by others turned out to match my own judgement...</p> <p>Not at all / badly / not badly nor well / well / completely</p> <p>E078 By using the ratings provided by others, the time it took me to find the learning resources I needed has:</p> <p>Fallen sharply / fallen / stayed the same / gone up / largely gone up</p> <p>E079 How do you value the rating system overall?</p> <p>Very useful / useful / not useful nor useless / useless / very useless</p> <p>E080 How many times did you provide ratings yourself to a learning element?</p> <p>times</p>
<b>Forum and chat</b>	
2. the PCM group will show more active use of the forum and chat, where people connect to people, and help each other find their way. 3. PCM will lead to more posting and reading of messages in forum and chat	<p>C066 Did you read posts from others</p> <ul style="list-style-type: none"> <li><input type="radio"/> No, there were (almost) no posts in the forum.</li> <li><input type="radio"/> No, there were posts in the forum, but I didn't read them</li> <li><input type="radio"/> I read (almost) all posts in the forum</li> <li><input type="radio"/> I read only those posts in the forum that seemed relevant to me.</li> </ul> <p>C065 How many messages did you post to the forum</p>

	<p>(approximately)? —</p> <p>C063 To the extent that you did not post messages to the forum, what were your reasons? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> I didn't see the forum tab</li> <li><input type="checkbox"/> I did not know how to post a message.</li> <li><input type="checkbox"/> I did not have problems with course content or organisation</li> <li><input type="checkbox"/> Lack of time</li> <li><input type="checkbox"/> Lack of interest</li> <li><input type="checkbox"/> There were no messages by others to which I could react</li> <li><input type="checkbox"/> There were messages by others, but I could not provide any help</li> <li><input type="checkbox"/> Other, namely _____</li> </ul> <p>To the extent that you did not use the chat, what were your reasons?</p> <p>C068 Did you use means other than the forum for group communication? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No</li> <li><input type="checkbox"/> Email</li> <li><input type="checkbox"/> Chat</li> <li><input type="checkbox"/> Skype</li> <li><input type="checkbox"/> Telephone</li> <li><input type="checkbox"/> Video-conferencing</li> <li><input type="checkbox"/> Face-to-face meetings</li> <li><input type="checkbox"/> Other, namely _____</li> </ul>
4. PCM will lead to better appreciation of forum and chat	C067 What is your overall rating of the forum? What is your overall rating of the chat?
5. <i>in PCM it will be easier for participants to create the Competence Development Plan for their students</i>	<i>[will not be tested]</i>
<b>EFFECTS</b>	
<b>awareness</b>	
6. In the PCM it will be easier for participants to become aware of the competences involved, to identify their starting point,	C053a In the beginning, I quickly got an overview of the competences involved and my current proficiency level
<b>More, better exchange and pro-active sharing</b>	
7. in the PCM group, there will be more discussion on the competences that people have to master 8. PCM will lead to more sharing of resources 9. PCM will lead to more help seeking and providing	<p>C064 What did you use the forum for?</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> I didn't use it at all -&gt; go to (39) or (40)</li> <li><input type="checkbox"/> Seek help on course content</li> <li><input type="checkbox"/> Provide help on course content to others</li> <li><input type="checkbox"/> Discuss course content</li> <li><input type="checkbox"/> Discuss the competences that I had to master</li> <li><input type="checkbox"/> Share learning resources</li> <li><input type="checkbox"/> Seek help on course organisation</li> <li><input type="checkbox"/> Provide help on course organisation others</li> <li><input type="checkbox"/> Make appointments, e.g. for chat meetings</li> <li><input type="checkbox"/> Make organisational decisions</li> <li><input type="checkbox"/> Socializing</li> <li><input type="checkbox"/> Other, namely _____</li> </ul> <p>Cxxx What did you use the chat for?</p>
10. PCM will lead to more and better discussion	<p>Appreciation of collaboration</p> <p>C059 In our small group we had a lively and stimulating</p>

11. PCM will lead to more exchange of data and files	discussion C060 In our small group we had a lively and stimulating exchange of data and files C061 In the larger group of all people following this course, we had a lively and stimulating discussion C062 In the larger group of all people following this course, we had a lively and stimulating exchange of data and files
better, more decentralized, self-organized and empowered competence management: 12. PCM will lead to a more control over learning	Appreciation of control C053 I had a good overview on what I had done and what I had to do C054 I had insight into how my learning progressed C055 I had the feeling that I learned exactly what I wanted to learn C056 I had the feeling that I could plan my own learning C057 I felt in control of my own learning
13. Use of PCM will lead to better competence development	Scores on competence assessment Answer on post-test question: C035 Did you complete your Competence Development Plan / the course [formulation depending upon the situation]? C036 Did you pass the final competence assessment?
<b>Appreciation of competence development</b>	Answer on post-test question:
14. Use of PCM affects the type of competences that are acquired	How much have you learned with respect to the following types of competences? C037 Knowledge; C038 Functional skills, know how to do things; C039 Social skills; C040 Knowing how to behave according to the rules and values of the profession; C041 Knowing how to guide my future use by reflection on current practice; C042 Knowing how to find creative solutions for problems related to this competence.
15. Use of PCM is more enjoyable	C043 I enjoyed this way of learning
16. Use of PCM stimulates further competence development	C044 I wish to continue developing this competence further
17. With PCM, people appreciate the learning route better	The learning route I followed was: C045 .... Efficient C046 .... Exciting
18. With PCM, people appreciate the learning resources more	C048 How many of the available learning resources did you use? The learning resources were: C049 ... difficult C050 ... interesting C051 ... useful C052 The learning resources matched my learning needs
<b>Better match learning needs</b>	
19. better match their learning needs: The support that PCM offers (learning resources + possibility for choosing own path) is most appreciated	C047 What, in hindsight, would have been the most supportive for your learning process: o Learning resources + the outlined path + the possibility to choose my own learning path was fine o Learning resources only o o Learning resources + a path that I obligatorily had to follow
<b>Other variables</b>	
20. Is there a difference in these outcomes between learners of different age, sex, country, educational level, profession, years of work experience,	P007 Age: ___ years P008 Sex: [1] Female / [2] male P009 Country in which you live: _____ P010 Highest educational degree that you earn:

<p>current proficiency level, distance learning experience, experience with the tools used, learning style, equipment at home / work, learner motivation, or involvement of employer</p>	<p>o [1] Primary school  o [2] Secondary school  o [3] Secondary vocational education  o [4] Higher vocational education  o [5] Bachelor's degree  o [6] University master's degree  o [7] PhD</p> <p>P011 Profession: I am a _____</p> <p>P013 Number of years of experience in the [relevant profession, to be filled in by pilot coordinator] profession: _____ years</p> <p>_____ Competence development</p> <p>P010 How would you describe your current proficiency level with respect to [name of competence to be filled in by pilot coordinator] competence?  [1] Novice / [2] beginner / [3] intermediate / [4] advanced / [5] expert</p> <p>P023 How would you describe your experience with distance learning?  I have followed __ courses / modules etc. through distance learning.</p> <p>P024 How often have you participated / do you participate in online (webbased) discussion forums?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P025 How often have you participated / do you participate in online chats?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P026 How often have you used / do you use search functions for finding information, such as Google or database search?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P027 How often have you used / do you use ratings by others for selecting information for your own use?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P028 How often have you shared / do you share sharing data and files with other people in online communities for leisure (free time) purposes?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P029 How often have you shared / do you share sharing data and files with other people in online communities for professional purposes?  [1] Never / [2] occasionally / [3] sometimes / [4] often / [5] very often</p> <p>P030 Which of the following reasons for following the xxxx pilot apply to your situation? Tick all of the answers listed below that apply to your situation.</p> <p><input type="checkbox"/> [1] I want to keep up to date within my existing function or job</p> <p><input type="checkbox"/> [2] I want to study for a new function or job or improve my current job level</p> <p><input type="checkbox"/> [3] I want to reflect on my current competences to look which functions and jobs are within my reach or to help me define new learning goals</p> <p><input type="checkbox"/> [4] I want to improve my proficiency level of a specific competence</p>
--	--

	<p><input type="checkbox"/> [5] I want some support on a non-trivial learning problem</p> <p><input type="checkbox"/> [6] I want to explore the possibilities in a new field (learning network) to help define new learning goals</p> <p>P031 Which of the following describe(s) the involvement of your employer? Tick all of the answers listed below that apply to your situation.</p> <p><input type="checkbox"/> [1] My employer is not involved in my following this course</p> <p><input type="checkbox"/> [2] My employer pays this course's fee</p> <p><input type="checkbox"/> [3] My employer has obliged me to follow this course</p> <p><input type="checkbox"/> [4] My employer has allocated part of my working hours for following this course</p> <p><input type="checkbox"/> [5] Following this course successfully is necessary for me to keep my current job function</p> <p><input type="checkbox"/> [6] Following this course successfully is necessary for me to obtain a new job function at my current employer.</p> <p><input type="checkbox"/> [7] I follow this course as part of a trajectory for people who are unemployed or who are in danger of becoming unemployed.</p> <p>P032 The course will provide you with a diversity of web-based learning resources. In addition, your learning can be supported in several ways. We can outline a path for you, we can ask you to follow a specific learning path, or we can give you the freedom to follow your own path. What would be most supportive for your learning:</p> <p><input type="radio"/> [1] Support me with learning resources only</p> <p><input type="radio"/> [2] Support me with learning resources + an outlined path + the possibility to choose my own learning path</p> <p><input type="radio"/> [3] Support me with learning resources + a path that I need to follow</p> <p>Facilities</p> <p>P033 The computer you use most for accessing the course is best described as</p> <p><input type="radio"/> [1] New (less than one year old)</p> <p><input type="radio"/> [2] Neither new nor old</p> <p><input type="radio"/> [3] Very old (more than a few years old)</p> <p>P034 The Internet connection you use most for accessing the course can best be described as</p> <p><input type="radio"/> [1] Slow</p> <p><input type="radio"/> [2] Medium</p> <p><input type="radio"/> [3] Fast</p> <p><input type="radio"/> [4] Very fast</p>
<p>21. To what extent can outcomes be explained by elements of the treatment other than the TENCompetence infrastructure, namely the tutor, the number of hours spend on the course, and/or technical problems?</p>	<p>C014 Who was your teacher/coach/guide?</p> <p>C015 How many hours did you spend on the course?          ___ hours</p> <p>C016 Was your learning process hindered by technical problems?</p>



## *Variables*

### *Background variables*

- age
- sex
- country
- education (years of formal education and degree attained)
- profession

### *Experience*

- years of work experience
- experience with distance learning
- experience with specific tools used
- own estimation of current proficiency level

### *Learner needs:*

- Learner motivation
- involvement of employer (time, need etc.)

### *Learner conditions:*

- Learning style
- amount of time to be spent on the course
- Equipment at home / workplace

### *Dependent variables*

- Better competence development
- Overall appreciation
- More, better exchange and pro-active sharing:
- Amount of activity in the forum
- Appreciation of forum activity
- Amount of exchange of resources
- Better, more decentralized, self-organized and empowered competence management
- Better match their learning needs

*Measures*
*Measures for question j:*

<i>Background variables</i>	<i>Measure from questionnaires; answer to question:</i>
age	- How old are you? __ years old
sex	- What is your sex? Female / male
country	- In which country do you live? _____
education	- What is the highest educational degree that you earn: <input type="radio"/> primary school <input type="radio"/> secondary school <input type="radio"/> secondary vocational education <input type="radio"/> higher vocational education <input type="radio"/> bachelor's degree <input type="radio"/> university master's degree <input type="radio"/> PhD
profession	- What is your profession? I am a _____ - What is your current job function? _____
years of work experience	How many years of work experience in the _____ profession do you have? _____ years
own estimation of current proficiency level	How would you describe your current proficiency level with respect to [the competences involved]. Tick all of the answers listed below that apply to your situation: <i>[to be filled in by the pilot coordinators]</i>
Experience with learning at a distance	- How would you describe your experience with distance learning? <input type="radio"/> I have followed __ courses / modules etc. through distance learning.
Experience with tools and models used in the PCM	- Which statement describes your experience with using webbased discussion forums best? Please select only one answer: <input type="radio"/> I have never participated in a web based forum <input type="radio"/> I have occasionally contributed to web based forums <input type="radio"/> I often use web based forums as a means for communication - Which statement describes your experience with using search functions for finding resources in databases or other collections? Please select only one answer: <input type="radio"/> I have never used a search function to find resources in a database or collection <input type="radio"/> I have occasionally used a search function to find resources in a database or collection <input type="radio"/> I often use a search function to find resources in a database or collection - Which statement describes your experience with using ratings by others for selecting resources in databases or other collections? Please select only one answer: <input type="radio"/> I have never used ratings by others for selecting resources in a database or collection <input type="radio"/> I have occasionally used ratings by others for selecting resources in a database or collection <input type="radio"/> I often use ratings by others for selecting resources in a database or collection - Which statement describes your experience with using information on people's presence in a digital environment to connect to them directly? Please select only one answer: <input type="radio"/> I have never used information on people's presence in a digital environment to connect to them directly <input type="radio"/> I have occasionally used information on people's presence in a digital environment to connect to them directly <input type="radio"/> I often use information on people's presence in a digital environment to

	<p>connect to them directly</p> <ul style="list-style-type: none"> <li>- Which statement best describes your experience with exchanging experiences with other people in webbased communities? Please select only one answer: <ul style="list-style-type: none"> <li>○ I have never shared my experiences with others in a webbased community</li> <li>○ I have occasionally shared my experiences with others in a webbased community</li> <li>○ I often share my experiences with others in a webbased community</li> </ul> </li> <li>- Which statement best describes your experience with sharing resources with other people in webbased communities? Please select only one answer: <ul style="list-style-type: none"> <li>○ I have never shared resources with others in a webbased community</li> <li>○ I have occasionally shared resources with others in a webbased community</li> <li>○ I often share resources with others in a webbased community</li> </ul> </li> </ul>
<i>Learner needs:</i>	
motivation for following the course	<ul style="list-style-type: none"> <li>- Which of the following describe(s) apply to your situation? Tick all of the answers listed below that apply to your situation. <ul style="list-style-type: none"> <li><input type="checkbox"/> I want to keep up to date within my existing function or job</li> <li><input type="checkbox"/> I want to study for a new function or job or improve my current job level</li> <li><input type="checkbox"/> I want to reflect on my current competences to look which functions and jobs are within my reach or to help me define new learning goals</li> <li><input type="checkbox"/> I want to improve my proficiency level of a specific competence</li> <li><input type="checkbox"/> Want some support on a non-trivial learning problem</li> <li><input type="checkbox"/> Want to explore the possibilities in a new field (learning network) to help define new learning goals</li> </ul> </li> </ul>
involvement of employer (time, need etc.)	<ul style="list-style-type: none"> <li>- Which of the following describe(s) the involvement of your employer? Tick all of the answers listed below that apply to your situation. <ul style="list-style-type: none"> <li><input type="checkbox"/> My employer is not involved in my following this course</li> <li><input type="checkbox"/> My employer pays this course's fee</li> <li><input type="checkbox"/> My employer has obliged me to follow this course</li> <li><input type="checkbox"/> My employer has allocated part of my working hours for following this course</li> <li><input type="checkbox"/> Following this course successfully is necessary for me to keep my current job function</li> <li><input type="checkbox"/> Following this course successfully is necessary for me to obtain a new job function at my current employer.</li> <li><input type="checkbox"/> I follow this course as part of a trajectory for people who are unemployed or who are in danger of becoming unemployed.</li> </ul> </li> </ul>
<i>Learner conditions:</i>	
Learning style	<ul style="list-style-type: none"> <li>- Which of the following is your preferred way of learning: <ul style="list-style-type: none"> <li>○ Provide me with the learning resources only, so that I can make up my own selection and my own learning path;</li> <li>○ Provide me with alternative learning paths from which I can choose the path that fits my learning style best and which I can alter if needed</li> <li>○ Outline a learning path with a logical order for me that I can exactly follow, containing all resources that I need</li> </ul> </li> </ul>
Equipment at home / workplace	<p>The computer you use most for accessing the course is best described as</p> <ul style="list-style-type: none"> <li>○ new (less than one year old)</li> <li>○ neither new nor old</li> <li>○ very old (more than a few years old)</li> </ul> <p>The Internet connection you use most for accessing the course can best be described as</p> <ul style="list-style-type: none"> <li>○ slow</li> <li>○ medium</li> <li>○ fast</li> <li>○ very fast</li> </ul>

*Measures for question a – i:*

<b>Variable</b>	<b>Measure in both control groups</b>
Better competence development	Scores on competence assessment Answer on post-test question: C035 Did you complete your Competence Development Plan / the course [formulation depending upon the situation]? C036 Did you pass the final competence assessment?
Appreciation of competence development	Answer on post-test question: How much have you learned with respect to the following types of competences? C037 Knowledge; C038 Functional skills, know how to do things; C039 Social skills; C040 Knowing how to behave according to the rules and values of the profession; C041 Knowing how to guide my future use by reflection on current practice; C042 Knowing how to find creative solutions for problems related to this competence. C043 I enjoyed this way of learning C044 I wish to continue developing this competence further Appreciation of learning route The learning route I followed was: C045 .... Efficient C046 .... Exciting Appreciation of learning resources C048 How many of the available learning resources did you use? The learning resources were: C049 ... difficult C050 ... interesting C051 ... useful C052 The learning resources matched my learning needs
More, better exchange and pro-active sharing: Amount of activity in the forum Appreciation of forum activity Amount of exchange of resources	The forum C063 To the extent that you did not post messages to the forum, what were your reasons? Please tick all that apply: <input type="checkbox"/> I didn't see the forum tab <input type="checkbox"/> I did not know how to post a message. <input type="checkbox"/> I did not have problems with course content or organisation <input type="checkbox"/> Lack of time <input type="checkbox"/> Lack of interest <input type="checkbox"/> There were no messages by others to which I could react <input type="checkbox"/> There were messages by others, but I could not provide any help <input type="checkbox"/> Other, namely _____ C064 What did you use the forum for? <input type="checkbox"/> I didn't use it at all -> go to (39) or (40) <input type="checkbox"/> Seek help on course content <input type="checkbox"/> Provide help on course content to others <input type="checkbox"/> Discuss course content <input type="checkbox"/> Share learning resources <input type="checkbox"/> Seek help on course organisation

	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provide help on course organisation others</li> <li><input type="checkbox"/> Make appointments, e.g. for chat meetings</li> <li><input type="checkbox"/> Make organisational decisions</li> <li><input type="checkbox"/> Socializing</li> <li><input type="checkbox"/> Other, namely _____</li> </ul> <p>C065 How many messages did you post to the forum (approximately)? _____</p> <p>C066 Did you read posts from others</p> <ul style="list-style-type: none"> <li><input type="radio"/> No, there were (almost) no posts in the forum.</li> <li><input type="radio"/> No, there were posts in the forum, but I didn't read them</li> <li><input type="radio"/> I read (almost) all posts in the forum</li> <li><input type="radio"/> I read only those posts in the forum that seemed relevant to me.</li> </ul> <p>C067 What is your overall rating of the forum?</p> <p>C068 Did you use means other than the forum for group communication? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> No</li> <li><input type="checkbox"/> Email</li> <li><input type="checkbox"/> Chat</li> <li><input type="checkbox"/> Skype</li> <li><input type="checkbox"/> Telephone</li> <li><input type="checkbox"/> Video-conferencing</li> <li><input type="checkbox"/> Face-to-face meetings</li> <li><input type="checkbox"/> Other, namely _____</li> </ul> <p>Appreciation of collaboration</p> <p>C059 In our small group we had a lively and stimulating discussion</p> <p>C060 In our small group we had a lively and stimulating exchange of data and files</p> <p>C061 In the larger group of all people following this course, we had a lively and stimulating discussion</p> <p>C062 In the larger group of all people following this course, we had a lively and stimulating exchange of data and files</p>
<p>better, more decentralized, self-organized and empowered competence management</p>	<p>Appreciation of control</p> <p>C053 I had a good overview on what I had done and what I had to do</p> <p>C054 I had insight into how my learning progressed</p> <p>C055 I had the feeling that I learned exactly what I wanted to learn</p> <p>C056 I had the feeling that I could plan my own learning</p> <p>C057 I felt in control of my own learning</p>
<p>better match their learning needs</p>	<p>C047 What, in hindsight, would have been the most supportive for your learning process:</p> <ul style="list-style-type: none"> <li><input type="radio"/> Learning resources + the outlined path + the possibility to choose my own learning path was fine</li> <li><input type="radio"/> Learning resources only</li> <li><input type="radio"/> Learning resources + a path that I obligatorily had to follow</li> </ul>

*Measures for question k:*

<b>Variable</b>	<b>Measure in both control groups</b>
	Answer to questionnaire:
teacher	C014 Who was your teacher/coach/guide?
Time spent on the course	C015 How many hours did you spend on the course? hours
Technical problems	C016 Was your learning process hindered by technical problems?

## ***Appendix 3: Welcome package used in Digital Cinema Cycle 1 pilot***

### **Learners assigned to PCM – experimental groups**

#### **WELCOME TO THE TENCOMPETENCE PROJECT**

You will be able to start the virtual sets course after you complete the process explained here

TENCompetence, GTI, FBM-UPF, and Brainstorm, welcome you to this online training. If you finish the course, you will be able to create and manage a virtual set using Brainstorm eStudio software. Despite you can choose the best time suites your schedule, there is a time limit of two months to complete it.

#### **Course contents**

For any question regarding the course contents, rely on the colleagues by posting messages in the forum/chat.

There is a tutor that will try to make sure you are advancing in the completion of the course, but this is a self-teaching e-learning platform.

We would like you could rate the lesson after completing it.

We encourage you to take advantage of the user interface and the forum.

#### **Software required**

In order to complete the course, you will use the PCM e-learning platform, for accessing it, you need to download a little java application.

You will also need to install the Brainstorm eStudio software in your PC to be able to make the exercises. Remember that there is a temporary license attached to eStudio, so you can't switch from one computer to another. Make sure to decide in which computer you will follow the course, and install the Brainstorm software there. The amount of temporary licenses is limited, and we have booked one per student.

Click in the following link to download the eStudio application folder.

Share  
eStudio

- Install the Share.exe and then eStudio.exe on your hard drive.
- Finally download the assets folder from [this](#) location and copy its contents inside your eStudio folder (eg: C:\Program Files\Brainstorm\)

After installing, we need you send back to us a file with name **hostinfo.txt**, which is the output of the following command:

Launch a command window (Start >> Execute >> Open: cmd)

- **cd C:\Program Files\Brainstorm\bin**
- **estudio -?**
- **cd ..**
- **dir \*.txt**

If there are no further issues, a **hostinfo.txt** file would appear in the Brainstorm folder.

As soon as you send to us this generated file “hostinfo.txt”, we will request to Brainstorm a temporary license so we can send you back the required license (**hostinfo.lic**) to activate the use of the virtual set software. Please send your request of license, with the **hostinfo.txt** file attached, to the email address [virtualsets@upf.edu](mailto:virtualsets@upf.edu)



### **Issues with the e-learning platform**

Technical support service schedule for the e-learning platform is 8x5 with immediate response time from 9:00 to 17:00. Out of office time, and during weekends, service response time might be longer. In case you detect any issue with the e-learning platform, send an email to [antelope.support@llista.upf.edu](mailto:antelope.support@llista.upf.edu)

### **Feedback**

This is a R+D project on e-learning, and we would be very happy if you were able to send feedback to us about your experience with this platform and contents.oo7

Send your feedback with the Subject: FEEDBACK, to the email address: [virtualsets@upf.edu](mailto:virtualsets@upf.edu)

### **Recognition**

After you finish this training, you will get a diploma recognizing your participation in the course and the fulfilment of all the lessons.

### **Starting the course**

If you have followed the previous steps, and no issues have been faced, you can launch PCM application and then register into the community: "Virtual Sets Diploma". If you follow the steps on the document "User Register Guide", you will be able to start the course immediately.

Please use your complete first name and your initial for your middle name/lastname as user ID, not an alias. For example ... if your name is **John Richard Doe** ... use either **johnrd**, **johnrd** or **johnr** as your username for the e-learning platform.

### **Troubleshooting**

If you have forgotten your username and password for the PCM, look on your computer for the file "conduit.xml". This file is stored within your personal settings (normally "C:\Documents and Settings\YourUserName\org.TENCompetence\tencomp-workspace\conduit.xml").

Erase it and launch again the system (the application will regenerate the file again)

If you have reached this point, you should have already completed the assessment (point 1 of the list below):

Please check the necessary actions to start the training:

- 1) COMPLETE THE PRE-ENROLL ASSESSMENT
- 2) FILL THE REGISTRATION FORM
- 3) READ AND FOLLOW STEPS ON THE USER REGISTRATION GUIDE
- 4) READ/BROWSE THE E-LEARNING USER GUIDE
- 5) INSTALL IN YOUR COMPUTER THE VIRTUAL SET SOFTWARE
- 6) DEDICATE YOUR TIME TO FOLLOW THE TRAINING AND COMPLETE THE ASSESSMENTS
- 7) COMPLETE THE FINAL ASSESSMENT

### **User guide to REGISTER to the eLearning platform**

[http://www.TENCompetence.upf.edu/virtualsets/User\\_register\\_guide\\_PCM.pdf](http://www.TENCompetence.upf.edu/virtualsets/User_register_guide_PCM.pdf)

## **User guide to PCM eLearning platform**

[http://www.TENCompetence.upf.edu/virtualsets/UserGuide\\_0.91.pdf](http://www.TENCompetence.upf.edu/virtualsets/UserGuide_0.91.pdf)

## **Binaries to install the eLearning platform**



Windows: <http://downloads.sourceforge.net/TENCompetence/tencomp-pcm-win-1.0beta2.zip>

After installing the Windows client, go to Preferences >> Chat and write there: [blinn.upf.es](http://blinn.upf.es), and General host: <http://www.pcm.upf.edu:8080/TENCDiscovery/servers>



Apple: <http://downloads.sourceforge.net/TENCompetence/tencomp-pcm-mac-1.0beta2.tar.gz>



Linux: <http://downloads.sourceforge.net/TENCompetence/tencomp-pcm-lnx-1.0beta2.tar.gz>

## Learners assigned to Moodle – control groups

### WELCOME TO THE TENCOMPETENCE PROJECT

You will be able to start the virtual sets course after you complete the process explained here

TENCompetence, GTI, FBM-UPF, and Brainstorm, welcome you to this online training. If you finish the course, you will be able to create and manage a virtual set using Brainstorm eStudio software. Despite you can choose the best time suites your schedule, there is a time limit of two months to complete it.

### Course contents

For any question regarding the course contents, rely on the colleagues by posting messages in the forum/chat.

There is a tutor that will try to make sure you are advancing in the completion of the course, but this is a self-teaching e-learning platform.

We would like you could rate the lesson after completing it.

We encourage you to take advantage of the user interface.

### Software required

In order to complete the course, you will use Moodle; for accessing it, you need to go to the URL: <http://galactus.upf.edu:81>

You will also need to install the Brainstorm eStudio software in your PC to be able to make the exercises. Remember that there is a temporary license attached to eStudio, so you can't switch from one computer to another. Make sure to decide in which computer you will follow the course, and install the Brainstorm software there. The amount of temporary licenses is limited, and we have booked one per student.

Click in the following link to download the eStudio application folder.

Share  
eStudio

- Install the Share.exe and then eStudio.exe on your hard drive.
- Finally download the assets folder from this location and copy its contents inside your eStudio folder (eg: C:/Program Files/Brainstorm/)

After installing, we need you send back to us a file with name **hostinfo.txt**, which is the output of the following command:

Launch a command window (Start >> Execute >> Open: cmd)

```
8) cd C:\Program Files\Brainstorm\bin
9) estudio -?
10) cd ..
11) dir *.txt
```

If there are no further issues, a **hostinfo.txt** file would appear in the Brainstorm folder.

As soon as you send to us this generated file "**hostinfo.txt**", we will request to Brainstorm a temporary license so we can send you back the required license (**hostinfo.lic**) to activate the use of the virtual set software. Please send your request of license, with the **hostinfo.txt** file attached, to the email address [virtualsets@upf.edu](mailto:virtualsets@upf.edu)

### **Issues with the e-learning platform**

Technical support service schedule for the e-learning platform is 8x5 with almost immediate response time from 9:00 to 17:00. Out of office time, and during weekends, service response time might be longer. In case you detect any issue with the e-learning platform, send an email to [antelope.support@llista.upf.edu](mailto:antelope.support@llista.upf.edu)

### **Feedback**

This is a R+D project on e-learning, and we would be very happy if you were able to send feedback to us about your experience with this platform and contents.

Send your feedback with the Subject: FEEDBACK, to the email address: [virtualsets@upf.edu](mailto:virtualsets@upf.edu)

### **Recognition**

After you finish this training, you will get a diploma recognizing your participation in the course and the fulfilment of all the lessons.

### **Starting the course**

If you have followed the previous steps, and no issues have been faced, you can access the course and start the training by opening a browser and going to the URL <http://galactus.upf.edu:81>

Please use your complete first name and your initial for your middle name/lastname as user ID, not an alias. For example ... if your name is **John Richard Doe** ... use either **johnd**, **johnr** or **johnr** as your username for the e-learning platform.

If you have reached this point, you should have already completed the assessment (point 1 of the list below):

Please check the necessary actions to start the training:

- COMPLETE THE PRE-ENROLL ASSESSMENT
- FILL THE REGISTRATION FORM
- READ AND FOLLOW STEPS ON THE USER REGISTRATION GUIDE
- READ/BROWSE THE E-LEARNING USER GUIDE
- INSTALL IN YOUR COMPUTER THE VIRTUAL SET SOFTWARE
- DEDICATE YOUR TIME TO FOLLOW THE TRAINING AND COMPLETE THE ASSESSMENTS
- COMPLETE THE FINAL ASSESSMENT

### **User guide to Moodle eLearning platform**

[http://www.TENCompetence.upf.edu/virtualsets/student\\_guide\\_Moodle.pdf](http://www.TENCompetence.upf.edu/virtualsets/student_guide_Moodle.pdf)

## **Appendix 4: Test questionnaire for learners dropping out of the Digital Cinema Cycle 1 pilot**

Dear participant in the Digital Cinema Pilot,

Thank you for your interest in the Digital Cinema Pilot. The Digital Pilot is a pilot within the TENCompetence project, which aims at establishing an infrastructure for life-long competence development. As the infrastructure is under development, it is very important for us to evaluate how the infrastructure is used in the Digital Cinema Pilot.

We write you, because currently you are not actively participating in the pilot or have not even registered in the system. If you do not plan to continue with the course, we would like to ask you to answer this short questionnaire. Your participation in this evaluation would be highly appreciated, as feedback from the pilot participants is our main source for improving the TENCompetence infrastructure. If you still plan to continue with the course, just answer this e-mail confirming that.

We like to stress that by returning this questionnaire, you only grant the researchers permission to use your answers for the evaluation of the pilot. The data you provide will be made completely anonymous before data analysis. They will be used by the evaluation researchers only and not be distributed to anyone else. The questionnaire contains 7 short questions in total; answering the questions will take 5 minutes.

Thank you for your participation!

### *Explanation on the questionnaire*

The questionnaire includes several question types:

- \_\_\_\_ asks for a short answer
- \_\_\_\_\_ indicates that you can type in longer text.
- \_\_\_ / \_\_\_ indicates that you have to choose one of several answers; you can either circle the correct answer, or strike-through or remove the incorrect answer.
- a round box ‘o’ indicates that you have to choose one of the available answers
- a square box ‘□’ indicates that you can choose several answers; tick all answers that apply.

### **Experimental group**

<b>Background information</b>		
D002	(1)	Date: __ / __ / 2007
D003	(2)	Start date: __ / __ / 2007
D006	(3)	Name: _____ Note: your name is needed only to combine the information you provide before and after the pilot; your answers will be processed anonymously.
D015	(4)	How many hours did you spend on the course? __ hours

<b>Reasons for not completing the course</b>		
D106	(5)	<p>To the extent that you did not continue with the course, what reasons did you have? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> [1] I tried but I could not install the Personal Competence manager</li> <li><input type="checkbox"/> [2] I could install the Personal Competence manager, but I could not log in to the Digital Cinema Pilot</li> <li><input type="checkbox"/> [3] I have other technical problems</li> <li><input type="checkbox"/> [4] I did not understand how to use the Personal Competence Manager</li> <li><input type="checkbox"/> [5] I tried but I could not install the Brainstorm software</li> <li><input type="checkbox"/> [6] Lack of time</li> <li><input type="checkbox"/> [7] The contents of the course are too easy</li> <li><input type="checkbox"/> [8] The contents of the course are too difficult</li> <li><input type="checkbox"/> [9] The contents of the course are not interesting</li> <li><input type="checkbox"/> [10] The contents of the course are not useful</li> <li><input type="checkbox"/> [11] The course does not match my expectations</li> <li><input type="checkbox"/> [12] I don't feel in control of my own learning</li> <li><input type="checkbox"/> [13] I don't like that I have to choose my own learning route</li> <li><input type="checkbox"/> [14] I have problems with the English language</li> <li><input type="checkbox"/> [15] Other, namely _____</li> </ul>
D107	(6)	<p>Please, provide further information about your reasons. (For example, specify the types of technical problems that you may have or why you are not finally interested in the course)</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
D108	(7)	<p>If I have time, I would like to be enrolled in future pilots related to Digital Cinema:            [1] Certainly / [2] yes / [3] perhaps, perhaps not / [4] no / [5] certainly not</p>

Thank you for your participation!

### Control group

<b>Background information</b>		
D002	(1)	Date: __ / __ / 2007
D003	(2)	Start date: __ / __ / 2007
D006	(3)	Name: _____ Note: your name is needed only to combine the information you provide before and after the pilot; your answers will be processed anonymously.
D015	(4)	How many hours did you spend on the course? __ hours
<b>Reasons for not completing the course</b>		
D106	(5)	<p>To the extent that you did not continue with the course, what reasons did you have? Please tick all that apply:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> [2] I tried but I could not log in to the Moodle system</li> <li><input type="checkbox"/> [3] I have other technical problems</li> <li><input type="checkbox"/> [4] I did not understand how to use Moodle</li> <li><input type="checkbox"/> [5] I tried but I could not install the Brainstorm software</li> <li><input type="checkbox"/> [6] Lack of time</li> <li><input type="checkbox"/> [7] The contents of the course is too easy</li> <li><input type="checkbox"/> [8] The contents of the course is too difficult</li> <li><input type="checkbox"/> [9] The contents of the course is not interesting</li> <li><input type="checkbox"/> [10] The contents of the course is not useful</li> </ul>

		<input type="checkbox"/> [11] The course does not match my expectations <input type="checkbox"/> [12] I don't feel in control of my own learning <input type="checkbox"/> [13] I don't like that there is a prescribed learning route <input type="checkbox"/> [14] I have problems with the English language <input type="checkbox"/> [15] Other, namely _____
D107	(6)	Please, provide further information about your reasons. (For example, specify the types of technical problems that you may have or why you are not finally interested in the course) _____ _____ _____ _____ _____ _____
D108	(7)	If I have time, I would like to be enrolled in future pilots related to Digital Cinema: [1] Certainly / [2] yes / [3] perhaps, perhaps not / [4] no / [5] certainly not

Thank you for your participation!