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The PROLEARN Roadmap for the desired state in 2020 of Technology Enhanced Professional Learning

Vana Kamtsiou, Ambjörn Naeve, Milos Kravcik, Daniel Burgos, Volker Zimmermann, Ralf Klamma, Mohamed Amine Chatti, Paul Lefrere, Jacques Dang, Tapio Koskinen

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A ROADMAP FOR TECHNOLOGY ENHANCED PROFESSIONAL LEARNING (TEPL)

Network of Excellence in Professional Learning

European Commission Sixth Framework Project (IST-507310)

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Note

In the course of building the roadmap, we have been communicating with as well as following the work of several communities and groups from the Academia, Industry and Policy, just to name a few such as ELIG, eSkills Task Force (DG Enterprise and Industry), MENON Network, IPTS, IFIP, EDEN, IACEE, WorkInNet, EuroPace, etc. There are professional communities of purpose, with access to needed financial and technical resources, as well as know-how, associated with each of the components of the vision statements, e.g. developing TEL-enhanced forms of mentoring and other components of next-generation Career Services (A6.5). Building links with those communities, and with publicly-funded projects that involve their most influential members, will be important steps towards helping Prolearn to achieve long-term sustainability (which is explored in Prolearn work package 6).

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TABLE OF CONTENTS

1. INTRODUCTION **5**

The Future of Technology Enhanced Professional Learning: Core and strategic visions **7**

Core Vision for TEPL in 2020 ..... **7**

The 6 Vision Statements **7**

2. FORESIGHT AND GAP ANALYSIS MAIN CONCLUSIONS: VISIONS, GOALS, GAPS BETWEEN TODAY AND TOMORROW **9**

Vision Statement 1: **9**

Short description 9

Goals 9

The Gap 10

Assumptions – Preconditions 10

Vision Statement 2 ..... **11**

Short description 11

Goals 11

The Gap 12

Assumptions – Preconditions 12

Vision Statement 3 ..... **13**

Short description 13

The Gap 14

Assumptions – Preconditions 14

Vision Statement 4 ..... **15**

Short description 15

Goals 15

The Gap 16

Assumptions – Preconditions 16

Vision Statement 5 ..... **17**

Short description 17

Goals 17

The Gap 18

Assumptions – Preconditions 18

Vision Statement 6 ..... **19**

Short description 19

Goals 19

The Gap 19

Assumptions – Preconditions 20

3. CLOSING THE GAPS: PROPOSED ROADMAP AND TIME FRAMES **21**

Actions Recommendations Vision Statement 1: **22**

Actions Recommendations Vision Statement 2: **24**

Actions Recommendations Vision statement 3: **25**

Actions Recommendations Vision Statement 4: **26**

Actions Recommendations Vision Statement 5: **27**

Actions Recommendations Vision Statement 6: **30**

1. Introduction

The intended audience for this document is people with future-facing responsibilities or interests that involve or are relevant to knowledge work and to technology-enhanced learning in support of knowledge work. This includes developers and early adopters of new or enhanced products and services; funders and sponsors of such work (eg venture capitalists; not-for-profit social entrepreneurs; foundations; public bodies); policymakers; strategic planners; research managers; and human resources managers. The aim of this document is to widen the awareness of those target groups both of the specific content presented here, and of the value of tracking EU Networks of Excellence (and thus aid the long-term sustainability of such networks, (as addressed for example in the work of PROLEARN Work Package 6).

The main content of this document is a summary of recent findings from a pan-European Roadmapping exercise lead by the PROLEARN NoE on the future of Technology-Enhanced Professional Learning (TEPL). The results are presented in terms of: a) visions describing the desired future state b) identified gaps between the current state of the art and the visions (Gap analysis) and c) actions recommended to fill the identified gaps. The Roadmapping process followed by the PROLEARN team aims to provide us with information on *"where we want to go"* (foresight/visions/desired future) and *"where we are now"* (current state), so that we will be in a position to determine *"How we can bridge the gaps between the future and the present" (*action plan). In Figure 1, the first two stages comprise Phase 1 (Where do we want to go? - output: Vision statements expressing the desired future state of TEPL) and the last two stages comprise *Phase 2* (*How to bridge the gap?* - outputs: Identified Gaps and Recommended actions to bridge them).

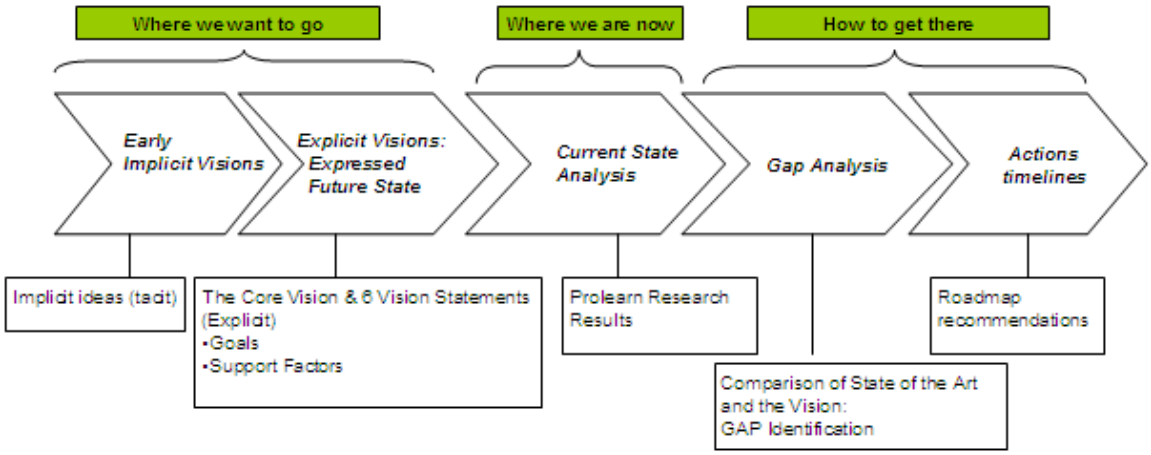


Figure 1: *Roadmapping stages*

Early (Implicit) Visions: They are defined as overall ideas, of what people sharing these ideas want to happen in the future. In case of PROLEARN they are embodied and reflected on both the individuals and group activities and challenges. Visions at this stage are often tacit knowledge which has to be expressed and made explicit.

Explicit Visions (Expressed Future State): Externalization and Combination of the implicit visions in a formal and systematic way. The ideas that represent the future state are expressed and crystallized in the form of concrete vision statements, in order to be able to define specific challenges that can make this future state a reality.

Gap Analysis: for each vision statement a gap analysis between the current state of the art (what is available now) and the desired future state (what is needed for the future expressed in the vision statement) was carried out.

Actions/timelines: based on the gap analysis results, a portfolio of short-, mid- and long-term actions and recommendations are produced in order to bridge the identified gaps.

Roadmap Methodology: In our view, Roadmapping is regarded as a knowledge creating process (as a continuous distributed process) that spirals outwards from the core partners of the PROLEARN Network (individuals, groups, the core Network) via the Network's associated partners, to the entire scientific community and industry. In our approach, we have combined conceptual modelling with the SECI theory of knowledge creation introduced by Nonaka (1991) and developed further by Nonaka and Takeuchi (1995) to form the PROLEARN Roadmapping process framework, introduced in PROLEARN D12.3 and D12.6.

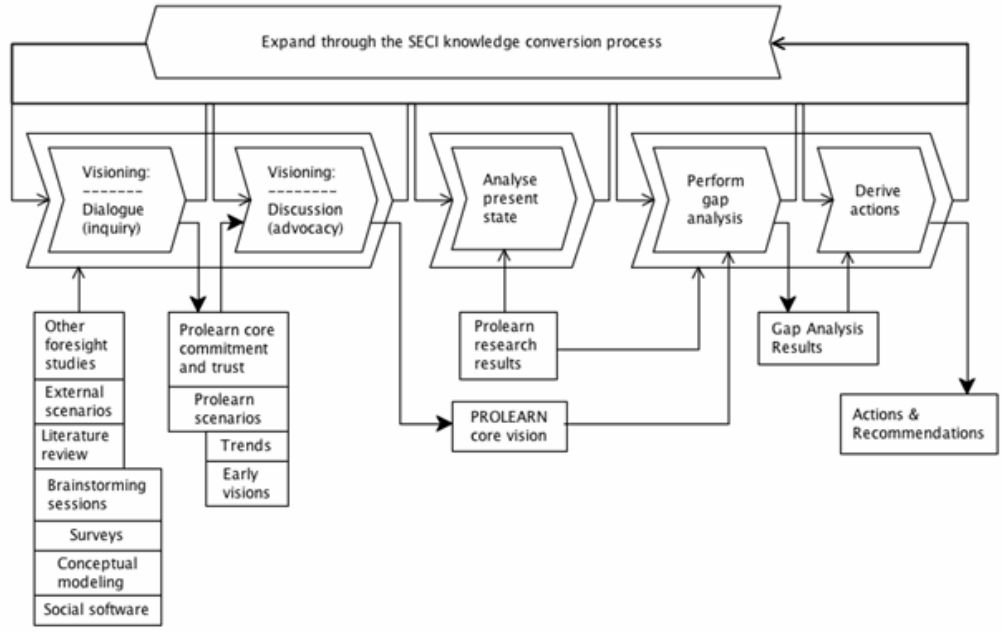


Figure 2: *Roadmapping Process Framework*

In this case, the different assets of the stakeholders who were building the roadmap were mobilized and shared in four different spaces of interaction whereas the tacit knowledge held by individuals was converted, expressed and amplified by the SECI-spiral knowledge-creation through: Socialization, Externalization, Combination and Internalization. As indicated in figure 2 the work on each of the key Roadmapping activities Visioning (dialogue), Visioning (discussion), Performing Gap Analysis, and Deriving actions has been continuously expanded and updated through the SECI process via interaction (dialoguing and discussing) with internal (PROLEARN) and external experts and groups from Academia and Industry. In parallel, the input from these discussions has been analysed and modelled using the Conzilla tool (www.Conzila.org) for conceptual modelling in order to be able to identify the essential concepts and processes and their complex relationships in various contexts, and to visualize them in a way that can be communicated to - and elaborated by - various stakeholder groups.

A detailed description of the methodology used in building the roadmap can be found in the Prolearn deliverables, D5.3 "A Conceptual Approach to Modeling the Learning Process with a Special Focus on Knowledge Creation", and D12.6 "Roadmap methodology and framework analysis Version II". The Conzilla model of the Roadmapping Process is described in D12.7, D12.14, and D12.16 Versions 1, 2, and 3. Versions 1 and 2 are available online as a web-based "electronic document" in the form of a Java applet (www.conzilla.org/wiki/Online/Main), and version 3 is available as a Conzilla model at http://www.conzilla.org/projects/roadmapping/presentation/CM#15a94f1105ee8e827. Navigational instructions can be found at www.conzilla.org/wiki/Doc/Navigation Roadmapping Process, Version 3". The process model is available as a web-based "electronic document" in the form of a Java applet at the Conzilla browser.

The Future of Technology Enhanced Professional Learning: Core and strategic visions

The PROLEARN Roadmapping team has applied foresight analysis in order to map out the desired future for Technology-Enhanced Professional Learning (TEPL) in the form of prevalent visions in the community at large. A number of instruments have been employed to identify major trends and to derive vision statements from stakeholders. These instruments include: scenario analysis, brainstorming sessions, international Roadmapping forums and workshops with experts, interviews with companies, virtual communities on the web as well as a multi-target large scale online survey of current trends. The overall guiding principle has been "finding the currents that lead us where we want to go" (proactive approach), instead of "floating in the currents that we are presently in" (reactive approach).

The prevalent visions for 2020 are centered on leveraging technology to: enhance and support work performance for businesses and directly link learning technologies with business needs; to promote innovation, creativity, and flexibility to support change in organizations; while at the same time promoting increased security for individuals in the form of employability and assuredness of equal opportunity, and taking into account both the social and market dimensions.

Core Vision for TEPL in 2020

The PROLEARN Roadmapping team has integrated the results from the various foresight activities and has come up with the following core vision for the future of TEPL in 2020:

"To support knowledge workers with technology-enhanced learning by promoting motivation, performance, collaboration, innovation and commitment to lifelong learning."

In this context, a knowledge worker is defined as someone who doesn't just consume knowledge but who is able to create it and who reflects critically on every level of activity in the organization and contributes back.

The 6 Vision Statements

The Core vision has been broken into 6 individual vision statements that synthesize and explain the core vision:

Vision statement 1: (IST challenge) "Everyone (in the community of current, potential and future knowledge workers) should be able to learn anything at anytime at anyplace."

Vision statement 2: (Industry challenge) "Learning as a means to support and enhance work performance."

Vision statement 3: (Industry challenge) "Promote innovation, creativity, and entrepreneurship at work."

Vision statement 4: (Employee perspective) "Learning as a means to increase employability."

Vision statement 5: (Market dimension) "Consumer driven market take-up, based on increased market transparency and the availability of a wider range of offers".

Vision Statement 6: (Social inclusion) "Access to professional learning for all – extending the knowledge based society".

The vision statements each have their distinct overall perspectives and focus. They represent different and complementary views of the core vision, such as Information Society view, industry views, learner view, market and societal dimensions. Figure 3 illustrates the six PROLEARN vision statements. As depicted in this figure, the PROLEARN vision statements provide a holistic picture of the desired future of TEPL in an outwards spiraling way that highlights the aspirations of all stakeholders: the individual (V1 & V4), the enterprise (V2 & V3), the market (V5) and the European society as a whole (V6).

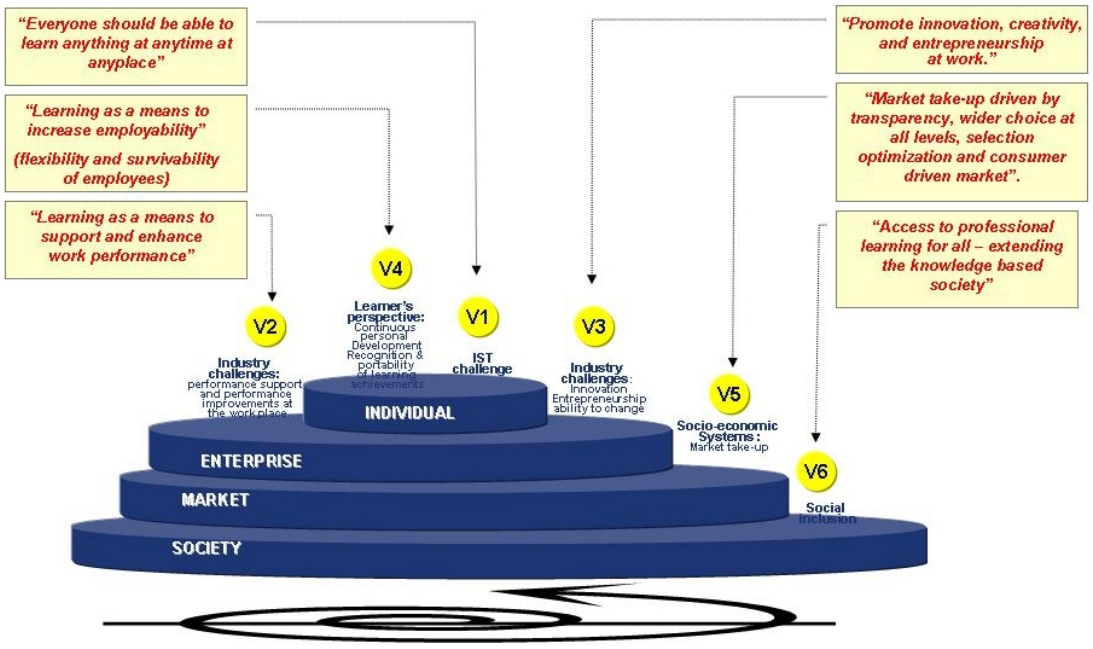


Figure 3: *The six PROLEARN vision statements*

During the foresight analysis, each vision was described in terms of its main goals (a goal is a challenge that is difficult to achieve but necessary to fulfill the vision) and the support factors, critical elements that have been identified for supporting the realization of the vision. The six vision statements formed the main input for the Gap Analysis phase of the roadmap. (See PROLEARN deliverable D12.10)

During the Gap Analysis, a comparison between the state of the art and the vision statements was performed in order to identify the Gaps between what is available today and what is needed for the future, set capability targets and requirements and derive the strategy (Actions/Recommendations) needed to fill these Gaps. Our approach has aimed to identify the current strengths (existing capabilities), weaknesses (missing or inadequate capabilities), opportunities (key future capabilities) and capability-related threats (problematic factors such as competition for sources of capabilities and resources needed to acquire new capabilities or re-direct existing capabilities) and which will contribute to the realization of the visions. (See PROLEARN deliverable D12.12).

Strategy to fill the gaps, Roadmap actions/recommendations: Based on the results of the previous phases, a portfolio of actions has been produced. During this cycle the following question was addressed: What is the strategy needed to fill the Gap? The result is a list of actions that must be planed in order to fulfill each vision. Each action was classified according to the following four Roadmapping sectors: Business/Economics (BE), Technical (T), Socio-cultural (SO), Political (P). Moreover each action was described using the following format:

- The Action itself (title) plus a short description
- The Actors to be involved and means to be used in order to implement these actions
- A time span form now till 2020, within which the actions should be implemented

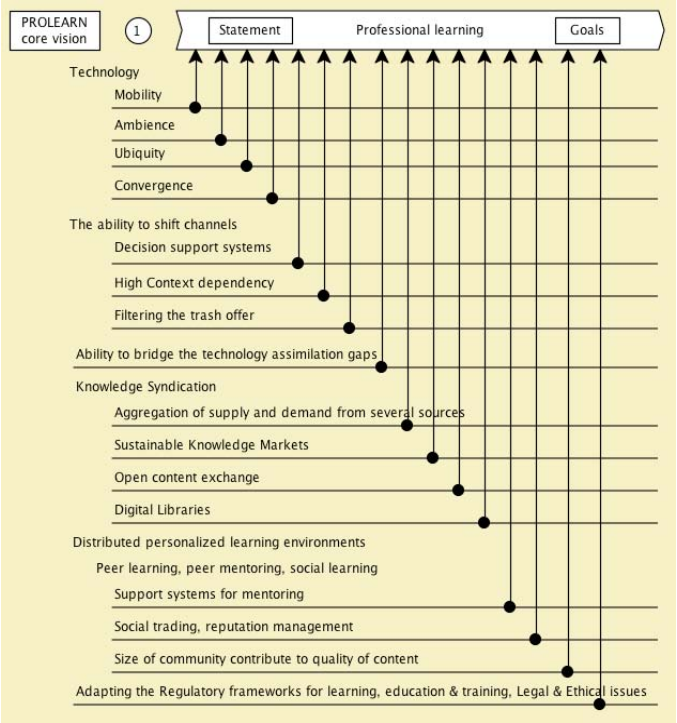
2. Foresight and Gap Analysis main conclusions: visions, goals, gaps between today and tomorrow

Vision Statement 1:

(IST challenge) "Everyone (in the community of current, potential and future knowledge workers) should be able to learn anything at anytime at anyplace."

Short description

Vision statement 1 is closely linked to the IST challenge and is focused on the individual. It is related both to personalization and to access to learning at any time at any place. The aim is to create and deliver a personalized learning experience to everyone. The word "everyone" in the vision's statement title and goals signifies that everyone should have the ability to learn anything where and when he wants. In that sense, this vision statement tries to integrate all different interpretations of learning and learning approaches. How technology can support the different learning processes in the life of people and provide many choices to learning and how to utilize all different technologies that exists to remove the barriers to learning including what people don't know that they need to learn. This goal also commands that everyone should have different tools at his disposal available that will help him/her to find, select and choose among the abundance of options. Therefore, the goal of this statement is not only to create many choices but also help people decide what's just right for them.



Goals

1. Provide the right learning experiences at the right time for the target person (which can be anyone)

2. Everyone should have access to all public learning materials at any time at any place

The Gap

In the *business* area, the separation between work and not work is not clear today, especially for knowledge workers. Learning tends to be transparently integrated into work processes, and thus it needs to be ubiquitous and nomadic. Traditional educational institutions prevail and new appropriate business models for learning services are still missing, which is a major drawback nowadays.

The *technical* field witnesses the most rapid development, particularly of information and communication technology. Originally separated technologies are being integrated, combining various benefits. Mobile devices enable ubiquitous communication services and access to huge amounts of information. However, standards and specifications are not harmonized, which causes interoperability problems. For instance there is a need for interoperable learning repositories.

From the *socio-cultural* perspectives there are essential differences in the availability of the modern technology and services, as well as in digital literacy that is often missing. Only one-sixth of the world population has access to the Internet and can benefit from its innovative services – information, publication, communication, and collaboration. A major issue of information-overload has been addressed by effective information retrieval and recommendation services. Huge popularity of mobile communication devices shows a promising direction for development of learning services. Open content exchanges and distribution channels are crucial for integrative learning based on bottom-up approaches. The modern trends focus on individualized and personalized learning, as well as on ambient and nomadic learning.

In the *political* sphere there is a demand to support new educational models and methodologies that are necessary for both formal and informal life-long learning.

Assumptions – Preconditions

Assumptions

- The statement doesn't imply that companies should allow everyone to access the proprietary knowledge that the companies have developed in-house. By "access" we mean access to all learning material publicly available.
- Web 2.0 has created a new attitude towards learning (knowledge-sharing, networking, learners communities, learning from informal networks). New business models and opportunities are emerging because of the web 2.0 phenomenon.
- More and more People don't feel part of a nation or a state anymore but part of worldwide "communities". The exogenous approach to resources and platforms merges different inputs within a single community of practice focused on the topic and the relation and not on the technical or affiliation restrictions.
- The separation between work and not work is becoming very blurred today. The whole professional area is becoming more diffused (as opposed to what is used to be actual work and working "formally in the office").
- The Internet is expanding, and there is a huge and rapidly increasing amount of public information on the Web
- Information retrieval facilities are becoming more effective
- The Semantic Web is rapidly developing
- Capturing information is easier than before
- Bottom-up learning approaches are becoming popular

Preconditions

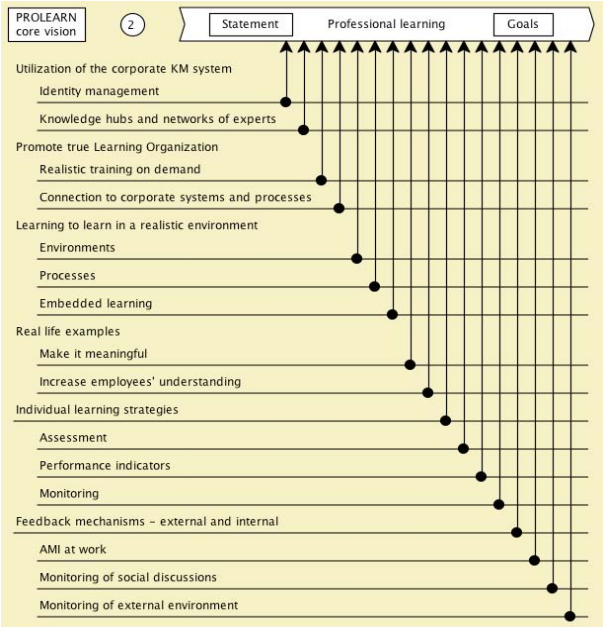
- Interoperable learning repositories
- Harmonization of learning standards
- Knowledge management based on semantics
- Innovative educational methods (e.g. interest, motivation, curiosity driven learning)
- Attractive forms of learning (e.g. integrated into leisure time, entertainment and game-based learning)
- Individualized personalized and contextualized learning supported by ICT
- Support for informal life-long learning
- Support for ambient and discontinuous learning
- Appropriate business models for learning
- The individual in his/her community is taking control of the learning process.

Vision Statement 2

(Industry Challenge): "Learning as a means to support and enhance work performance."

Short description

Vision statement 2 is related to specific industry challenges, such as performance support and performance improvements at the work place. It is focused on the organization and how to use TEPL as support and enabler for increased work performance. It is linked to organizational issues where the company deals with work performance that increases the company's productivity. This statement is therefore related to the standardized, structured and known business processes of the organization. This differentiates it from Vision Statement 3 which focuses on the use of TEPL to support innovation and creativity in the organization and support large scale changes within the organization - often related to project-based work and process-oriented activities that are unstructured and complex. A conceptual framework of how to link learning technologies to work performance and link the results of learning performance to work performance is of paramount importance. (Such framework is suggested in PROLEARN D1.10, D7.5 and D7.7) This translates in a need for new tools, methodologies and services in order to a) to link business process management to learning design methodologies (such as competency-based business process analysis) and b) to measure learner performance in relation to the defined learning goals and business needs. The new learning systems should be able to understand the skills and competencies required by the new business processes and match them with learning experiences in a way that will be transparent to the user. At the same time individual learning strategies for performance assessment and indicators to monitor the results of learners and their performance must be in place in order to effectively measure the impact of learning on performance.



Goals

1. To support human performance improvements and to provide links between business processes, competencies and learning processes

2. To use TEPL to design high quality work-based learning activities so that learning and working becomes seamlessly combined

The Gap

In the business area work performance is strongly linking business needs, competency needs and learning to help knowledge workers. We still have to bridge the gap between a top-down view and a bottom up view:

Top down View: companies must make sure that learning addresses both the individual competency gaps and the business needs. Only if both aspects are properly balanced, can they be accepted at the employee level and increase business performance through learning at the workplace.

- "Time2Competency" matters; link to competency management
- Performance Management must be business driven
- Configurable personal learning environments come into place

Bottom up View: Knowledge workers use learning technologies as one element of information and knowledge gathering and exchange. "Instant learning technology" and different forms of social learning support knowledge workers more effectively than managed learning technologies

- Web 2.0 applications - User-centric views - Exchange of all kinds of content will be necessary (rating, feeds, ...)
- Learning technologies must be linked

From a *technical* point of view we have to bring competency management technologies into place that can be used also for knowledge workers. Several projects at the EU level address this issue, so that we can expect that results emerge within the next two to three years. The interoperability of knowledge management technologies, learning management and web 2.0 technology is of critical importance here.

From the *socio-cultural* perspectives there are essential efforts to be carried out concerning the awareness and use of learning technologies at the management level. Recently, the topic is not in focus of a company's management as the ROI impact has not been proven. In addition, there is a lack of openness from the side of unions. Depending on the country where we use the technology, there is more or less openness and active support for the vision.

In the *political* area there is a demand for policy makers to continuously support projects in the area of vision 2 in order to ensure that new technologies come into place. The funding of related projects should continue at least 5 to 8 years in order to ensure, that proven technologies are implemented and disseminated.

Assumptions – Preconditions

Assumptions

- Learning technology must get higher management awareness through positive success stories and having an ROI impact
- Companies coming from knowledge intense businesses prove that performance of people through investing in learning technologies have an ROI impact
- Unions don't see it as negative if companies aim to measure peoples performance.
- Standard technologies for learning performance monitoring and measuring come into place
- Knowledge management technologies and web 2.0 technologies have positive impact on learning technologies.

Preconditions

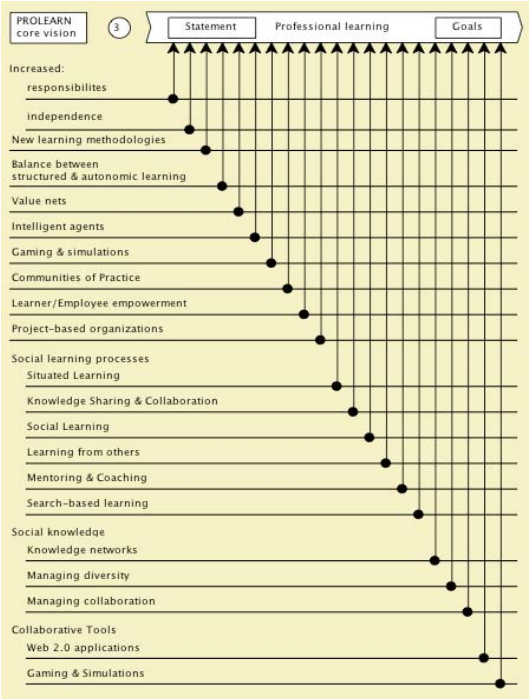
- Human resource business units need to stronger interlink their activities with business units and training units.
- ERP solution providers must be open to integrate learning technology by offering open interfaces and webservices to learning technologies
- Management awareness for learning technologies should be increased as a key element of company performance
- Unions should take into account the positive effect of learning technology in relation to the company's performance.

Vision Statement 3

(Industry Challenge): "Promote innovation, creativity, and entrepreneurship at work."

Short description

Vision statement 3 is related to industry challenges such as investment and development of the human capital of companies and use of learning to support the ability to change in organizations. It is focused on the organization and the role of its employees as something much more than just simple actors in a process chain. It recognizes human capital as the key to organizations' completive advantage. Employees are not passive consumers of knowledge, but are capable of critical reflection who can provide feedback to the processes of the organization. This is a new view of the organization, where search-based learning is coupled with reflection within the organization. The big challenge is how to create an atmosphere of collaboration within the organization to foster innovation, and also how to create an atmosphere and attitudes of people in the organization to make room for reflection and contribution to get new products out of TEPL. We need to link the top-down management views of today to this new bottom up business reality. Move away from central control and allow for the "creative chaos", fluent behavior and redundancy needed for collaboration, creativity and innovation. To facilitate this type of innovation, a new educational culture and mindset is required which relates more to informal learning methods that differ from teacher-centric models and allow for creativity and collaboration to be at the center of the learning process. Networking and Collaboration technologies play a big role in supporting this type of learning and knowledge sharing such as Web2.0 applications and Social Software.



Goals

1. Learning that supports radical change in an organization and improves the ability to change
2. To support innovation in an organization by enhancing knowledge-sharing and collaboration
3. To develop specific competences related to thinking out of the box, creativity, asking the right questions, leadership

The Gap

From a **business as well as a socio-cultural perspective**, Peter Drucker argues that in the emerging economy, knowledge is a primary resource for individuals and for the economy overall as well as land, labor, and capital. He further argues that improving knowledge-worker productivity is the greatest challenge of the 21st century (Drucker, 1994). Similar to a knowledge-worker, a professional learner is a person who doesn't just consume knowledge but who is able to create it. Over the past few years, the Web has been shifting from being a medium, in which information is transmitted and consumed, into being a platform, in which content is created, shared, remixed, repurposed, and passed along (Downes, 2005). We are entering a new phase of Web evolution: The read-write Web; a new generation of the Web where everyone can be a consumer as well as a producer of knowledge in new settings that place a significant value on collaboration. Web 2.0 technologies have been opening new doors to the professional learner that enable more dynamic and social forms of learning. The new Web trends have offered new means to connect people not only to digital knowledge repositories but also to other people, in order to share ideas, collaboratively create new forms of dynamic learning content, get effective support, and learn with and from peers. Since learning is social, personal, distributed, flexible, dynamic and complex in nature, a fundamental shift is needed toward a more social, personalized, open, dynamic, emergent and "knowledge-pulling" model for learning, as opposed to the one-size-fits-all, centralized, static, top-down, and "knowledge-pushing" models of traditional learning solutions.

As far as the technical perspective is concerned, current learning models are following a static and pre-defined representation of knowledge and put a heavy emphasis on content and technology. Learning is however more than static content and technology is just an enabler. At the heart of the learning process there are people. Consequently, current learning models have to be replaced with new models that reflect the social nature of learning and respect the human side of knowledge. In the future, people-driven implementations of learning models need to be the norm rather than the exception.

Assumptions – Preconditions

Assumptions

- There is a visible move toward open environments where collaboration is the norm.
- Learning is social, personal, distributed, flexible, dynamic and complex
- Organizations are becoming more and more project-based with multidisciplinary teams working together around the world (within and across companies)
- At the workplace there is a move from close supervision to more independence and responsibility.

Preconditions

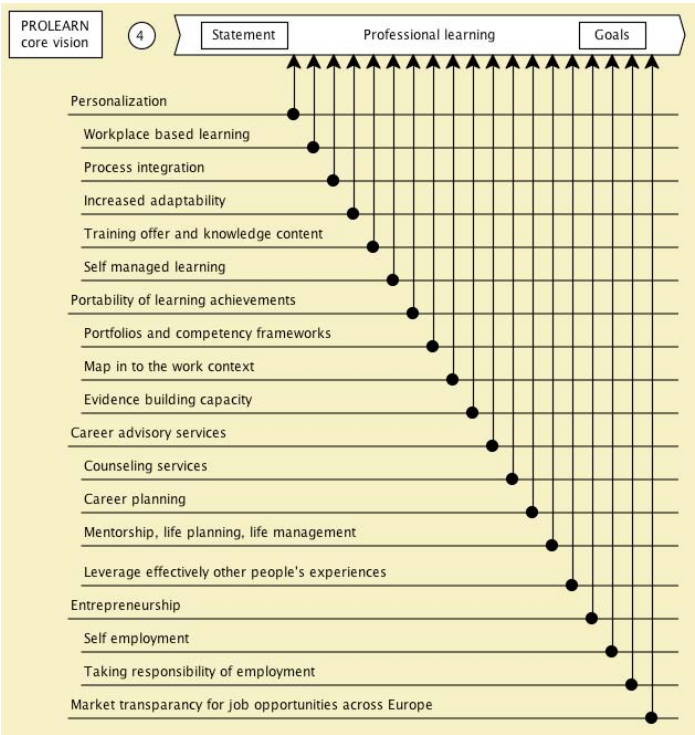
- Flexible learning models that are open to change to meet the needs of the new knowledge society.
- A participatory culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe that their contributions matter, and feel some degree of social connection with one another (Jenkins, 2006).
- Trust as a major prerequisite for knowledge sharing

Vision Statement 4

(Employee perspective): “Learning as a means to increase employability.”

Short description

Vision Statement 4 focuses on the Learners’ perspective, the employees’ continuous professional development, and the need to increase their future employability. Use of learning to increase employability means acquiring "competencies that can increase professional choices", over the whole of one's lifetime (this is looked at by the PROLEARN Learning Cluster, PRO-LC). These "competencies" may relate to fields and qualifications that do not exist yet. The "professional choices" include looking for new jobs or new ways of working, e.g. self-employment, entrepreneurship, portfolio careers, consultancy, project-based work and short-term employment or delegating such inquires to software systems that are "intelligent" in some way. Similarly, the term “workforce” in this vision statement refers to “knowledge workers”. In the knowledge economy, everyone can be knowledge worker by aggregating knowledge, filtering it, reflecting on it and adding value to it. This vision statement aims at both increasing professional choices for knowledge-workers (for example by reducing the barriers to becoming a competent member of other professional communities and sharing their knowledge widely) and also assisting them to find activities (or create activities) that count as being employed. Sharing knowledge within a community of knowledge-workers, to help everyone to improve on-the-job performance, is the key towards this aim.



Goals

1. To promote resiliency, personal growth and fulfillment
2. To enhance mobility, employability and competency of the workforce

The Gap

This vision statement (“Learning as a means to increase employability”) directs our attention at such issues as how knowledge-workers can learn to stay employed by anticipating changes in market conditions (or by being agile enough to respond quickly and appropriately to those changes), and refining and adapting what they offer employers, to meet those new conditions. What is needed here is considerably in advance of the state of the art in vocational education and training. For example, globalization is already a problem for knowledge workers in the West, in the sense that their continued employability depends on their ability to compete with knowledge workers from low-wage economies elsewhere. Thinking through the implications of the vision statement, one way to compete is to seek out local niches for knowledge work (a "long-tail" approach to finding opportunities), and then acquire new knowledge, appropriate to those niches, which can be turned into services for an employer. The goal is to offer localized forms of knowledge work (localized services are often hard for off-shore knowledge workers to compete with). Localization of e-learning courses, like personalization of those courses, requires fast, effective, low-cost ways to incorporate new content, new methods, tuned to the specific needs of the knowledge worker and their employer or prospective employer. Unfortunately, while research in those areas is beginning to show good results, we are still maybe a decade from affordable, flexible, powerful and personalizable learning technologies, able to make a big difference for employability. The same points can be made about Vision Statement 1 (regarding the need for learning resources on "anything"); Vision Statement 2 (regarding how to update, quickly and affordably, all information relevant to “Learning as a means to support and enhance work performance"); and Vision Statement 6 (regarding how to cut the cost of personalized “Access to professional learning for all”).

Assumptions – Preconditions

Assumptions

- A widely anticipated trend in the future is a global "race for talent" (meaning high demand for top-quartile performers, especially in knowledge-based industries). Current and aspiring knowledge workers who are talented will have wider choice of how to work, leading to a rise in the proportion of knowledge workers who choose to be self-employed or choose short-term employment. In this scenario, the number of portfolio workers will increase and their employability will demand the ability to anticipate the requirements of constantly changing work community.
- In the skills base associated with high-performance knowledge work, there will be a move from simpler to more complex skills and from skills that suit a slowly changing world to high-agility skills, needed to cope with a faster changing world.

Preconditions

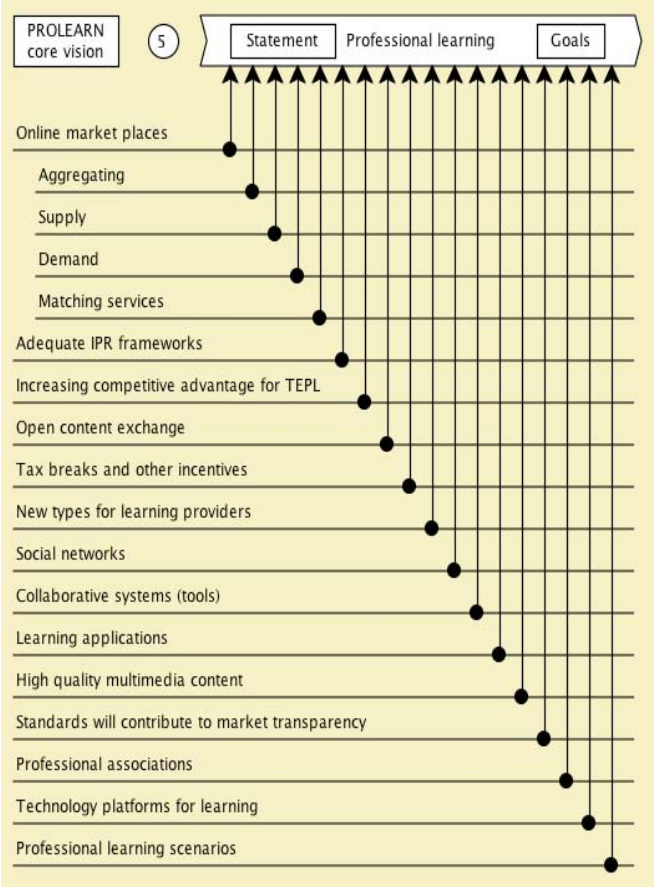
- This vision statement aims at both increasing professional choices for knowledge workers and also assisting them to stay employed. Having the skills needed for a high level of "On-the-job" performance is the key towards this aim.
- Knowledge workers who aspire to be high performers should join communities of practice that contain people who perform at that level, and are willing to share their insights. Key insights include: how to be proactive, how to be able to anticipate the problems before they occur; and how to understand how your work is related to a larger context and hence be able to anticipate undefined needs of your co-workers in order to be able to adapt effectively to changes in the business process. This is easier done in small organizations than in large organizations. Direct access to high-level management information might not be possible in large organizations, which limit access to Knowledge Management systems on a need-to-know basis. On the other hand, top-down approaches lead to outcomes of poor quality and tasks not done efficiently. Therefore, someone needs to have the role to document the overall business process and share it with the organization.

Vision Statement 5

(Market dimension): "Consumer-driven market take-up, based on increased market transparency and the availability of a wider range of offers".

Short description

Vision statement 5 focuses on market take-up for TEPL. It involves the development of all segments of the market, ranging from the low-end commodity market to the high-end, upscale, high value-added segment, with a range of different segments offering a consistent variation in the price/benefit ratio, relying on emerging European industry players. This vision focuses on market take-up of technology-enhanced professional learning, both on the demand side (customer) and on the supply side (provider, investor). It targets the ability to provide and purchase content and learning services regardless of their type and of the location of the learning supplier in a unified transparent market.



Goals

1. To enable the customer to purchase, not only at any time and in any location (as described in vision statement 1) but also:

- any type of professional learning/training technology-enhanced service or combination of services, from the most basic ones to the more complex ones
- at any price, as market transparency and the increased availability of products and services allow the customer to understand the price/performance ratio of a wide range of offers
- from any channel or vendor, ranging from online marketplaces to high-end consultancies

2. To achieve significant TEPL adoption in three different market segments:
- large corporations and organizations in knowledge-intensive industry sectors
- SMEs, which represent 90% of companies in Europe : widespread adoption
- individuals : for life-long learning

3. To address the wide range of needs of these three main market segments, with product/service offerings ranging from the basic low cost offering involving static content to services targeting communities of practice such as content creation and sharing

4. To enable the emergence of strong European TEPL industry capable of competing on a level field with North American and Asian TEPL-vendors

The Gap

This vision statement largely complements vision statement 1 “Learning anything, at any time, in any place” and vision statement 6 “Access to professional learning for all”. Building on the view that everyone will be a knowledge worker, it extends the consumer base to every individual, beyond the limits of existing companies and, therefore, significantly increases the importance of market dynamics, making TEPL similar to any other mature market, with offers targeted at a large range of different market segments and purchasing contexts. The gaps therefore involve a large number of deployment and implementation challenges, at the pedagogical, business and social levels.

In the *business* area, there is a strong need to bridge the digital divide that currently separates SMEs from large corporations and successfully develop access to learning opportunities for individuals. IMC, with its Slidestar project, which addresses sharing of learning content by all, introduces a significant shift from its traditional approach and exclusive focus on the corporate LMS for large companies. If widely embraced by other providers, this shift would definitely speed up adoption by individuals and lead to substantially lower prices for SMEs for a wider range of services.

In the technical field, the challenges consists mostly in making available a greater range of services accessible to all at any time and in any location, at a price level acceptable to each market segment and at a cost which is sustainable by the producer. Current research, at the same time, will provide the basis for launching and extending the outreach of high-end customized services, such as competency management.

In the *socio-cultural* sphere, effective adoption of life-long learning has not significantly taken off, yet, but is a strong challenge for the European society as a whole in order to maintain its influence in the globalization process.

In the *political* sphere, extending the outreach of TEPL is key to maintaining and improving Europe’s competitive edge for the entire economy as well as to developing a European industry sector that can both compete with other global players and help sustain highly skilled jobs in Europe

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Assumptions – Preconditions

Assumptions

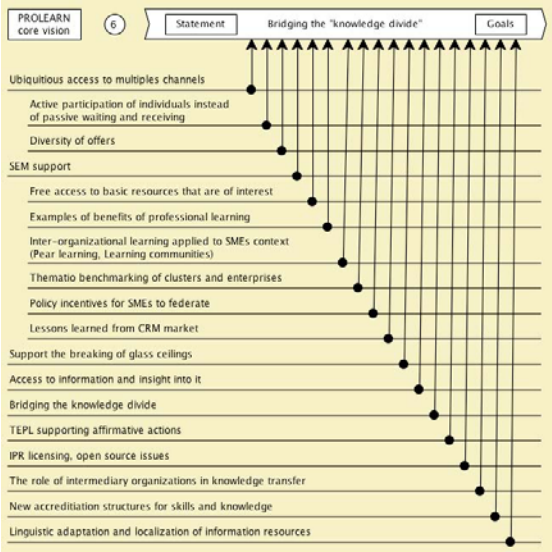
- Users, both staff in SMEs and large corporations as well as individuals, have an increasing need for TEPL products and services, which translates into increased market volume and market value.
- Everyone, whether (s)he is working in an organization, is self-employed or is unemployed, has become a knowledge worker.
- TEPL market development does not depend on a single pedagogical approach or organizational model.

Pre-conditions

- There are no strong pre-conditions. Nevertheless, failure in implementing VS1 and VS6 would definitely mean that VS5 would be very difficult to achieve in two of the three market segments: SMEs and individuals

Vision Statement 6

(Social inclusion): "Access to professional learning for all – extending the knowledge based society".



Short description

Vision statement 6 is closely linked to social inclusion as it is perceived in the context of the knowledge-based society. It views the different stages of the Digital Divide through the dimensions of Access, eAccessibility & Usability, Service Development, Individual Capacity Building, Human & Social Capital, and Citizen Participation. The aim of the vision is to ensure that the current knowledge workers, the potential knowledge workers, and the future knowledge workers are able be part of a society that fulfills the criteria expressed by recent European policies and strategies related to the knowledge based society and/or information society. The issues addressed by vision statement 6 are somewhat similar to those addressed by the first vision statement, which is focusing on the individual knowledge worker, while unlike the other visions, this vision statement focuses on societal issues.

Goals

1. To promote e-inclusion and equal opportunities for all
2. To provide the needed support for SMEs to ease the first steps in the acquisition of professional leaning tools and techniques
3. To provide ubiquitous access to multiple information channels & the knowledge needed to filter, understand and use them

The Gap

In the *business* area The strengths and several opportunities are relying on the development of Social Web applications and the potential that they have especially for enabling CoP (Communities of Practice) type of collaborative knowledge creation and sharing. The development of IT and Web-based services is expected to enable application service provision of services that today are common only within proprietary corporate systems. The main weaknesses relate to the old-fashioned view of training as an expense and as an activity that is only weakly linked to the actual business processes. Such attitudes may prove difficult to overcome, yet they are obstacles on the way towards exploiting the full potential of TEPL.

The *technical* field will have to cater to the needs and expectations arising from the business - and most of all from the users - with increasing demands and expectations for the Web-based learning services. The main challenges in standardisation will be in the area of competency, skills, and knowledge. Mobile devices and "digital convergence" will make mobile work possible for the majority of knowledge workers. This will further blur the line between work and leisure. Access to broadband will become commonly available, even in the new member states and rural areas.

***From the Socio-cultural* perspectives** the good news for the knowledge worker will come in the form of systems that recognise learning achievements resulting from informal learning, as well as from non-formal and formal types of learning. The achievements and competences will be documented in the learner's e-portfolio in a format that can easily be understood by potential employers/clients/peers/etc, thanks to standardised representations. The majority of young professionals will not have the luxury of long-term employment contracts. They will work on short-term project assignments and they may have more than one employer/client at one time. So called "portfolio workers" will need career-counseling, mentoring, and networks for other types of peer-support. These services are not being developed at the needed pace.

In the *political* sphere the challenge still comes from the rapid changes resulting from the evolution of ICT application and the digitalisation of everything. How can we maintain sustainable e-Inclusion, social inclusion, eAccess while developing the competitiveness of Europe? In the education and training arenas legislation and regulatory frameworks are needed for the protection of privacy and the harmonisation of qualifications frameworks. Systems are needed for recognizing and validating the learning achievements resulting from informal learning. There is an increasing gap between today's professionals and the rest of the workforce that could lead in a 2 speed Europe.

Assumptions – Preconditions

Assumptions

The SWO analysis focuses on eInclusion issues that are mostly related to concrete TEPL issues. Therefore the assumption behind the realization of the overall goal of the vision requires that the main challenges, as identified previously, do not produce major obstacles for sustainable Knowledge-Based Society development:

- Increasing polarization of e-included and e-excluded, linked to factors such as real and opportunity cost
- Cultural and social fragmentation
- Surveillance and control

The approach also assumes that lifelong learning will maintain its priority on the political agenda, and learning as such will continue to be considered an activity that contributes to personal fulfillment as well as to better competitiveness. In addition many of the currently prevailing trends affecting TEPL will continue. These trends include:

- Shortening the value-chain
- Increasing the affordability of personalisation
- Increasing the individualization of learning opportunities.
- Shortening the response time of the system.
- Continuing of the rapid development and increase in popularity of peer-to-peer and many-to-many applications.
- Success means different things to different people.

Preconditions

Since the SWO analysis focuses on eInclusion issues that are mostly related to concrete TEPL issues the precondition for the realisation of the overall goal of the vision requires that the desirable opportunities for enhancing eInclusion in the Knowledge Society as a whole, as listed previously, are being realised:

- Providing greater access to more consumers for a wider diversity of consumer products, services and choices.
- Supporting a more effective role for consumers in the development of new products and services, and greater control over quality, utility and relevance.
- Providing opportunities for the harnessing and utilization of the creative potential of people in the innovation process, and creating conditions for wider and more effective entrepreneurship.
- Supporting and encouraging individual self-determination, self-expression and more effective social interaction, through social networking.
- Contributing to the development of social capital, for example through the expansion of social-networking via Web 3.0 into community-based support networks.
- Increasing participation in decision-making, and thereby supporting increased motivation to participate in democratic processes and a more 'participative culture.'
- Supporting participative culture through the expansion of e-government infrastructure.
- Reinforcing and enhancing democratic structures, for example through providing more open scrutiny and critical review of government agencies and actions.
- Contributing to improving the knowledge base, and the skills base, by promoting knowledge creation, knowledge sharing and acquisition of new skills, through both formal and non-formal learning.

3. Closing the Gaps: Proposed Roadmap and Time Frames

This section provides the actual actions recommended for each vision statement. Each action is also classified according to the four Roadmapping sectors: Business/Economics (BE), Technical (T), Socio-cultural (SC), Political (P).

Actions Recommendations Vision Statement 1:

(IST challenge) "Everyone (in the community of current, potential and future knowledge workers) should be able to learn anything at anytime at anyplace."

Based on the identified gaps a set of actions is derived per vision statement. Each action is also classified according to the four Roadmapping sectors: Business/Economics (BE), Technical (T), Socio-cultural (SC), Political (P).

Actions: Vision Statement 1 The aim is to create and deliver a personalized learning experience to everyone. This Vision Statement addresses a grand challenge which is very difficult to meet entirely. The actions described below are moving us towards this challenge but they don't guarantee that this challenge will be met. The term "learning resource" signifies any entity that can support learning, e.g. learning object, learning activity/event/design, learning assessment, learning plan, curriculum, peer, tutor, expert, community, learning network, etc.

BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political

Description	Means	Actors	Timelines (now – 2020)	Sector
A1.1 "Federation of learning resources": Establish a public platform where people collect, aggregate and share learning resources (or their references), annotate (metadata), evaluate, recommend, and discuss them. This platform should be based on modeling different combinations of "contextualized content" in order to provide overview of available resources in relevant contexts. The platform should be decentralized and open for contributions by anybody. .A "long tail" approach used in other fields such as publishing, music etc. needs to be adopted considering the three forces of: a) democratization of production, b) democratization of distribution and c) social filtering (Anderson, 2006).	research, development case studies	researchers, developers, business actors, publishers, multimedia developers, clearing houses, brokers	Now - 2010	**T**
A1.2 "Contextual delivery of learning resources": Implement semantic search (and filtering) based on various types of metadata (e.g. educational, contextual, usage) and adaptive delivery (mobile, ubiquitous) of learning resources, supporting both pull (self regulated) & push (centralized) learning approaches while taking into account the learners preferences, interests and degree of preparation.	research, development conceptual models and reference scenarios of personalization and adaptation of learning experiences. reference scenarios of mobile learning	researchers, developers, educators	2012- 2015	**T**
A1.3 "Production tools for support of contextual delivery of learning resources": Develop new production of online tools that will simplify the production of standardized (reusable, interoperable) learning material, including adaptive interactive components.	research, development	researchers, developers, educators	2010 - 2015	**T, SC**

A1.4 "Harmonization of learning standards": Enable better interoperability of learning resources by harmonizing learning standards and using the Semantic Web as a facilitator. In order to achieve the needed interoperability between different learning systems, it is necessary to promote distributed systems architectures (based on SOA), with standardized interfaces of systems components and make them easily identifiable and interchangeable over the internet.	analysis, negotiation Service Oriented Architectures blug and play components	researchers, instructional designers, key players from the Industry	2012- 2015	**T, P**
A1.5 "Digital Identity Management": Establish mechanisms to verify the identity of individuals and organizations in virtual learning networks in order to facilitate knowledge sharing and collaborative knowledge creation. These mechanisms should enable any individual to: connect and collaborate in different knowledge networks; effectively identify those networks, their information nodes, recognize patterns and locate the person(s) or the community/communities with the required know-how who can help her/him achieve better results.	research, development, negotiation	researchers, developers, educators	Now - 2012	**T, SC**
A1.6 "Innovative business models for learning exchanges": Develop feasible business models to enable efficient sharing and exchange of learning resources. These models should support both open/free and commercial learning offerings and provide the needed sustainability for such ventures and initiatives. (eg innovative models for facilitating exchange, copyright management, quality assurance, revenue generation, etc.)	negotiation, development, PPP (Private, Public, Partnerships) the conditions of use should be made more transparent by increasing the efforts to develop standards for managing IPR issues, spread of use of standard open licenses, European Harmonization of Educational exception (reproduction, economic, distribution rights)	business actors, educational institutions, policy makers, funding bodies,	2015-2020	**BE**

Actions Recommendations Vision Statement 2:

(Industry challenge) "Learning as a means to support and enhance work performance."

Actions: Vision Statement 2: This VS is related to specific industry challenges, such as performance support and performance improvements at the work place. It is focused on the organization and how to use TEPL as support and enabler for work performance. It is linked to organizational issues where a company deals with work performance in the area of increasing its productivity and uses learning to improve time-to-performance in everyday situations and rapidly raise the qualification levels of the participants. This statement is therefore related to the standard, structured and known business processes of the organization.

BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political

Description	Means	Actors	Timelines (now – 2020)	Sector
A2.1 "Methodologies for skill-based performance management": Develop a methodological approach for skill-based work performance. (i.e. competency-based business process analysis and measurements of learner performance in relation to the defined learning goals and business needs.)	action research	research, HR departments, case studies, instructional design experts	Now - 2010	**P**
A2.2 "Measurement framework for work performance": Develop measurements for work performance in different application domains such as industrial enterprises, services organizations and the public sector.	action research, analysis	research, methodological work	Now - 2010	**SC**
A2.3 "Open services for integration of learning and knowledge management": Integrate technologies such as open content repositories with learning and knowledge management technologies to create an open services framework for learning and content.	development, case studies, application of existing standards	research, development, best practice networks	Now - 2010	**SC**
A2.4 "Interoperability standards for learning and knowledge management": Develop flexible learning services frameworks that support formal and informal learning of knowledge workers - including technologies that are open and interoperable.	conceptual design, research actions, analysis, deployment activities	research, technology vendors	Now - 2012	**SC, T**
A2.5 "Social Learning Networks": Establish social learning networks that create a new kind of collective intelligence across companies and organizations in order to share and exchange knowledge in new media formats	action research, new business models, new organizational models	research with key players from industry and organizational research	Now - 2015	**BE**

Actions Recommendations Vision statement 3:

(Industry challenge) "Promote innovation, creativity, and entrepreneurship at work."

Actions: Vision Statement 3: VS 3 is related to industry challenges such as investment and development of a company's human capital and use of learning to support innovation and change management within the organization. It is focused on the organization and the role of its employees as something much more than just simple actors in a process chain. It recognizes human capital as the key to an organization's competitive advantage. Employees are not passive consumers of knowledge, but are capable of critical reflection, and they can provide feedback to the processes of the organization.				
BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political				
Description	**Means**	**Actors**	**Timelines (now – 2020)**	**Sector**
A3.1 "New Learning Models": Develop a new, more social, personalized, open, dynamic, emergent, and knowledge-pulling learning model, characterized by the combination of knowledge management, and formal, non-formal, and informal modes of learning within a social context.	conceptual design, action research, analysis, case studies	research, analysis	Now - 2015	**SC, T**
A3.2 "Participatory Culture": Take initiatives to widen participation and create a participatory culture that supports knowledge sharing and fosters trust (create opportunities for knowledge workers to meet and interact, reward rather than punish collaboration initiatives, establish collaboration as a key part of the performance evaluation of knowledge workers, provide new reward schemes based on collective team performance)	action research, analysis	research, business actors	Now - 2015	**SC**
A3.3 "Informal Learning Support": Develop a framework to promote a participatory culture by creating synergies between formal, non-formal and informal learning approaches and activities within the organization, provide links between work and informal leaning environments and lift barriers between formal and informal learning towards a more organic way of organizing and managing organizations.	action research	research, educational institutions, (inter-)national quality assurance agencies	Now - 2012	**P**
A3.4 "Flexible Organizational Structures": Establish knowledge-based organizations with less hierarchical, less centralized, and more flexible structure, enable knowledge workers to interact outside the boundaries of the organizations and allow different actors from different institutions to come together for a short time to solve a specific problem.	action research, new business models	research with key players from industry	Now - 2020	**BE**
A3.5 "Social Learning Networks": Establish social learning networks that create a new kind of collective intelligence across companies and organizations to share and exchange knowledge in new media formats	action research, new business models, new organizational models	research with key players from industry and organizational research	Now - 2015	**BE**

Actions Recommendations Vision Statement 4:

(Employee perspective) “Learning as a means to increase employability.”

Actions: Vision Statement 4 ("Learning as a means to increase employability"). This means acquiring "competencies that can increase professional choices", over the whole of one's lifetime. These competencies may relate to fields and qualifications that do not yet exist. The professional choices include looking for new jobs or new ways of working - e.g. self-employment, or delegating the job search to software systems that are "intelligent" in some way.				
BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political				
Description	**Means**	**Actors**	**Timelines (now – 2020)**	**Sector**
A4.1 "Share-insights": Establish an EU-wide experience-tapping system based on open standards and social software, for users to share, annotate, compare and describe experiences of competencies that are in-demand & good ways to acquire those competencies and plan for personal development.	analysis, negotiation peer comparison of personal development planning within and outside the organization	researchers, businessmen	Now-2010	**BE**
A4.2 "Share good practice in HR": Develop localizable Semantic Web Services to help match jobs to job-seekers, using EU-standard ways to describe competencies, levels of performance and links to specific job roles.	analysis, negotiation, research, development	researchers, businessmen, employment agencies	Now-2015	**T, BE, SC, P**
A4.3 "Personalize learning strategies": Develop semantic tools to help individual learners to match their learning opportunities and their ways of learning to their career aspirations, to build e-portfolios more purposefully, and better integrate what they learn informally from practitioners, in authentic settings (e.g. at work and in social networks), with what they learn from formal e-learning courses from employers.	research, development	researchers, developers	2010-2015	**T, BE, SC**
A4.4 "Develop career advisory services": Develop Semantic Web Services (and linked social software) to access career advice scenarios and opportunities to learn good practices, to recover from failure, and to practice in a safe environment before implementing the practice in real environments.	research, development simulations , game-based environments	(Future) businessmen	Now-2012	**T, SC, P**
A4.5 “Develop a Pan-European alerting system for innovation” Develop a system that will identify, record, and classify important trends and signals at a global scale and analyze their significance for new competencies development, jobs, work environments and business opportunities.	research, development, analysis	observatories, associations, living labs	Now - 2017	**T, SC, P**

Actions Recommendations Vision Statement 5:

(Market dimension) "Consumer driven market take-up, based on increased market transparency and availability of a wider range of offers"

Actions: Vision Statement 5: VS 5 is about consumer-driven market take-up. It is focused on increasing market transparency in terms of ease-of-use for consumers (e.g. being able to select efficiently from a large number of offers, easily finding out the economic conditions of use, being comfortable in using the selected services, and having the services delivered on demand). It is also in line with Vision Statement 6, which is about extending the benefits of the knowledge-based society to all. Regarding the actions that are recommended in this Vision Statement, they are in line with market take-ups, which means that they are mostly ST and MT. LT issues about educational curricula - which are social - are not addressed here but in other vision statements. Overall, VS5 provides support for a move from existing, high-value market niches, to a global market where everyone could become a knowledge worker.

BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political

ST = short term: 2007 - 2010, MT = medium term: 2011-2015, and LT = long term: 2016- 2020

Description	Means	Actors	Timelines	Sector
A5.1 "Quick, easy and affordable access for all" Extend access to digital learning content and services platforms for all (as everyone will be a knowledge worker) - including advanced services related to competency development, with an emphasis on areas where adoption today is low: SMEs, individuals (life-long learning).	Implement open exchanges & market places for single point of access to federated catalogues of content & services	content and service producers	Now – 2010	**BE, P**
	Provide an offer of services ranging from the basic entry-level centered on content, to more advanced competency profile offerings with an easy upgrade path	capital ventures agent	2010-2015	
	Provide tax incentives on the supply side, focused on knowledge intensive staff	regional & national authorities	Now – 2010	
	Enable effective collaboration between Academia and Industry based on meaningful dialogue and formation of enduring partnerships.	industry & academia	Now – 2010	
	Establish Public Private Partnerships (PPPs) with local authorities or local development agencies to offer affordable and easy access to existing content.	local & regional authorities	Now - 2010	

A5.2 "Develop a stronger learning and training culture in SMEs": Take actions to support SMEs in increasingly embracing training and learning, taking into account their diverse maturity level. Implementation can involve adoption of standard training practices, shifting resources from standard training to technology-based approaches, or developing a strong workplace learning culture, depending on the maturity level.	Provide dissemination and training/coaching activities Provide tax incentives on the consumer side (VAT exemption) as well as on the provider side (tax deductions)	Professional unions, chambers of commerce, clusters of SMEs Regional & national authorities	Now – 2010 Now – 2010	**BE, SC**
A5.3 "Increase take-up by individuals for life-long learning": Take actions to facilitate the adoption of technology-based approaches by acting on the supply side as well as on the demand side, focusing on the individuals' specific learning approaches as well as on community-based approaches.	Ensure wide-spread dissemination - including social interaction and community driven take-up (Web 2.0 – social side of dissemination), where individuals can be introduced to friends and mentors and embrace life-long learning. Provide tax incentives on the consumer side (VAT exemption) Provide means - such as e-portfolios - to ensure recognition of non-formal learning & training. Ensure that there are competing wide-ranging catalogues and marketplaces to offer access to content and services.	National ,& EU authorities National ,& EU authorities National ,& EU authorities and industry Industry	Now – 2010 Now – 2010 2010-2015 Now – 2010	**BE, SC** **P**

A5.4 "Secure legal environment": Provide a less complex and more secure environment for content authoring, production and distribution within the EU that effectively removes hindering factors for professional as well as for user generated content. (e.g. encourage the use of standard open licenses such as "Creative Commons" licenses from mainly public environments to commercial environments. Or develop similar standard licenses specific to commercial environments.)	Integrate and harmonize current legislation that combines laws or directives on IPR, patents, databases, software, audio-visual production, employment law and does not always allow for a seamless process for content generation and usage. Standardized license schemes Comparative analysis among EU Member States Develop appropriate contractual forms for DRM (eg. release of copyrights) Question the adoption of software patents, since they undermine the openness and interoperability that is crucial to integrate formal and informal learning environments. At the least, promote the provision of standardized interfaces.	legal experts, national and EU authorities	2010 - 2015	**BE, P**
A5.5 "Networks of Excellence" and "Living labs for learning": Provide environments where practitioners can work together with researchers and policy makers at the European, National, Regional and local levels.	Negotiation, R&D, Action research	regional and national authorities academia and Industry	Now - 2015	**BE, P, SC**

Actions Recommendations Vision Statement 6:

(Social inclusion) "Access to professional learning for all – extending the knowledge based society".

Actions: Vision Statement 6 ("Access to professional learning for all – extending the knowledge-based society"). This vision statement is closely linked to social inclusion as it is perceived in the context of the knowledge-based society. It views the different stages of the Digital Divide through the dimensions of Access, e-Accessibility & Usability, Service Development, Individual Capacity Building, Human & Social Capital, and Citizen Participation. The aim of this vision statement is to ensure that the current knowledge workers, the potential knowledge workers, and the future knowledge workers are able to be part of a society that fulfills the criteria expressed by recent European policies and strategies (such as e-Inclusion) related to the knowledge-based society and/or information society.

BE = Business/Economics, T = Technical, SC = Socio Cultural, P = Political

ST = short term: 2007 - 2010, MT = medium term: 2011-2015, and LT = long term: 2016- 2020

Description	Means	Actors	Timeline	Sec-tor
A6.1 "Widely used standards for competences" Develop standardized descriptors for competency, skills and knowledge that can be widely used by professionals, employers, learning service providers, etc. Two separate kinds of groups have been distinguished under this category. Standardized descriptors for people who are in today's professional jobs, which is a MT action, and standardized descriptors for the entire workforce which is a LT action.	analysis, negotiation, harmonization segmentation between different types of learner groups	researchers, developers, standardisation bodies, service providers	Now - 2020	**T, SC, BE**
A6.2 "Make learning achievements portable" Enable the portability of learning achievements resulting from formal, non-formal and informal learning, e.g. in the format of an e-portfolio. The portability of learning achievements for certain high-interest groups of people who are already developing e-portfolio systems is a MT action. The portability of learning achievements for the entire workforce is a LT action. In terms of Market segments, R&D and take-up, we cannot put the timelines for all of them as MT or LT, but there will be different rates of adoption.	analysis, negotiation, harmonization segmentation between different types of learner groups	researchers, developers, policy makers, service providers	Now - 2015	**P, SC, BE**

A6.3 "Digital literacy for all" Develop educational systems and curricula that emphasize development of learning skills, digital literacy and life management. Promote reforms in Academic institutions for the rapid skills development of the European workforce. (e.g. Complement the formal curricula of higher educational institutions with informal flexible curricula that can be re-packaged and personalized to accommodate learning that is driven from emerging demands).	Policy-making and change management	policy makers, educators	Now - 2020	**P, SC**
A6.4 "Provide intelligent hosting for collaboration" Encourage the development and application of Semantic Web-based tools that support collaborative knowledge-creation and sharing of knowledge through communities of practice	R&D	researchers, developers, service providers	Now - 2015	**T, SC, BE**
A6.5 "Career Services" Support services for portfolio workers, such as career advisory, mentoring, and coaching services. In the long-term, the technological development will enable cost-effective provision of personalised services that today are available only at a relatively high cost.	analysis, negotiation, policy making	policy makers, service providers, professional associations	Now - 2020	**P, SC**
A6.6 "Diminishing the social divide - no citizen left behind": Establish social and economic prerequisites for disadvantaged groups to be able to take advantage of the possibilities of the emerging knowledge-based society. This action is a necessary condition for reaching the goal of enabling every European citizen to become a knowledge worker. Ensure a minimum level of economic support for people to be able to devote attention to LLL and democratize access to economic and social resources.	community of practices public funding e-inclusion: An information society for all http://ec.europa.eu/information_society/activities/einclusion/index_en.htm Lisbon strategy	lobby organizations community activists policy makers government agencies funding organizations	Now - 2020	**P, SC**

VS	VS: Recommended actions	Related work – PROLEARN deliverables
V1	A1.1 “Federation of learning resources	D1.13, D3.7, D3.8, D4.1, D4.2, D4.4, D4,6, D4,8, D6.8, D15.3
	A1.2 “Contextual delivery of learning resources”	D1.9, D1.10, D1.13, D3.7, D3.8, D8.15, D12.13, D15.1
	A1.3 “Production tools for support of contextual delivery of LR”	D1.8, D1.13, D2.2, D2..4, D2.5, D2.8, D6.6, D6.7, D7.6
	A1.4 “Harmonization of learning standards	D1.2, D1.11, D4.7, D4.4
	A1.5 “Digital Identity Management”	D1.3, D1.5
	A1.6 “Innovative business models for learning exchanges	D1.13, D6.8, D8.15
V2	A2.1 “Methodologies for skill-based performance mgmt“	D1.10, D1.12, D6.8, D7.3, D7.4, D7.5, D7.7
	A2.2 “Measurement framework for work performance“	D7.3, D7.5, D7.7, D7.9
	A2.3 “Open services for integration of learning & KWM“	D1.10, D7.7, D7.9
	A2.4 “Interoperability standards for learning and KWM”	D1.2, D4.7, D6.7, D7.7, D10.11
	A2.5 “Social Learning Networks”	D3.7, D7.7, D7.9, D15.1, D15.2, D15.3, D15.5
V3	A3.1 “New Learning Models”	D1.10, D5.3, D6.8
	A3.2 “Participatory Culture”	D1.10 , D5.3, D6.7, D15.2, D15.3,
	A3.3 “Informal Learning Support”	D1.10, D15.2, D15.3, D6.7, D7.7, D7.9,
	A3.4 “Flexible Organizational Structures”	D1.10, D7.5
	A3.5 “Social Learning Networks”	D6.7, D7.7, D15.1, D15.2, D15.3, D15.5
V4	A4.1 " Share insights "	D1.10, D15.2, D15.3, D15.5
	A4.2 "Share good practice in HR”	D15.5, D9.3.1
	A4.3 "Personalize learning strategies"	D1.10, D1.11, D1.13, D7.4, D7.7, D12.13, D15.2,D15.3,
	A4.4 "Develop career advisory services"	D6.8, D9.3.1
	A4.5 “Develop a Pan-European alerting system for innovation”	D8.7, D8,9, D8.10, D8.12, D9.6.1, D9.6.2, D12.16, D14.13
V5	A5.1 “Quick, easy and affordable access for all”	D2.1, D3.6, D3.8, D6.8, D7.2, D7.7
	A5.2 “Develop a stronger learning and training culture in SMEs”	D8.7, D8.12, D8.15
	A5.3 “Increase take-up by individuals for life-long learning”	D1.10, D5.3, D9.3.1
	A5.4 “Secure legal environment”	D8.13
	A5.5 “Networks of Excellence” and “Living labs for learning”	D1.10, D7.2, D8.7, D8.12, D8.15, D9.9, D14.13
V6	A6.1 “Widely used standards for competences”	D7.4
	A6.2 “Make learning achievements portable”	D1.10, D1.12, D6.8, D7.4
	A6.3 “Digital literacy for all”	D9.1.1, D9.2.1, D9.6.3, D9.8, D9.9
	A6.4 “Provide intelligent hosting for collaboration”	D1.10, D8.15, D12.16
	A6.5 “Career Services”	D6.8
	A6.6 “Diminishing the social divide - no citizen left behind”	D12.16

Cross reference table of Actions Recommended per Vision Statement with related Prolearn Deliverables

Resources

- Anderson, C., (2006) “The Long Tail: How Endless Choice is Creating Unlimited Demand”, The Random House Group Limited, ISBN 9781844138500, UK 2006
- J. Cullen, K. Hadjivassiliou, K. Junge (2007), “Status of eInclusion measurement, analysis and approaches for improvement – Topic Report 4: Recommendations for future action”, Tavistock Institute, February 2007
- P.F. Drucker, (1994) “The Theory of Business”, September/October 1994, Harvard Business Review, pp. 95-104
- H. Jenkins et al. (2006), Confronting the challenges of participatory culture, MacArthur Foundation, 2006
- Stephen Downes (2005), S. Downes, E-learning 2.0, ACM eLearn Magazine, Article, 2005.
- Kaplan, Daniel (2005): eInclusion. New Challenges and Policy Recommendations.
- Nonaka, I. (1991), *The Knowledge-Creating Company*, Reprinted in Harward Business Review on Knowledge Mangement, HBS Press, 1998 (1987).
- Nonaka, I., Takeuchi, H., (1995), “The Knowledge-Creating Company”, Oxford University Press, New York.
- OLCOS Roadmap 2012, (2006) Open Educational Practices and Resources, www.olcos.org
- Senge, P., (1990), “The Fifth Discipline: The Art & Practice of the Learning Organization”, Doubleday/Currency.
- Senge, P., et al. (1994): “The Discipline Fieldbook: Strategies and Tools for Building a Learning Organization”, Doubleday/Currency.
- PROLEARN Deliverable “Analytic framework - eInclusion and eAccessibility priority issues” Deliverable 1.1. of the project: “Strengthening eInclusion and eAccessibility across Europe” (IST-502553), October, 2004
- PROLEARN Deliverable, D5.3 “Conceptual Approach to Modelling the Learning Process – with a Special Focus on Knowledge Creation”, June 2005.
- PROLEARN Deliverable, D12.6 “Roadmap methodology and framework analysis Version II”, June 2005
- PROLEARN Deliverable, D12.7 “Conzilla-based Conceptual Model, of the PROLEARN Roadmapping Process, Version 1”, December 2005
- PROLEARN Deliverable, D12.10, “Envisaged future states of Technology Enhanced Professional Learning”, July 2006.
- PROLEARN Deliverable, D12.14 “Conzilla-based Conceptual Model, of the PROLEARN Roadmapping Process, Version 2”, December 2006.
- PROLEARN Deliverable, D12.16 “Conzilla-based Conceptual Model, of the PROLEARN Roadmapping Process, Version 3”, December 2007.
- PROLEARN Deliverable D12.13 "The Snowflake Effect", January 2007 http://www.conzilla.org/projects/roadmapping/presentation/CM#15a94f1105ee8e827
- Friedman, T. L., (2006), “The World is Flat”, Penguin Group, ISBN-13: 978-0-141-02272, 2006
- PROLEARN Deliverable, D12.12 “Gap Analysis Report”, May 2007
- Tapscott, D., Williams, A. D., (2006), “Wikinomics: How Mass Collaboration Changes Everything”, Penguin Group, ISBN 978-1-59184-138-8, 2006.
- Zettel, C., (2006), “European Programmes and activites on work-oriented innovations”, Joint Secretariat of WORK-IN-NET project, 2006, http://www.workinnet.de

Major events

- Summer school 2007, (26/5/07 – 2/6/07) Frejus, France.
- EDEN Conference 2007 (13-16 June, 2007) (Session B6 – Workshop, “European Networking and Learning for the Future”) NAPLES, Italy.
- Meetings in Paris with UNESCO (July 5 and 6 2007), about potential collaboration as part of UNESCO's commitment to sharing e-knowledge and e-content.
- EC-TEL 2007 (17-20 September 2007), Crete, Greece.
- WorkInNet workshop (10-11 October 2007) and Consultation meeting, Athens, Greece.
- MIT-LINC general conference (30 October 2007), Amman, Jordan.
- WEE conference on engineering education (7 November 2007), Lapland and at CEE forum.
- MIT-LINC executive conference (4 November 2007), Dubai, UAE.
- ELIG General Assembly (12-13 November 2007), Dublin Ireland.
- Professional Training Facts (PTF), (14 November 2007), Stuttgart, Germany.
- Kaleidoscope Symposium 2007 (26-27 November 2007), Berlin, Germany.
- Online Educa (28-30 November 2007), Berlin, Germany.
- PROLEARN workshop on IPR for digital educational content, Paris workshop (7 December 2007), Paris, France.
- eLearning and the Lisbon agenda conference (16 October 2007), Lisbon, Portugal..
- eSkills advisory group (DG Enterprise) Meeting (30 November 2007), Brussels, Belgium
- IPR group Meeting, Prolearn (with WP6) (7 December 2007), Chamber of Commerce, Paris, France.
- UNITAR (UN agency for training and research) (10 December 2007) meeting in Geneva, Switzerland.