PROLEARN framework for process-oriented learning and knowledge work

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Legal Notices

Abstract

Given the importance of an organisation's human capital to business success, aligning training and competency development with business needs is a key challenge. Many companies did initiate in the past knowledge management activities or founded corporate universities as the organization intended to help companies to face this challenge. In this deliverable, we talk about knowledge work and learning management as a concept to "increase business performance" through a better short- and long-term learning approach for people at management level. The aim is to provide a guideline for corporate users based on our and others' experiences of implementing solutions for knowledge work and learning. This is connected to many forms and methods of learning: formal learning processes, informal learning, team learning, collaboration, social networking, community building etc. In many companies, managers think that knowledge work can be supported solely by offering courses and enabling to access content on demand. In this deliverable this aspect (ACQUIRING knowledge) will not be in focus as it is more the job of a training department to manage courses and catalogues. Instead we focus on APPLYING knowledge. The concept of knowledge work management comes into place, when companies see the ability of their employees to APPLY their education and knowledge as a strategic instrument to create competitiveness and look for tools to provide learning and knowledge at workplace on demand and fitting to the individual needs. And this objective is very actual as the globalization creates pressure on companies and the knowledge and experience of the employees gets the most important differentiator to competitors – leading to better innovation, faster processes, higher productivity and lower costs. In this deliverable, an overall approach and guideline for companies will be provided on how to implement knowledge work management and provide learning according to the needs in business and resulting from business processes.

Keywords: Process-oriented Learning, Knowledge and Learning Technologies, Web 2.0 Communities, user-driven learning TimeToCompetence, Competency Management.

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1 Business drives learning

In the present economic context enterprises are confronted with a number of vital business challenges to improve their operational efficiency. Gaining or maintaining a competitive advantage calls for new approaches, with regards to how companies plan, structure and manage their activities. The quality of a company's workforce and its ability to quickly adapt to changes plays an important role in all business improvement efforts, thus calling for a continuous investment in human resource development (Zimmermann/Faltin 2006; Accenture, 2006). Particularly in knowledge intensive business environments, employees are the carriers of knowledge and represent the organisation's "intellectual asset" (Nonaka & Takeuchi, 1995; Davenport & Prusak 1998). Ensuring that employees have the right skills for the job and do apply those skills are essential for the growth and success of an organisation. The goal of training services is to transfer needed knowledge in-time to employees in order to cover any deficits hindering the independent fulfilment of their daily business tasks. Accelerating skills acquisition, by means of reducing the "TimeToCompetency", can help organisations better cope with changes in processes, products and organisational structures.

Within an organisation, learning (Nonaka & Takeuchi, 1995; Senge, P. et. al. 1994; Grace and Butler, 2005) and business improvement as well as business performance (Business Process Reengineering, Continuous Process Improvement) (Scheer 2000; Hammer and Champy 1993; Davenport, 1993) essentially serve the same goal, i.e. to improve the operational effectiveness and excellence of the organisation. Nonetheless, traditionally, organisations have handled learning in their training department very separately from the operational business. In most cases, the business model was a very simple one: "Standard" courses have been designed by the training departments and then got booked by the business departments.

Many companies did found in the past corporate universities to change this model of cooperation between the training department and the business, especially in order to address "knowledge workers" and "managers". The idea was to drive business instead of getting driven, to interlink learning, knowledge management and business by integrating them in the daily work at the workplace and outside of the workplace at the "learnplace". The aim was to ensure that the company's objectives got implemented through a top-down learning process. Most corporate universities therefore took management training as their starting point. From 1996 to 1998, Bertelsmann, DaimlerChrysler and Lufthansa were the three first German companies with "corporate universities" as specific organizations, followed by Deutsche Bank, Volkswagen and E.ON (Zimmermann/Kraemer/Milius 1999). All over Europe, there were about 50 corporate universities in 2000, in US almost 250, which means that every large company did found such an organization. Almost all of these companies still have today their "corporate university", but not in the same organizational model with the same objective or the same business model as at the time when they have been founded.

Recently, corporate universities became in most cases merged with the training departments and focused on this new role of a business-driven learning and training organization. For example at Volkswagen, the VW AutoUni became part of the VW Coaching department – the

HR development organization of Volkswagen. Both did profit from this process. As a result, a new understanding of HR development came out of this process (Albrecht, 2006):

- HR developers and training departments are the architects of learning and knowledge strategies in a company.
- Companies concentrate on the management of learning and knowledge with the objective to increase individual competencies according to the needs. The needs are being defined by the core business and processes of a company.
- Companies have the objective to provide a solid framework, innovative programs and technologies to enable people to learn and to create as well as gather knowledge – both in formal as well as in informal processes.

The objective of this PROLEARN deliverable is to deliver a guideline and framework on how to implement learning and knowledge work, supported by technologies in a business-oriented way. We specifically address the question, how companies can accelerate skills acquisition for knowledge workers through the use of learning technology.

In order to do this, we start analyzing various concepts of knowledge work management and learning by looking at the specific aspects of knowledge management, learning management and social learning. We also take a look at actual running EU projects that are working on solutions for this topic. After that, we evaluate through empirical research activities based on user-clinics and a survey how knowledge workers learn or want to learn. In a third step and based on the analytical results, we derive various guidelines on how to implement learning and knowledge work solution approaches within companies, especially addressing the needs of knowledge workers.

2 The relation of knowledge work and professional learning

According to previous PROLEARN research, a knowledge worker is defined as a person, that does not just consume knowledge but who is also able to create it and who reflects the knowledge need critically on every level of activity in the organization. In addition a knowledge worker contributes actionable knowledge back to the organization. Typical knowledge workers are for example consultants, product and service engineers, researchers, software developers, service personel, sales agents and managers.

A key question in PROLEARN is how professional learning and training can support knowledge workers by using technology. Figure 3 shows the framework for this research question.

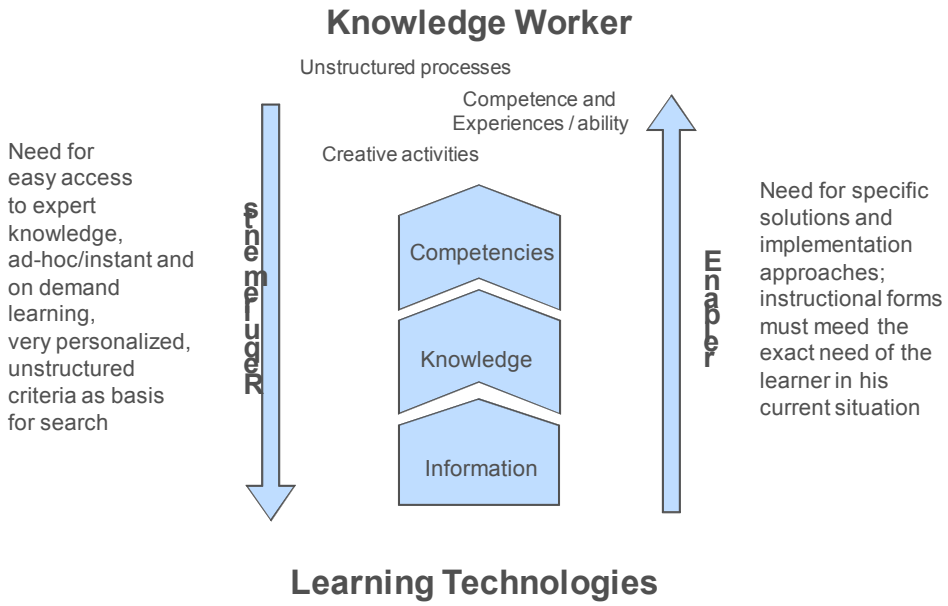

Figure 1: Relation between Knowledge Worker and Learning Technologies

The deliverable follows the thesis, that knowledge workers need easy and instant access to expert knowledge and very personalized learning offerings instead of standard training courses. We assume that knowledge workers very much learn in unstructured work processes by learning on the job, sharing experiences with other people, and through success stories. We assume that knowledge workers also perform routine processes to a large extent, but they will be out of focus in our following discussion. Knowledge workers develop competencies by using any information, filtering what they have, and commenting on the information. To do this, we assume that knowledge workers need specific learning technologies and instructional design approaches.

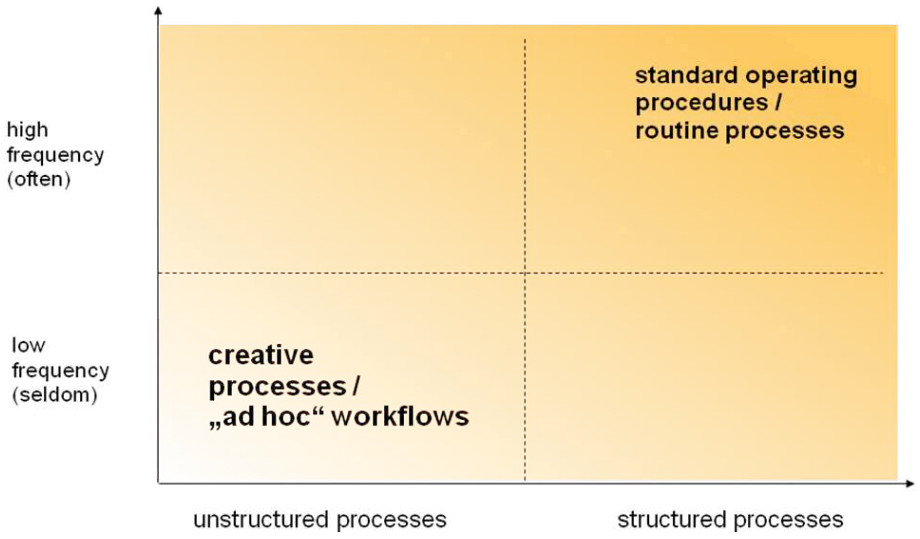

Figure 2: Learning and knowledge work in business.'
Knowledge workers need to learn in ad hoc workflows and creative work processes

This deliverable sees the learning technology for knowledge workers an instrument to help companies to reach their business goals and increase competitiveness. Aligning individual training with business priorities, so as to reduce the time to fill competency gaps and to build proficiency according to evolving business needs and daily work processes, is the key challenge. Business-oriented learning can enable organisations to adapt to changes in their organisational structure or core business processes or to effectively guide employees to new tasks to streamline business operations.

Normally, to reach this goal, companies have to do the following (Zimmermann/Faltin 2006):

- Perform business driven competency gap analysis: This comprises the identification and description of competencies or roles that are required to best perform in core business processes and functions as well as the gap analysis based on assessments, audits and tests.
- Design of learning processes, programs, communities and knowledge respositories: This includes: the instructional design, selection or development of learning content that fits to the needs; the creation of the learning processes; the setting up of collaborative communities; and the integration of new methods into the learning activities.
- The execution of the learning processes in many different forms: as online courses, blended learning programs, learning communities or other didactical methods.
- The learning performance monitoring as the evaluation of the impact of the learning process both on learning outcomes and on business performance.
- The business value analysis, which means measuring the business outcome of the competency improvements compared against the initial business need.

Figure 1 defines these tasks as an integrated learning life cycle approach of corporate universities.

Figure 3: The learning life-cycle of a business driven learning organisation (vgl. Kraemer/Milius/Zimmermann 2005)

In this deliverable, we aim to check if this “standard” business-oriented procedure does also apply for the creative and unstructured part of the daily work of knowledge workers. Many companies perform a competency gap analysis (in the sense of “auditing”) also for managers, but we have to ask, on which business level this is. We take the example of GMAC. As a result of a competency gap analysis related to business needs, GMAC created a competence portfolio on their qualification needs for managers. Figure 2 shows the result in the form of a competency portfolio at GMAC for managers. Leadership, communication and interpersonal skills are the highest ranked competency needs of managers. Professional knowledge in their expertise field is seen as basic knowledge and expected as available.

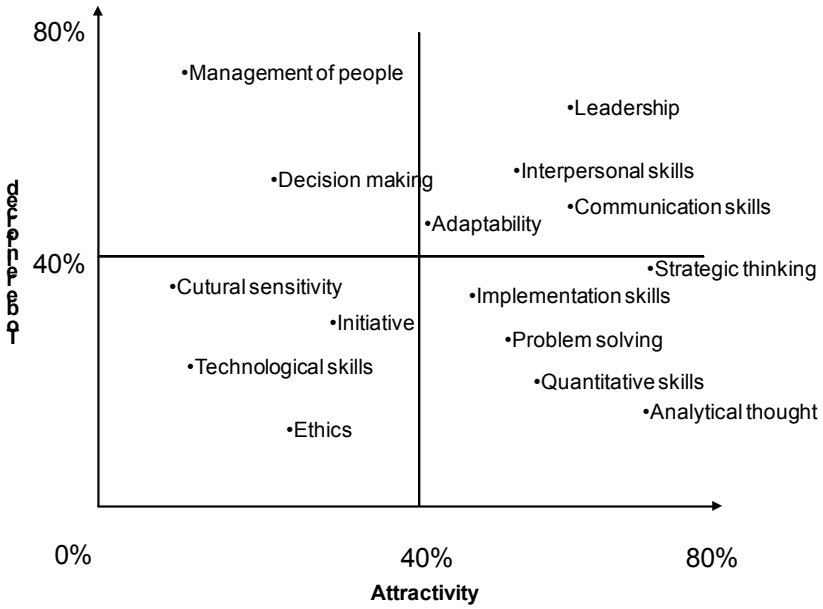

Figure 4: Sample for a Competency Portfolio at GMAC (Cornuel 2006)

Even though this is just a business example, it gives a good overview on what skill gaps are seen for knowledge workers. They are less direct business oriented and much more on a social level. We will use this sample competence portfolio later to refer to it when evaluating different approaches.

3 Existing frameworks for learning and knowledge work

Asking HR managers in companies[1] about their concepts of how to support knowledge workers from a technical point of view concerning tools, discussions come up from mainly three different directions:

- **Knowledge management** mainly focuses on the way how knowledge can be stored, searched, retrieved and reused. Many companies have made experiences in this field and still see the focus in this area.
- **Learning management** mainly focuses on how documented knowledge can be used to train other people. Supporting knowledge work in companies is often linked to training activities. Questions about the learning processes are in the center of this discussion, especially how knowledge workers learn and acquire competence.
- **Social learning approaches** focus on the aspect of how knowledge can be documented and generated within a community in order to share, rate and discuss it. Many companies today see the social network as part of their strategy to support knowledge workers.

In the following a brief description of the different frameworks will be done in order to be able to validate the advantages and disadvantages of these approaches.

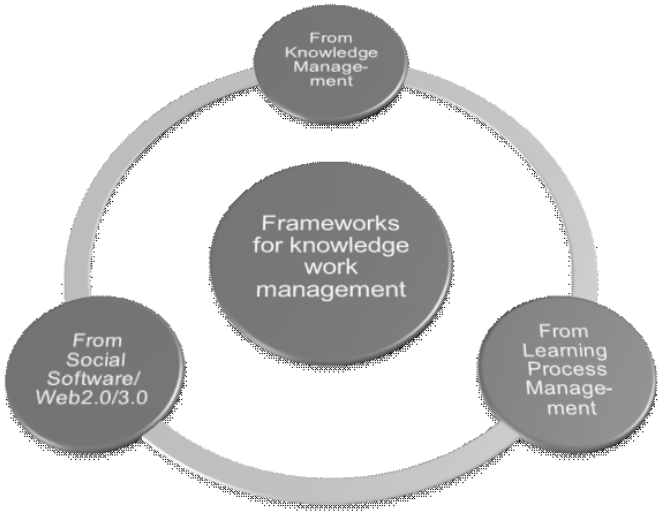

Figure 5: Classification of relevant frameworks for knowledge work management

The objective is to find the interrelations and to establish the basics to later derive from the results a common approach for a PROLEARN guideline on implementing knowledge work solutions in combination with the user-clinics.

[1] 40 HR managers have been asked in 2006/2007 within PROLEARN user clinics about the support of knowledge workers. 28 of 40 answered, that they do not know knowledge workers concept. 30 of 40 related knowledge work support with knowledge management.

3.1 Knowledge Management

The relation between knowledge work support and knowledge management seems to be obvious. Knowledge management concepts have been implemented in corporate environments as key technology mainly in the years 1990 to 2003. The main objective was to support the search and retrieval of documents in order to share and reuse the knowledge inside of these documents. Figure 6 describes the overall approach of knowledge management (Kappe 2001). The core process starts with the creation of knowledge (mainly documents or data stored in databases or unstructured files), the storing and organization in knowledge management software that is closesly related to document and content management systems, disseminate the documents, providing access and use it. For this process, knowledge changes its state from data to knowledge by interpretation of information and vice versa, with obvious points of contact with the stages in the SECI models of D5.3 and D1.10.

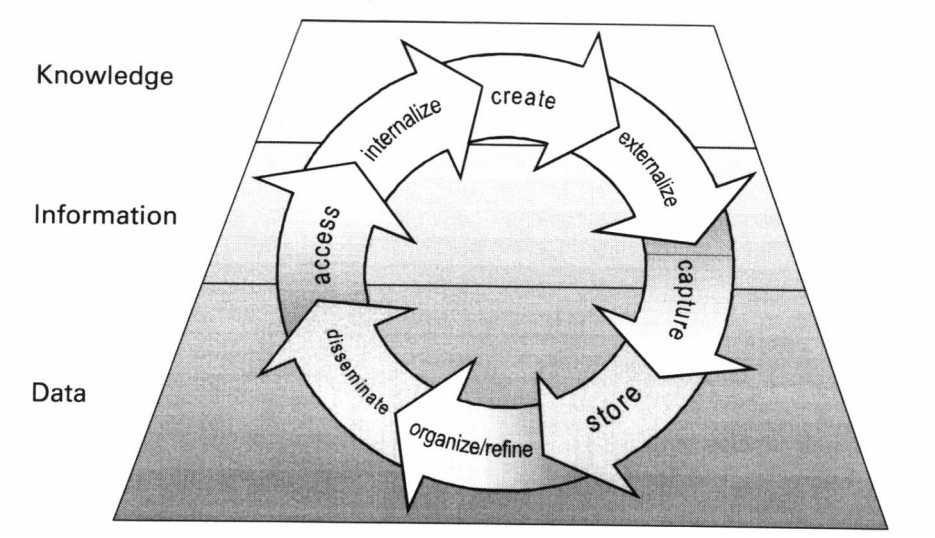

Figure 6: Overall approach of knowledge management (Kappe 2001)

To support this knowledge management concept from a technical point of view, knowledge and document management systems integrated functions that help to organize, search and retrieve documents and data contained in unstructured document formats. Semantic technology was developed in order to drill down and navigate between documents using topic maps. To structure and categorize the documents that contain specific knowledge, companies and institutions that implemented knowledge management solutions did define ontologies about their business. These ontologies described the relation between knowledge and business departments, topics and knowledge needs.

After a phase of enthusiasm about these concepts of knowledge management, organizations did face the high administration effort for these particular approaches; the parallels are obvious with the early content-driven approaches to e-learning (see e.g. WP6 content production workflows), which passed through similar stages. But also they saw the potential use of these concepts of knowledge management, if the dis-benefits of early approaches could be reduced. Many of the concepts today are easier and cheaper to implement and administer, as part of social software concepts with a more user-driven view (see below).

3.2 Learning process and content management

Other approaches try to answer the question how knowledge workers learn using technology. These approaches come from the direction of learning management and learning processes. The core technology here are learning management systems that support a learning life cycle from competency management over authoring, learning content management to learning management – as it has already been described above in Figure 3.

In the center of this discussion concepts are being developed that aim to help learners within formal and informal processes to acquire knowledge based on an identified competency gap. Many current EU research activities tackle within this framework very specific questions, e.g. on how learning objects can be provided according to concrete individual needs or how learning processes can be designed within the context of work. The following three projects are especially addressing this field.

3.2.1 APOSDLE Scruffy Approach

APOSDLE (www.aposdle.org) offers individual learning support to people working with information and contributing new content to an organisation's knowledge pool. These "knowledge workers" may include e.g. engineers, researchers, software developers, consultants, or designers. It follows a "learn@work" approach meaning that learning takes place in the user's immediate work environment and context. It offers integrated support for all three roles a knowledge worker interchangeably fills at the workplace: the role of the worker, the role of the learner, and the role of the expert.

The foundation for the APOSDLE approach is to not rely on specifically created (e)Learning content but to reuse existing (organizational) content which was not necessarily created with teaching in mind. The idea is to tap into all the resources of an organizational memory which might encompass project reports, studies, notes, intermediate results, plans, graphics, etc. as well as dedicated learning resources (if available) such as course descriptions, handouts and (e)Learning modules and references to people. The challenge is to answer the question how a mix of information can be provided to the knowledge workers in a way that they can advance their competencies with it.

A frequently travelled path (also within eLearning systems) is the creation of fine-grained semantic models which allow for the categorization and retrieval of such resources. But the creation of such models, their maintenance and the annotation of resources with their concepts prove prohibitive in a dynamic environment. Thus, the APOSDLE approach is a hybrid one: complementing coarse grained semantic models (maintained as much as possible automatically, see below) with the power of diverse associative methodologies, improved over time through usage data and user feedback (collective intelligence).

Semantic models play two roles in this scenario: serving as initial retrieval triggers and providing the basis for simple inferences and heuristics to interpret user interactions. A disadvantage of this approach is that "statements" made by the system such as "this resource helps you to understand the concept of use case modelling" or "this person has expertise in use case writing" rely on empirical observations with no claim to accuracy. However, users have become increasingly accustomed to this concept through their usage of (internet)

search engines. Also, obsolete models do not provide any added value and additionally are in danger of providing a false sense of security.

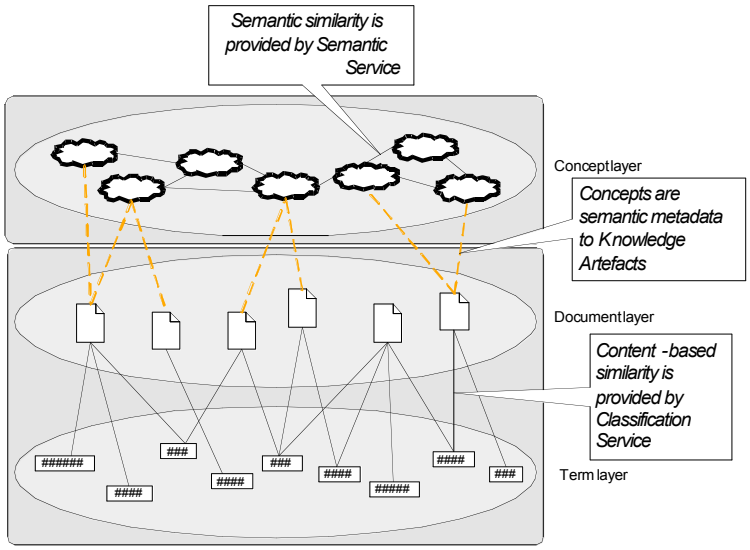

Figure 7: The associative network within APOSDLE exploits two different forms of similarity, i.e. semantic similarity and content based similarity. Semantic annotations function as a 'glue' between these two forms of similarity.

Within the APOSDLE research two main areas have been identified in which this hybrid approach can be applied: context-based retrieval and user profiles maintenance. And since for the time being, there is no possibility to make this happen without semantic models the project proposes the creation and maintenance of such models with scruffy technologies.

3.2.2 LUISA Semantic Web Services Architecture Approach

LUISA (www.luisa-project.eu) addresses the development of a reference semantic architecture for the major challenges in the search, interchange and delivery of learning objects in a service-oriented context. Therefore, LUISA is addressing the use of learning objects by knowledge workers as well as within formal learning processes. LUISA trys to connect learning technology and learning objects with a competency gap analysis.

In more detail: the mission of LUISA is that of exploiting the advantages of a Semantic Web Service Architecture to make richer and more flexible the processes of query and specification of learning needs in the context of Learning Management Systems and Learning Object Repositories. This entails the technical description of the solution in terms of current SWS technology, and also the provision of the ontologies, facilities and components required to extend and enhance existing learning technology systems with the advanced capabilities provided by computational semantics.

The outcomes of LUISA are expected to make a significant contribution to the automation of learning technology systems beyond current standards, fostering the advancement of Web-based learning with an increase in the ability for learners to locate, search and negotiate learning resources mediated by semantic tools.

LUISA aims to match learning needs and learning objects (resources) through a competency-gap driven approach. By introducing Learning Process Modules (LPMs), which provide the "missing context" for learning resources, competency gaps can be mapped to pre- and post-requisite competency gaps. Since individual competencies are refined and developed by learning, they can be considered as input- and output learning resources to learning processes (see below). The approach of LUISA is described in Figure 8. See Prolearn D1.10 for more information on this conception.

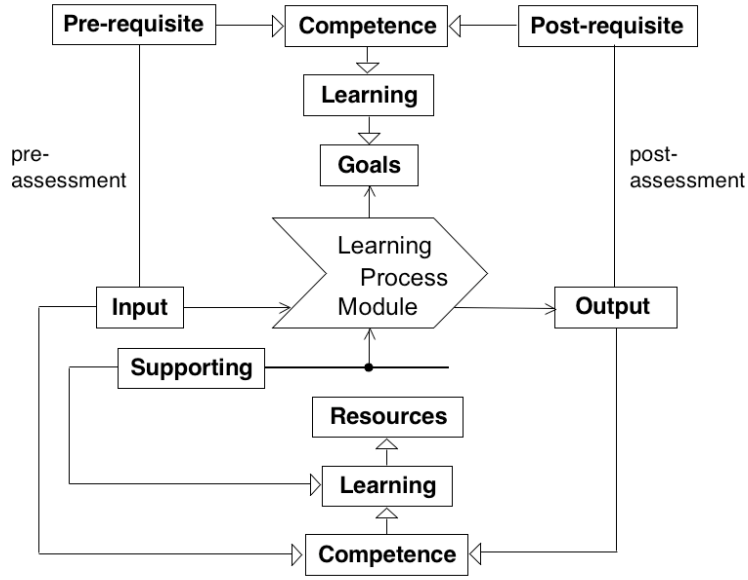

Figure 8: A Learning Process Module with a Formal and a Real Competency Gap

3.2.3 PROLIX Process-oriented learning life cycle approach

PROLIX (www.prolix-project.eu) envisages a system that allows for business process driven learning at the workplace, taking into account the single learner and their needs as well as the corporate requirements. Linking business processes and learning is a particularly complex task. Business processes define organisational roles and associated functions, each with its own specific competencies requirements (i.e. the competencies profiles of organisational roles). Learning processes can be defined based on the lacking competencies of individual employees assigned to specific organisational roles. Whenever there is a gap between the competencies profile of the individuals assigned to a specific role and of the role itself, organisations need to design suitable training plans, in order to close it. Business situations that may cause such changes include business engineering, recruiting and staffing, regulatory compliance and personal competency development (employee-initiated learning process).

The PROLIX approach covers the complete life cycle from the business need that triggers learning to the assessment of the actual impact learning made on business performance. The PROLIX Learning Life Cycle (PLLC) and the tools required for each step of the process are

depicted in Figure 9. Starting point is a complex business situation, i.e. a situation that translates into significant competency deficiencies and the need to train employees.

Business need analysis comprises the modelling or optimisation of business processes and the identification of competencies or roles required to carry out the functions of a business process (Business Process Cockpit).

The **identification of competency gaps** includes the calculation of overall competency gaps (by comparing employee's as-is and required competency profiles in the Competency Analyzer) and the prioritization of the competency gaps to be filled by means of learning (by simulating how the performance of the business process improves once specific competencies are acquired).

The **design of the learning processes** involves the selection or development of a didactically suitable learning process template (Didactical Learning Modeller) and the assignment of learning resources to this template to create a learning process (Learning Process Configurator).

The **execution of the learning processes** consists in employees being trained to fill the selected competency gaps (Learning Process Execution Platform).

Performance monitoring involves an evaluation of the impact of the learning process both on learning outcomes and on business process performance (Performance Monitor).

During **business value analysis** the business outcome of the competency improvements is compared against the initial business need. Unless the results are satisfactory, business processes and / or learning processes are adapted and optimized according to the analysis before restarting the PLLC.

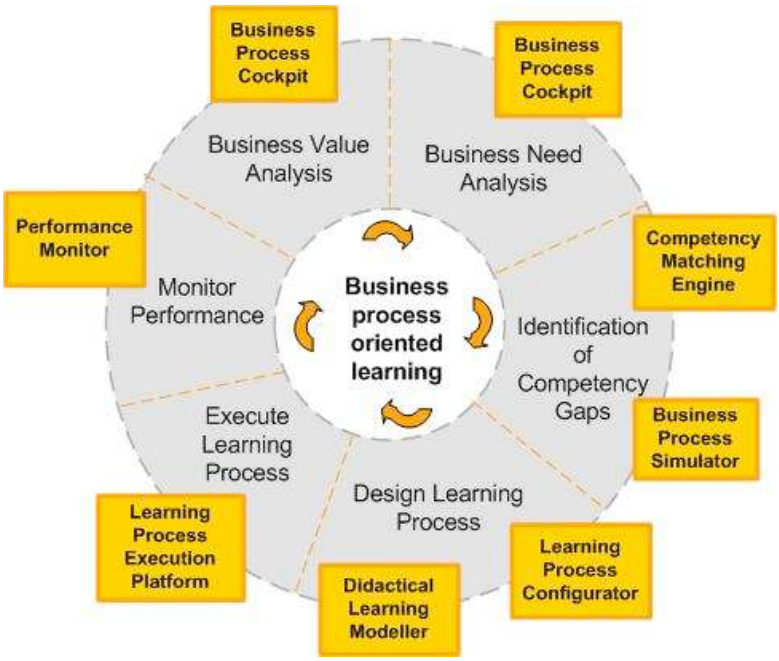

Figure 9: PROLIX Learning Life-Cycle for business process-oriented learning and solution map

3.3 Social Learning and Web 2.0/Web 3.0

Approaches within the area of social learning and web 2.0/web 3.0 follow the thesis that learning and knowledge are social, personal, flexible, dynamic, distributed, ubiquitous, complex, and chaotic in nature (Chatti/Jarke/Frosch-Wilke 2007). Therefore the aim is to rethink the models for learning management and knowledge management according to this "new" specification of learning.

This follows the aspect, that many researchers emphasised the social aspect of knowledge and learning (Polanyi, 1967; Nonaka and Takeuchi, 1995; Lave and Wenger, 1991; Wenger, 1998a). Lave and Wenger (1991) introduced communities of practice as ideal vehicles for leveraging tacit knowledge and learning and explore the participation metaphor of learning. More recent research also view learning as a social process. Siemens (2004b, 2005, 2006) stresses that the challenge today is not what you know but who you know, and introduces connectivism as a new learning theory. In contrast to the behaviorism (focus on externally observable change), cognitivism (focus on computational models of the individual mind), and constructivism (learners create knowledge as they attempt to understand their experiences) views of learning, connectivism presents learning as a connection/network-forming process. Connectivism principles acknowledge that learning is complex, multi- faceted and chaotic and consist of:

a. Learning and knowledge require diversity of opinions
b. learning is a network formation process of connecting specialized nodes or information sources
c. knowledge rests in networks
d. Knowledge may reside in non-human appliances, and learning is enabled/ facilitated by technology
e. capacity to know more is more critical than what is currently known
f. Learning and knowing are constant, ongoing processes (not end states or products)
g. ability to see connections and recognize patterns and make sense between fields, ideas, and concepts is the core skill for individuals today
h. currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities, and
i. decision-making is learning.

Social learning approaches therefore focus on knowledge networking and community building to leverage, create, sustain, and share knowledge in a collaborative way, through participation, dialogue, discussion, observation, and imitation.

3.4 Combination of the different approaches

All three approaches and framework concepts have advantages and disadvantages. They are rather conjunct than disjunct and get often combined with each other. None of them is a

"complete" solution – user clinics have shown (see below) that it depends much on the frame conditions and context in which knowledge workers have to search, retrieve, learn, use and apply knowledge. Instead, there has been an evolution (not merge) from knowledge management technologies to learning management technologies and vice versa. There have also been many approaches for social learning as integrated part of learning management and vice versa. Failures (eg in market terms, as in WP6) of current technology solutions mainly result from the heavy emphasis on one specific aspect such as content and technology or pure collaborative learning. There can be seen already draw-backs from user-generated social learning approaches where often only a small percentage of people create content and all other rely on the effort that has been taken by those few people. In addition, new restrictions come from trust and security matters. According to Gartner predictions from 2006, Community involvement varies, with fewer than 2% of all Internet users acting frequent contributors, between 10% and 15% contributing occasionally and 50% lurking, reading or watching what the communities are discussing (Plummer et al. 2006). Knowledge workers are expected to contribute more.

Learning and knowledge are more than "static content", and technology is mainly an enabler, but also a driver. To reach better results, complementary solutions have to be found concerning the following perspectives:

- **Integrate content-centric learning approaches with user-centric knowledge provision:** Content quality is important, but also the understanding of the unique needs of learners and knowledge workers is necessary. Learning and knowledge are very personal concepts, therefore approaches require a move to content- and user-centric models in a combination, putting the learner/knowledge worker at the centre and giving him/her more control on the learning process – but reflecting and adapting the process to the learning context and the learner's situation. Corporate users have in addition to be able to manage the learning processes and to track results in order to fulfil compliance regulations.
- **Coordinated decentralization instead of a pure centralised or pure distributed model:** Learning and knowledge are distributed and ubiquitous in nature. Today, information is broken up into microcontent units that can be distributed over dozens of domains (MacManus and Porter, 2005). Learners and knowledge workers are collaborating more than ever outside and across classroom and organisation boundaries which become more and more irrelevant. Centralisation works well for organised knowledge or established structures. Decentralisation is effective when things change rapidly, diverse viewpoints are required, and knowledge has not settled into a defined state, which is the case in today's complex knowledge spaces (Siemens, 2006, not to be confused with "[competence] knowledge space theory", http://wundt.uni-graz.at/kst.html). To make initiatives successful, this means to provide structures that allow a decentral approach that might be coordinated by a central management depending on the business goals. Such structures have been well developed also in other areas, as decentralization is flexible and effective, but centralization is efficient and allows to use synergies.
- **Top-down and bottom-up:** In general, learners and knowledge workers love to learn but hate not to be given the freedom to decide how they learn and work (Cross, 2003). Nowadays, educational institutions and organisations follow a top-down model and put

heavy emphasis on how to force users (learners, employees, customers, partners, and suppliers) to access their closed environments and join their small communities. These attempts often fail due to the "what's in it for me" factor. As a solution, Davenport and Prusak (1998) state that communities should emerge naturally and evade the control mechanisms of the formal organisations and institutions. Consequently, solutions need to be decided in a top-down approach but need to be developed within an emergent bottom-up approach, driven by the learner/knowledge worker and based on sharing rather than controlling.

- **Knowledge-push combined with knowledge-pull:** Knowledge-push models are being used to inform people and motivate them to learn. Knowledge pull-models are driven by the users based on their demand. Podcast technologies combine both. There does not need to be a shift from one approach to the other, but there needs to be environments that create content, push content and where people can pull content that meets their particular needs from a wide array of high-value but less structured resources like information repositories, communities, and experts, thus creating much more of a flexible, real time learning and knowledge culture (Rosenberg, 2006).

An interesting “complementary approach” comes from the KnowCom Consortium (Bayer 2005, Maier 2007, Schmidt 2005). Figure 10 shows the knowledge maturing process. It describes how knowledge matures from an emerging idea over the distribution within communities, the formalization to knowledge that is being trained in ad-hoc scenarios as well as formal scenarios.

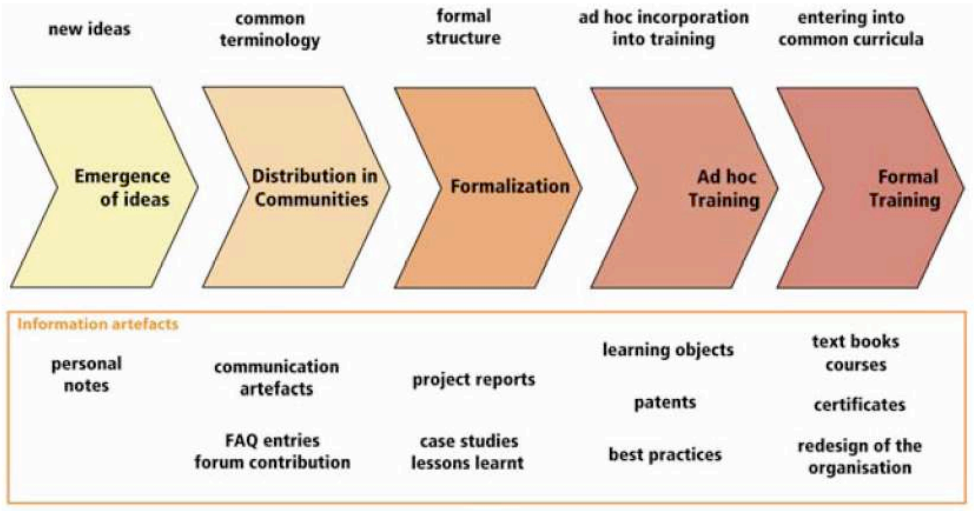

Figure 10: Knowledge Maturity Model (Bayer 2005, Maier 2007)

This model argues that the different approaches have to be integrated according to the context where they are being used: the knowledge and the content that will be trained. In relation to this: Social software and web 2.0 approaches are being used mainly for the idea development and distribution of knowledge as well as the discussion about it, knowledge management solutions mainly help to formalize the knowledge and document it, wheras learning management solutions help to provide ad-hoc as well as formal training about the topic.

4 Results from user clinics about the use of learning technologies for knowledge workers

4.1 The end user's view: how knowledge workers want to learn

In order to align business needs of a company with learning needs of a person, the company must know very well how people want to learn – besides knowing what intellectual capital the company needs. According to Cross (2003), formal learning processes just cover 20% of the daily learning need whereas most learning happens in informal processes (80%). So the question for companies is how they can emphasize formal and informal learning – with a shift to more informal learning. In an empirical study of IMC (Habermann/Schmidt/Kuechler 2004-2006) with more than 400 learners the issue of how people want to learn was analyzed. In PROLEARN, we added to this study specific aspects within user clinics on the aspect of time of learning and learning need analysis. In the following we will describe some of the key findings. The study did concentrate on managers and knowledge workers as people that not just consume knowledge but also create it. In most knowledge intensive businesses like service or consulting industry, work is knowledge work in this definition. But the empirical study also showed that learning environments and learning habitudes from managers or knowledge workers are not basically different from those of all other employees.

Result 1: Most people want to learn, but are too busy to learn often and concentrated

It is not possible to confirm the widely-held view that managers and knowledge workers, never having time for anything, certainly have no time for learning.

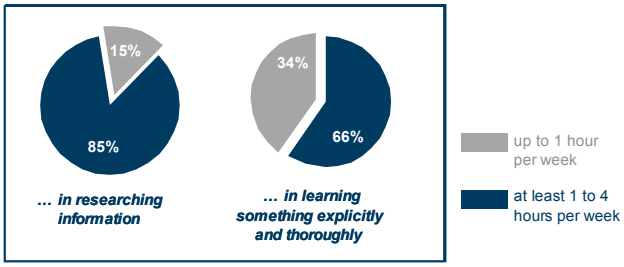

Figure 11: Time dedicated to self-study

What becomes clear is that the understanding of 'learning' ranges from traditional forms of learning (seminars) to "information procurement". Most people clearly place great importance on knowledge acquisition by personal initiative (self study). More than two out of three interviewees indicated dedicating a minimum of one to four hours per week.

Result 2: People do combine learning in the office with learning at home

The advantage of external conferences, company-internal forums or seminars at business schools or training centers is that they take place far from the office. This is at the same time the reason why such events are not attended much more often than once per year. But, people are expected to stay "up-to-date" and have understood that self-study is necessary (see fig. above).

In spite of single remarks to the contrary e.g. “too little time is devoted to office learning, it’s not a reason for working late“ and “learning is out at home; time is better spent with the family“, more than half of the interviewees do their learning most frequently in both, the office and at home. A small number of informants excluded home as a place for learning (10 percent). Only seven percent of the respondents voted the office as a place infrequently used for learning. 24 percent of the informants also use travel periods during business trips very frequently as learning times. (see figure below).

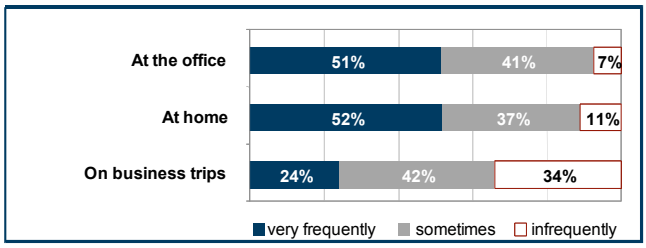

Figure 12: Location preferences for self-study

The most frequent stated reason for self study (73 percent) is the preparation of a project. Despite a general lack of time, more than half of the respondent people learn for personal interest reasons.

The figure below illustrates this view of the most important reasons for “self-study“.

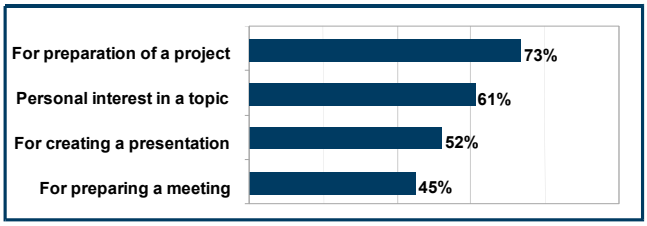

Figure 13: Main reasons for self-study

Interviewees confirmed, that learning is done almost always in relation to a given situation, driven by an actual business need, e.g. for comprehension of a subject-related problem, or to make sense of new situations/problems.

Result 3: People are not hostile to technology

More than 80 percent of all interviewees conduct their own searches for the knowledge they need very often. Almost every manager and knowledge worker has used an online tool in this connection, e.g. Internet search engines. All informants rate their own PC as an absolute necessity for their work.

This picture is also reflected in the study about the most frequently used information media. It comes as no surprise that specialist journals and books are an important source of new information. This resource is very often used by 61 percent of the interviewed people. Actually, the Internet is rated as the most frequently used source of information by almost all respondents (94%). In this regard there also is an unexpected result: the company’s own Intranet is given only very low importance in solving information needs for self study. The figure below illustrates this.

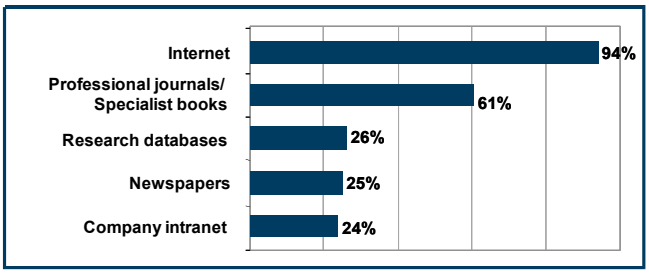

Figure 14: Very frequently used information media for self study

Result 4: People do use e-learning

The study also looked at the question: Do managers accept interactive (online) learning modules for self-study? Managers for instance describe media available online for downloading (80%) or printing (53%) as very frequently used for learning. There is also a desire for online learning documentation as complementary to conventional modes of seminar ("classroom training"). Not yet so important are documents for download to PDA computers yet. Only 11% are using this kind of media for their self-study.

Didactically more complex, interactive learning modules are rated by almost 30 percent of the informants as appropriate for their personal learning needs.

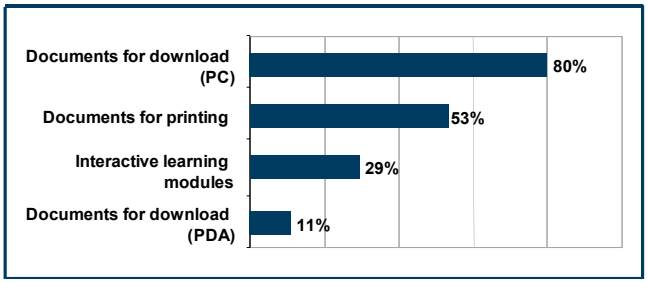

Figure 15: Very frequently used online media

In general, people take a critical position vis-à-vis interactive online learning media (Web Based Training, Computer Based Training). It is rated as very positive and also indispensable that such media include semantic links and optional more detailed information. On the other hand, the interviewed people see a high risk in the potential loss of control regarding their own learning style and speed. Learning modules including test options for rating personal knowledge levels is regarded as particularly useful.

Result 5: People want to create a "virtual knowledge community"

Not least important for employees are their personal networks. Many corporate universities have recognized this fact and are aiming to bring managers who are spread across the different locations of the company together in a creative exchange. This is achieved, for exam-

ple, by organizing internal forums on strategic topics or completing tailored-to-requirement case studies with business schools.

The question remains: Do people form virtual knowledge and learning communities? Questionnaire results to date show that currently Intranet communities on common interest topics are not yet so common. At the same time, there is an unexpectedly large interest (more than two thirds) for online networks and collaboration, such as virtual meeting rooms or general network communities for business contacts (see following figure).

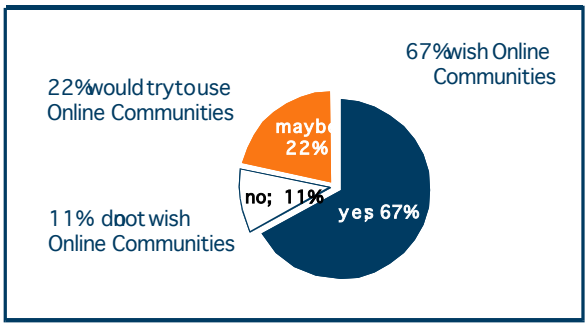

Figure 16: Virtual knowledge and learning communities for managers

A majority of informants wish to use online communities to remain in contact with other participants after conclusion of a class-room seminar, e.g. in online expert forums.

As a conclusion of the whole study, people do in fact learn very differently. These differences often are a question of detail. It has been shown that people do a large part of their learning in the office, frequently using the Internet, and are open to (though generally lack experience of) both e-learning and online knowledge communities. At the same time, the special aspects of the professional requirements in management also impact knowledge needs and learning behaviour.

People thus clearly have a special awareness in relation to the planned design of learning processes, placing high quality demands on methods and media design. Moreover, the attention on individual issues is extremely time-restricted. Intuitively, people look for shortcuts and respond positively to options and any risks or chances to which their attention is drawn.

4.2 The applying industry's view: how companies want to support the learning of knowledge workers

Besides the question how users want to learn, it is important to ask and analyse how companies and non-profit-organizations organize the learning activities of knowledge workers within their organization when implementing or applying technology. Within 24 user clinics, the different organizational approaches of companies in this area have been analyzed.

These user clinics covered observations of companies with qualitative interviews with the HR development managers or chief learning officers. They took about 3 to 4 hours. Most oft the interviews did take place in the headquarters face-to-face with 2 or 3 interview partners. After a preparation phase, the observation time was from October 2006 to May 2007. Some inter-

views have been done during events. Within the user clinics, companies presented their approaches for learning. Focus was on how they provide knowledge to people on management level as well as employees that are working in knowledge-intense service departments. User clinics and observations have been done with the following organizations:

1. BASF (Chemical Industry, GER)
2. British Telecom (Telecom, NE/UK)
3. DaimlerChrysler Corporate University (Automobile, GER)
4. Deutsche Lufthansa (Passenger Flights, GER)
5. Deutsche Sparkassenakademie (Banking, GER)
6. DIHK Online Academy (Public Sector, GER)
7. E.ON (Energy, Utilities, GER/UK)
8. FESTO (Engineering, GER)
9. Hager Tehalit (Engineering, GER/FRA)
10. IDS Scheer AG (Information Technology, GER)
11. KPMG (Consulting, Finance, GER/UK/NET/RUS)
12. Metro (Consumer Goods, GER)
13. Mobiliar (Insurance, CH)
14. Otto Versand (Consumer Goods, GER)
15. Open University (Education, UK)
16. SchwarzPharma (Pharma Industry, GER)
17. SCIE (Government, UK)
18. Slovenska Sporitelna (Banking, SLO)
19. Swiss Life (Finanice Industry - Insurance, CH)
20. TUI (Tourism, GER)
21. UBS (Finance Industry – Banking, CH)
22. USW Schloss Gracht (Management Education, GER)
23. VBV (Finance Industry - Insurance, CH)
24. VW Coaching (Engineering/Training, GER)

Selection criteria for choosing the company as “user clinc” have been:

- The companies have experience with learning technology on different management levels at least already for one year.
- The interview partners are decision makers.

- The companies are continuously investing into learning technology.
- The companies belong to the early adoptors of learning technology and therefore also started to use social software like wikis, blogs, podcasts or other related web 2.0 technology
- The companies have at least 1.000 employees or users in their target group.

As a result of the observations, Figure 17 shows a classification where companies see their focus in using technology for knowledge workers.

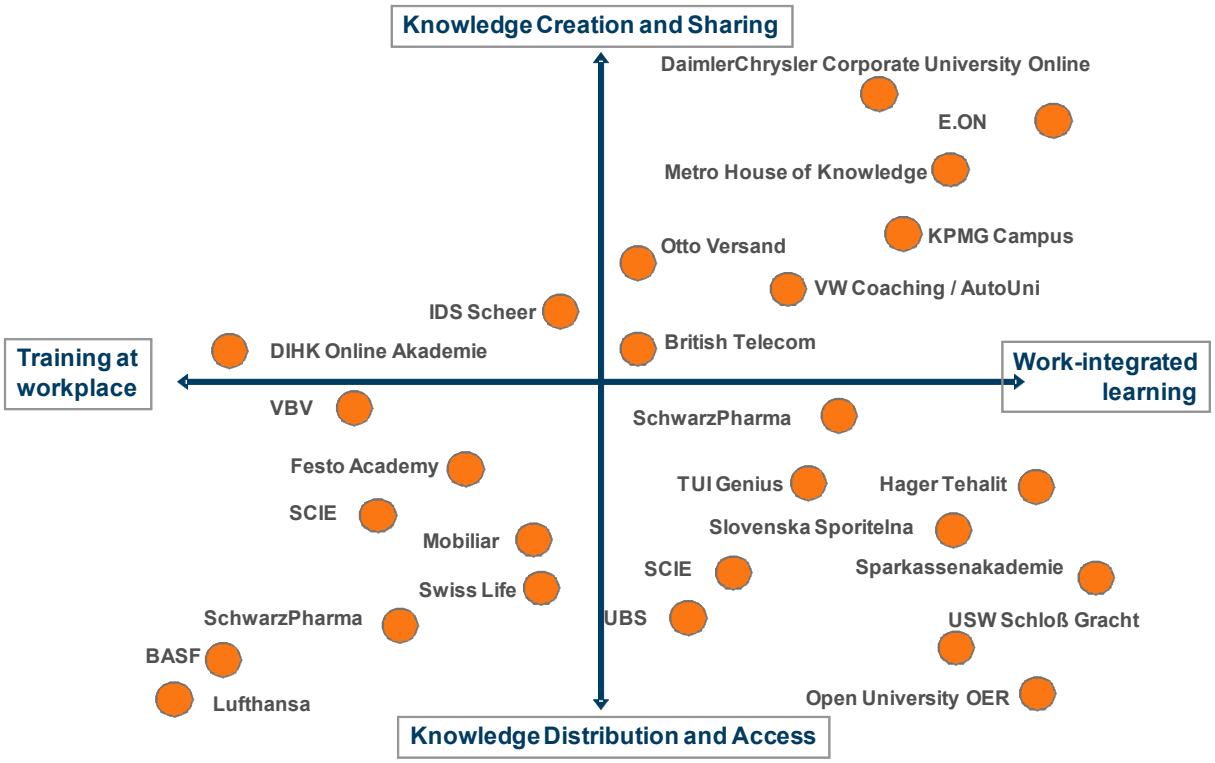

Figure 17: Strategic focus of technology use for knowledge work

There are two dimensions differentiated:

- The dimension “training” versus “learning” indicates whether the companies focus on the support of work-integrated learning or of explicit training processes (at workplace or at home). When focusing on work-integrated learning, this means, that companies offer the technology to enable employees to decide on their own when and what they learn, how much time they invest and which resources they use. Learning is defined here as a process to gather knowledge and make use of this knowledge in order to transfer it into action. When focusing on training companies they want to ensure that employees have specific capabilities to perform processes or have the know-how to make decisions. Training is therefore defined as activity of explicit practice, improvement and feedback.
- The dimension “knowledge creation” versus “knowledge distribution” indicates whether the companies focus on “user-generated content” within a collaborative community ap-

proach or managed content within the focus of providing search and retrieval functionality to employees in order to access the content quickly.

Based on this chart we can distinguish four sectors of strategic focus within companies. The upper right corner is the area where companies want to support an open, flexible environment for collaboration. They see in the communication and in user-generated content the highest value for their business. Their focus is on knowledge creation and sharing. We have seen within the observations that those applications have much functionality for community building, communication between experts in one field, etc.

The lower left corner is the opposite. This is the area where training is the key issue in these organizations and the focus is on business or product knowledge. Learning content is being produced by these companies to fill knowledge and competency gaps. Companies offer training e.g. for compliance subjects, soft and communication skills, language learning, business products, international management etc. In foreground stays, that this is rather the traditional formal training approach.

Of special interest was the fact, that for most of the companies that have been observed, the focus of why they use learning technology to support knowledge workers and how they use it, changed over time. Figure 18 shows an example for E.ON.

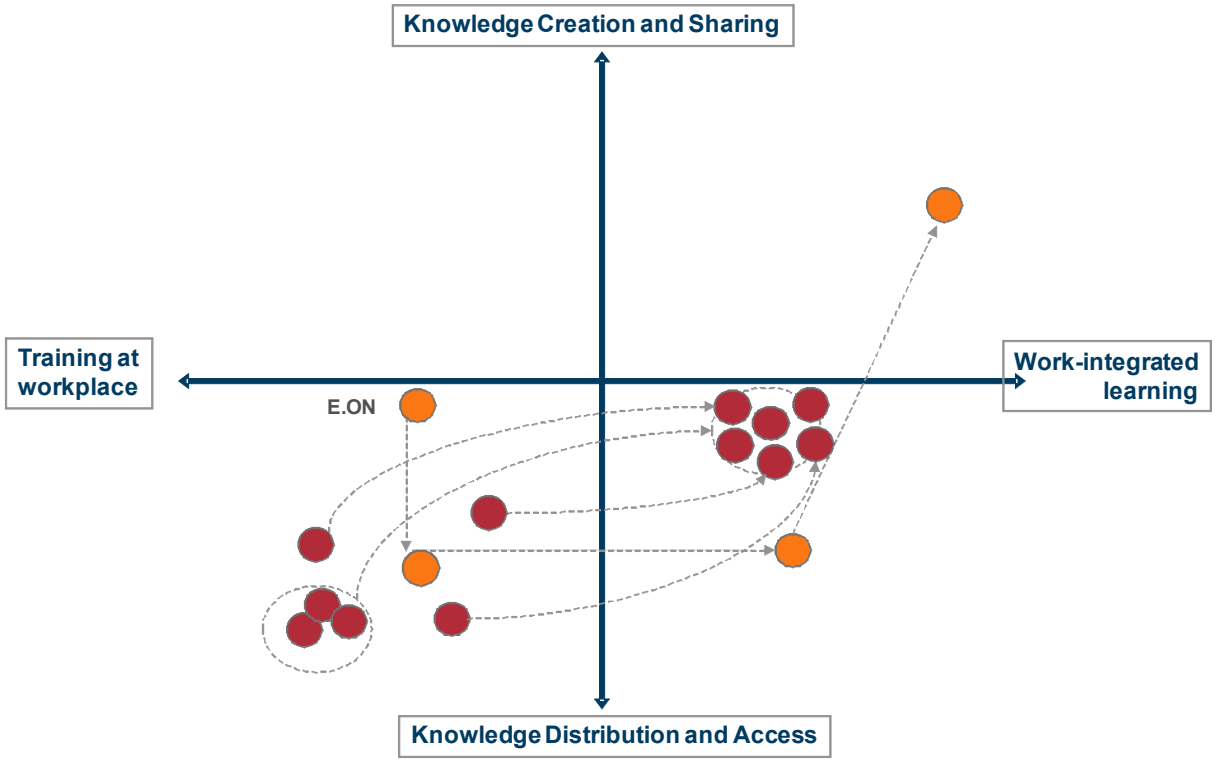

Figure 18: Change of focus within companies over time of learning technology use

E.ON started with the focus to provide management training on specific key issues such as HR management, trading and E.ON corporate identity. The focus did lie very much on training. After having focused on formal processes, they added community functions to the hybrid training model, seeing that tutors did invent the functionality as an instrument to generate communication between participants before and after a classroom session or online training.

The more the users got known and used to the technology, the more communication took place. Today, E.ON has shifted to the more collaborative learning with user-generated content inside of an academy approach, which means, that they build learning groups within managers that continuously take place online. In addition, they still provide formal learning processes. Intensity of both instruments varies very much, in large extend depending on the subject of knowledge and intensity need of learning.

In addition to the above described classification, we classified the different approaches of the companies according to organizational approach. Figure 19 shows the result for the 24 user clinics.

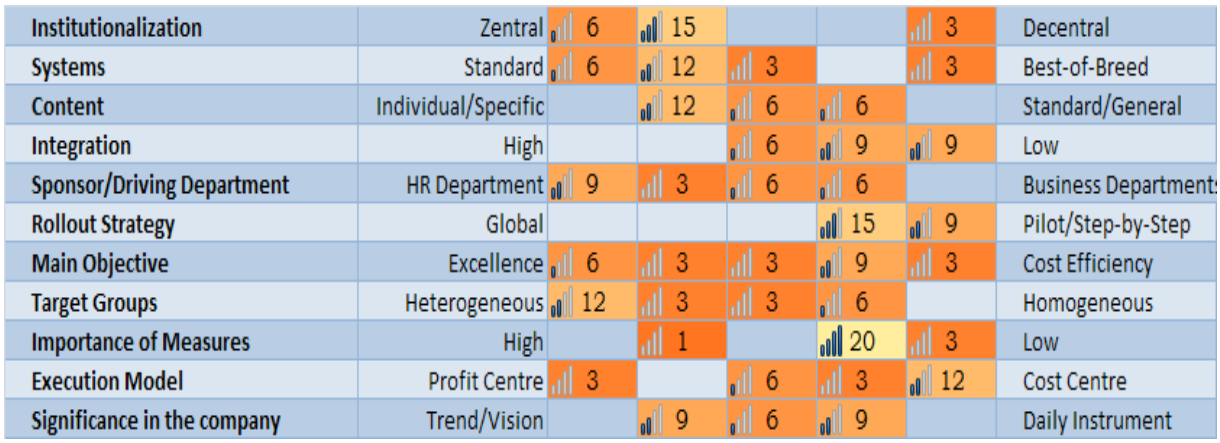

Figure 19: Use of learning and knowledge technology in companies

21 of 24 companies have a very central approach when organizing and managing the learning technology for knowledge workers. Most of the time, the training or HR department implements and organizes the technology as well as the content for the whole corporation. Only in 3 cases, we have a complete decentral approach, which means that every department itself is responsible for the content and the way how the corporation learns and offers training as well as knowledge work support.

Most of the companies (21 of 24) are rather running on standardized and integrated solutions instead of building a best-of-breed solution by coupling various technologies. But we can see a slight trend to a mix of technology, when we talk about integration into corporate wide technology platforms and portals. If the portal technology allows a best of breed-strategy based on service-oriented architectures, the companies tend to a standard solution that also gets extended with other functions e.g. blog and web 2.0 software elements.

Most companies mix standard and individual content. Individual content again can be user-generated within communities as well as inhouse produced on corporate specific knowledge.

The driving departments and sponsors are in most cases the HR department, but we can also identify that strong business departments might be the driver in order to fulfill business needs. Those departments are in many cases the financial departments (because of compliance regulations) or the product departments (because of sales training needs or knwoledge services for customers).

A step-by-step rollout strategy is the regular case. As described above, this allows the companies to shift the focus of their application from one pilot to the other. But in most cases, there is global strategy behind the step-by-step rollout.

The reasons why the companies are using technology are very different. To reach excellence in business is as important as cost efficiency in training. It changes from pilot to pilot.

In most cases, companies try to identify homogeneous target groups in order to be able to manage the offerings and technology. Small target groups are normally not addressed, which means also, that knowledge workers within very specific subject matter areas don't get the support of the technology.

Only some companies really measure the success of the technology. This is interesting, as investments vary between 100.000 Euro per year and 500.000 Euro. The measurement of training ROI has some importance, but not a key importance for 23 out of 24 observed companies.

The unimportance of measures might be related to the fact, that most companies run the solutions for learning technology as a cost centre. In this case, the need of arguing the impact on business success is less critical. Maybe this is also due to the fact that the ROI on training is delayed or hard to establish precisely. So managers might know certainly that TEL is worthwhile, it is prudent to set it up as a cost centre rather than stop the TEL. We also know from other research that the correlation between investments (e.g. on training) and returns (e.g. on sales or profits) is difficult to measure.

The technology is still seen as innovation in companies because the trend is going to use technology in order to support learning and knowledge work, but it is also getting more and more an instrument that gets used on a daily basis.

4.3 Summarizing the findings within the framework of PROLEARN D1.10

In chapter 11 of the PROLEARN deliverable D1.10 (Naeve et. al., 2007), a Professional Learning Processes Framework (PLPF) is presented, based on a modification of the SECI model, which was introduced into PROLEARN by the deliverable D5.3 (Naeve et. al., 2005). This framework is centred around learning before/during and after a project, a structure, which was inspired by the British Petroleum Knowledge Management Process (described in D1.10, section 10.2). As described in D1.10 the main purpose of the PLPF is to enable professional learners to record a number of different aspects of their formal and informal learning processes in a way that directly relates to the projects that they will become involved in, are involved in, and have been involved in.

As described in D1.10, section 11.4, our original plans were to represent the findings of our user-clinics in these terms. However, the findings of the user-clinics show that most of the interviewees do not relate to the before/during/after a project distinctions inherent in this model. This seems to be due to the fact that knowledge workers are normally involved in several closely related projects at the same time, and therefore find it hard to distinguish between the learning that goes on before/during/after a specific project.

Hence, in order to present the results in a way that more clearly reflects the responses of our interviewees regarding their professional learning processes, a somewhat simplified version

of the PLPF has been used in this deliverable. For example, for section 4.1, the "Formal Learning Process" of the PLPF has been identified with the "Formal events" supporting the Learning process (as depicted in Figure 20), and the "Informal Learning Process" of the PLPF has been indentified with the "Self-study" process of Figure 20.

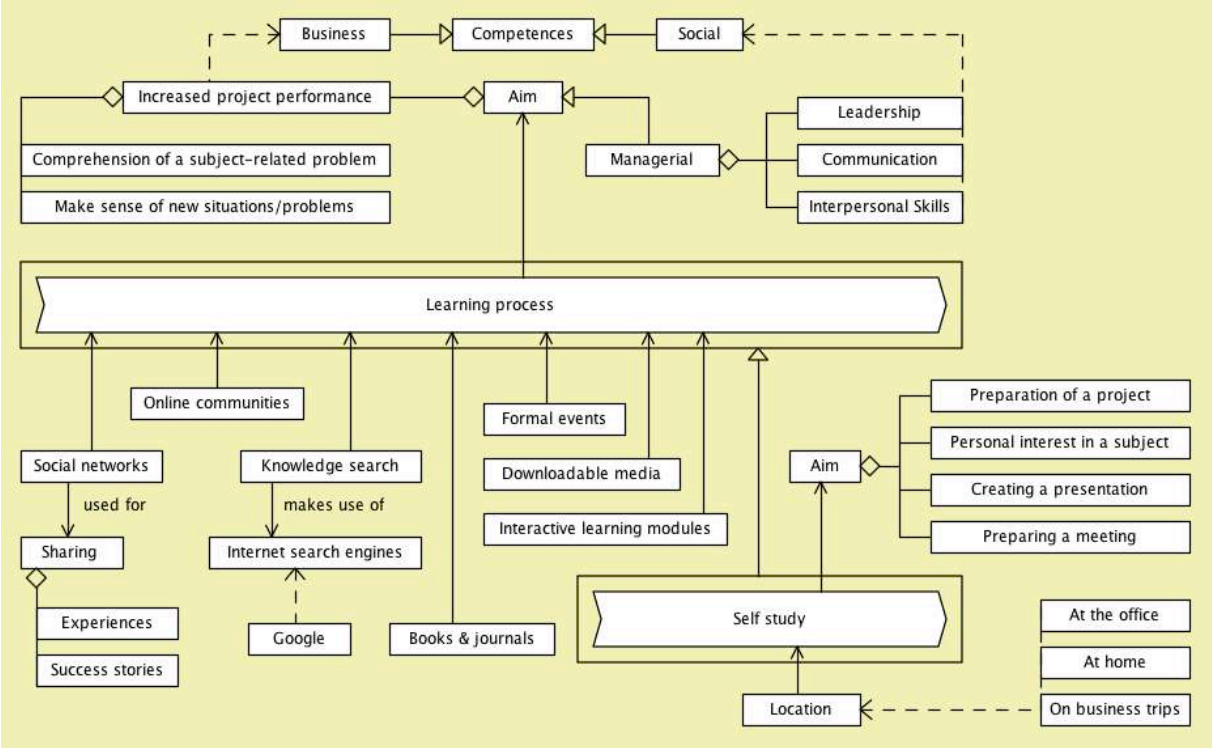

Figure 20: Summarizing the findings of section 4.1: How Knowledge Workers want to learn (A "live" version of this map is available in Conzilla at http://www.conzilla.org/people/amb/user-clinics/layoutCM#d821c8116d87858d8)

The process modelling notation used in Figure 20 is explained in detail in D1.10, An additional type of notation introduced in Figure 20 is the rectangular frames surrounding the two depicted processes. These frames represent a type of reification, which makes it possible to regard processes as concepts - and model their type-relations (in a static model), while at the same time modeling their dynamic characteristics. Since the arrow connecting the frames around "self study" and "learning process", represents generalization/specialization, we can infer that "self study" is regarded as a subtype of "learning process", and therefore inherits the general characteristics of its supertype ("learning process"). This type of modelling is very useful, since it allows the mixing of static and dynamic aspects, which helps to create an overview of the characteristics of a family of related processes.

Figure 20 summarizes the empirical findings presented in section 4.1. In fact, Figure 20 and Figure 21 are screenshots of Conzilla models (see D1.10, section 11.1), and the quantitative data has been represented as pop-up metadata on the corresponding concepts. Conzilla can be downloaded at www.conzilla.org.

Interpreting the semantics of Figure 20, we can infer that the aim of the general learning process is "increased project performance", which is an example of a" business competence", and which has the important parts of "comprehension of subject-related problems" and "making sense of new situations/problems." A special aim for managers ("managerial

aim") consists of improving their " leadership", "communication", and "interpersonal skills", which are examples of "social competences".

Moreover, Figure 20 shows that the most important support-factors of the (general) "learning process" (as described by the interviewees) are: "Social networks" (used for "sharing experiences and success stories"), "Online communities", "Knowledge search" (which makes use of "Internet search engines", notably "Google"), "Formal events", "Downloadable media", and "Interactive learning modules". Also, an important support-factor of the "self study" process is "Location", which was exemplified by the interviewees as "at the office", "at home", and "on business trips". Finally, the most important aims of the "self study" process was described by the interviewees "preparation of a project", "personal interest in a subject", "creating a presentation", and "preparing a meeting".

Figure 21 shows the summary of the empirical findings presented in section 4.2 (How companies want to support the learning of knowledge workers). Here, a larger part of the notation of the Generic PLPF has been retained. As discussed in section 4.2, and as seen in Figure 21, the formal (upper) part of the "process fish" is identified with "Training at workplace", while the informal (lower) part is identified with "Work-integrated learning". However, since the "Main Objective" and the "Target Groups" for these two activites were described as the same, the corresponding "formal aim" and "informal aim" arrows point to the same concept, which explains the double arrows.

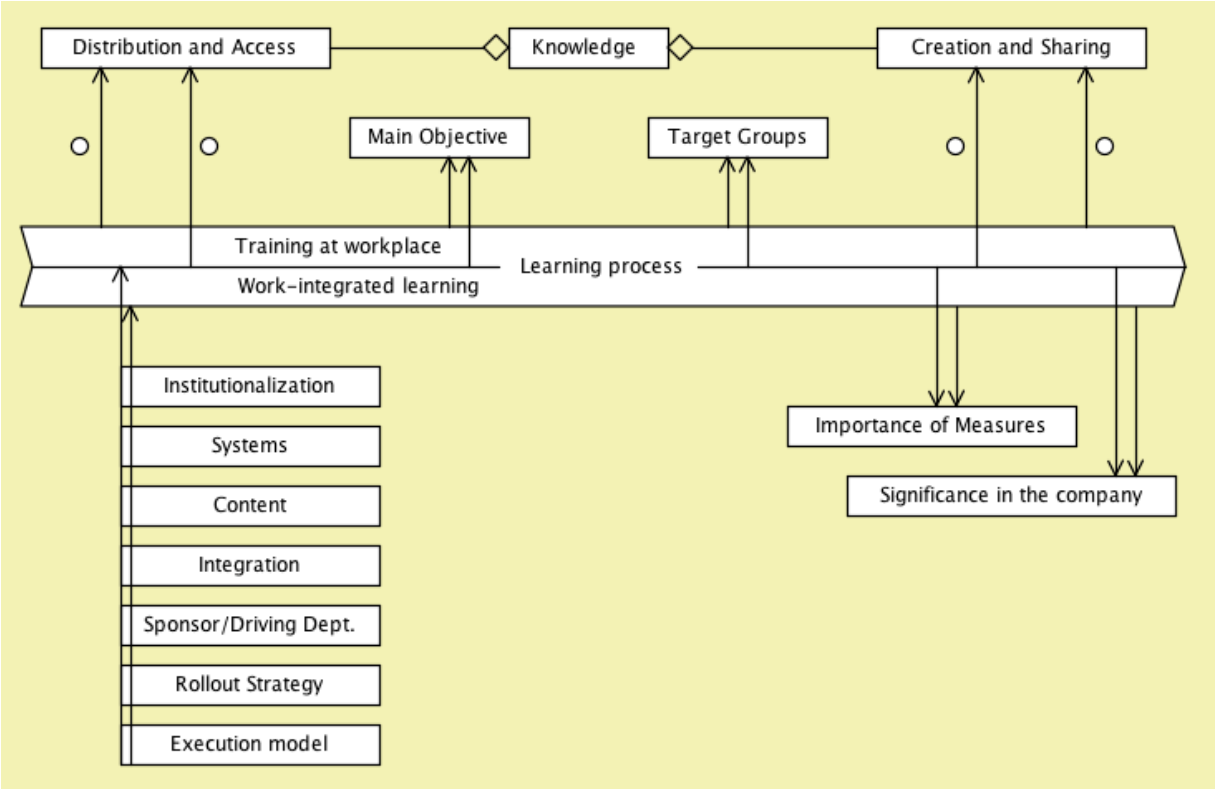

Figure 21: Summarizing the findings of section 4.2: How companies want to support the learning of knowledge workers. (A "live" version of this map is available in Conzilla at http://www.conzilla.org/people/amb/user-clinics/layoutCM#6f5891116e33d4612281)

In a similar way, since the interviewees did not discriminate clearly between support factors for the formal and informal part of the learning process, the listed support factors ("Institutionalization", "Systems", "Content", "Integration", "Sponsor/Driving Department", "Rollout Strategy", and "Execution model") are modelled with similar double arrows, which means that they support both the formal and informal part ot the "Learning process". Again, the quantitative aspects of the responses are described as pop-up metadata on the corresponding concepts.

As depicted by the "four-field diagram" of Figure 17, the interviewed companies have different focus (major aims) with the formal ("training at workplace") and informal ("work-integrated learning") parts of the learning process. This is reflected in the two different (formal and informal) "aims-arrow"s that end in "Knowledge Creation and Sharing", and the two different (formal and informal) "aims-arrows" that end in "Knowledge Distribution and Access". The companies that express a focus in one (or several) of these four areas are listed as pop-up metadata on the white dots beside the corresponding arrows.

Finally, in Figure 21, the "Importance of Measures" and the "Significance in the company" are modelled as (side)effects of both the formal and informal parts of the learning process, which reflects an absence of distinction of the interviewees between formal and informal learning with respect to these concepts.

5 PROLEARN guidelines and framework for process-oriented learning for knowledge workers

5.1 Guidelines

As we have seen within the user clinics a large number of corporations today use software technology to support their core processes in order to enable online learning and communication. For instance, the CLIX Learning Management System from IMC supports both the formal training, informal learning as well as social communication in one technology. In addition, corporate university-specific functionalities and business processes are being supported. This covers the offering of blended courses delivered by special business schools, booking of courses, self-paced or blended learning, tutoring processes, assessment and testing, community support, learning performance analysis and competency management.

In the last two years, the integration of learning solutions with corporate HR applications and enterprise portals got more important for corporations, in order to be able to support knowledge workers that are not specifically attending an online course but rather want to use the technology on a daily ad-hoc basis. Learning management or knowledge management activities as stand-alone approach did not fulfil these requirements.

In addition, user clinics did show, that there should not be placed too much emphasis anymore on content without understanding the unique needs of learners and knowledge workers. Most people want to use a learning management platform as an organizational support tool and not only as a learning tool, integrated with company portal and HR applications.

In the future, recognizing that learning and knowledge are personal and social processes, learning and knowledge management approaches require a move away from a one-size-fits-all content-centric model towards a user-centric model that puts the learner/knowledge worker at the centre and gives them the control in the sense of Web 2.0 applications (Chatti/Jarke/Frosch-Wilke, 2007). The above described E.ON example shows this trend because they moved from the lower left corner to the upper right corner with their learning strategy.

Corporate universities did act in the past too much as education brokers, dealing with content and high-level learning programs in a blended learning mode. Some corporate universities like DaimlerChrysler Corporate University did integrate communities of practice in an extensive way for specific knowledge areas into their overall concept (Zimmermann/ Kraemer/Milius 1999). The experience showed that this mix was the correct strategy and led to a good integration of learning and knowledge exchange.

In consequence, the future path for using learning technology in corporate universities and training organizations can be described as following (in relation to Chatti/Jarke/Frosch-Wilke, 2007):

- Companies need to get more user-centric instead of content-centric: In a learning context, a user-centric model means the creation of self-organized learning networks that provide a base for the establishment of a form of education that goes beyond course and curriculum centric models, and envisions a learner-centred and learner-

controlled model of lifelong learning (Koper, 2004). This means that corporate learning organizations need to enable personal learning experiences to every person (Hodgins, 2005) and a move to learning management systems that provide very personal training.

- Corporate learning organizations within companies should support better a distributed, coordinated, but not central approach: Stephenson (2004) writes “I store my knowledge in my friends”. Learners and knowledge workers are collaborating more than ever outside and across classroom and organization boundaries which become more and more irrelevant. Centralization works well for organized knowledge or established structures. Decentralization is effective when things change rapidly, diverse viewpoints are required, and knowledge has not settled into a defined state, which is the case in today’s complex knowledge spaces (Siemens, 2006). To be more effective, learning solutions need to operate both with formal and central approaches as well as more decentralized and socially open approach, based on small pieces, loosely joined and distributed control.
- Companies should better support bottom-up knowledge approach than top-down: In the starting phase, corporate universities did very much follow the top down-approach under the model of education brokerage. But top-down models and hierarchical controlled structures can be barriers for innovation. In general, learners and knowledge workers love to learn but they hate not to be given the freedom to decide how they learn and work (Cross, 2003). Nowadays, educational institutions and organizations follow a top-down model and put heavy emphasis on how to force users (learners, employees, customers, partners, and suppliers) to access their closed environments and join their small communities. These attempts often fail due to the "what's in it for me" factor. As a solution, Davenport and Prusak (1998) state that communities should emerge naturally and evade the control mechanisms of the formal organizations and institutions. Furthermore, learning and knowledge are dynamic and complex in nature. According to Cross (2005), emergence is the key characteristic of complex systems. It is the process by which simple entities self-organize to form something more complex.
- Companies should follow a balance of knowledge-push and knowledge-pull: Traditional learning initiatives adopt a knowledge-push model and are concerned with exposing people to content. Recognizing that learning and knowledge are dynamic and flexible in nature, the approaches require a shift in emphasis from a knowledge-push to a knowledge-pull model (Naeve, 2005). In the knowledge-pull case, people create an environment where they can pull content that meets their particular needs from a wide array of high-value but less structured resources like information repositories, communities, and experts, thus creating much more of a flexible, real time learning and knowledge culture (Rosenberg, 2006).
- Companies should enforce adaptive communities: learning and knowledge solutions need to be both simple and useful. Therefore corporate universities need to provide environments that support the effective capturing of quality and context-rich knowledge as it gets created. Collaboration contextualises content (Cross, 2003). In cases

where a company allows its knowledge workers access to external communities, the wisdom of crowds ensures that the company's knowledge resources are up-to-date and relevant. Knowledge created by many is much more likely to be of better value. Communities decide what is valuable through filtering, rating, feedback, reviews, criticisms, and recommendations. They also support the certification of people's expertise and the assessment of individual digital reputation. This collective intelligence is what is making e.g. Google, EBay, Amazon, YouTube, and Flickr so successful and popular today. Effective learning management approaches also need to develop mechanisms that ensure that learning and knowledge are embedded into the workflow of the job and in our daily activities in order to avoid any additional work.

- Companies should create a knowledge sharing culture and trust: Often, people tend not to share their valuable knowledge. Babcock (2004) cites two key reasons why people don't share knowledge: (a) people believe knowledge is power and (b) people don't trust each other. Motivation of learners, knowledge workers, customers, and suppliers to share valuable knowledge is based firstly on a culture that supports and encourages knowledge sharing and secondly on trust. A key requirement for knowledge sharing is a culture that allows knowledge to flow and rewards rather than punishes collaboration initiatives. Collaboration has to become the norm and a meaningful part of the performance evaluation of learners and knowledge workers. A major prerequisite for knowledge sharing is trust. Relationships foster trust. As a solution for the trust problem, Babcock (2004) suggests to create opportunities for people to meet and interact in formal and informal settings, give them time to develop relationships, to evaluate each other's trustworthiness and to learn each other's strengths and weaknesses. Similarly, Siemens (2006) states that social contact is needed to foster a sense of trust and comfort and secure and safe environments are critical for trust to develop. A bottom-up approach and distributed control also build a base for successful knowledge sharing and trust. People only tend to share their knowledge if they don't feel that they are forced to. Therefore, encouraging people to build their personal social networks and join communities based on their needs helps to ensure trust and motivates them to share.

Taking all these future directions into account, companies will get not only places to learn and to share knowledge. The whole discussion of Web 2.0 communities and social software raises a very important subject. As learning is a social process, it is important for people to create communities and collaborate. Many technologies have been developed in the past to do this, starting with virtual classroom software over collaboration and community tools. Within the web 2.0 wave, social software has emerged as a major component (Alexander, 2006). Objective is to facilitate any kind of social connection and information interchange. Rapidly evolving examples of social software technologies include wikis, blogs, RSS, podcasts, media sharing, and social tagging. Social software is however not restricted to these technologies.

Figure 22 shows the components that have to be taken into account when designing learning programs within companies, that want to reach the upper right corner in Figure 17 and support the formal learning as well (lower left corner).

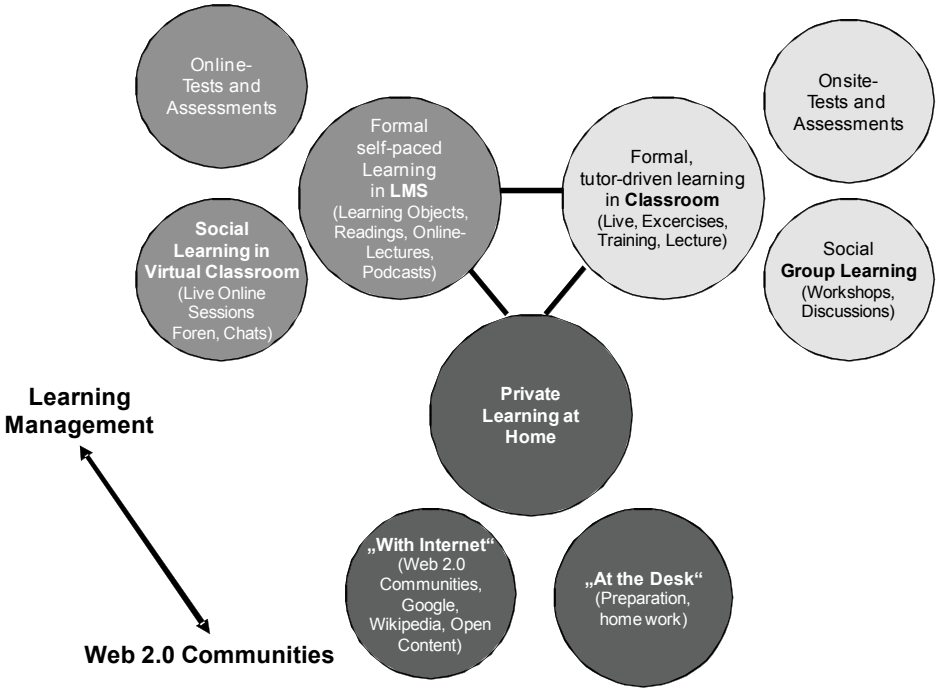

Figure 22: The future platform of corporate learning activities unites classroom learning, learning management and web 2.0 communities with learning in onsite, online and at home

Three areas where people learn can be differentiated:

- The area around traditional classroom training covers training sessions, workshops and learning in groups as well as onsite-tests and assessments. This is the “incentive” area also, where people learn in nice locations. In this area, also the aspect of community building plays an important role.
- The area of virtual learning, using online content and courses, performing online tests, integrated with chats, forums and other elements for sharing knowledge as well as communicating with other people. This area covers the managed learning and ensures that people perform concrete tasks to learn.
- The area of private learning needs to get a larger attention in the future. In the past, this area was not taken into account by instructional designers within corporate universities. But as we have seen above, people want to learn at home as well as in the office. This private learning area is more and more designed by the learners themselves. People choose and pick web 2.0 applications in the internet to share, discover or rate information as well authors or editors of content. People use search engines to retrieve information and use them within their learning process – formal as well as informal.

All three areas will merge more and more in the next years, not necessarily technically but concerning an integrated learning design. Within the design phase of learning programs, program managers of corporate universities will have to take all elements into account and manage a learning process over all three areas. The requirements resulting from this can be summarized (Gee 2006):

- Active and social learning must be blended by instructional designers: This is where motivation comes from. Learning takes place by activity of the learner itself. Formal learning processes give the learning process a structure – which is needed. Informal learning processes by using the web, literature, books, podcasts or online lectures allow the learner to make own decisions.
- Internet based learning technologies evolve to the core of corporate universities: In the past, the online platforms were a vehicle but not the main platform. By combining web 2.0 technologies with learning management systems, these platforms get the heart of a corporate university. As we know that most learning takes place outside of the classroom, corporate universities have to focus on this side of learning. The knowledge provided in the classroom should concentrate on showing the interlinkage, giving the big-picture and providing experiences and stories. In the classroom, the learner should be able to benchmark himself, get feedbacks on his progress and get support concerning the priorities of learning.
- LMS systems will be the logical linkage of all components and provide guidance: LMS systems will deliver transparent processes to the learner within the corporate university. It is the system for official learning resources, gives an overview about the priorities and helps to track the individual learning progress. By this, the LMS is the complementary element to the formal learning at onsite training and classroom. Web 2.0 platforms will not be a “competition” for LMS systems but rather be a complementary element to link to the more private and self-organized, informal learning.
- Everything in a corporate learning business will focus on personalization and individualization: Former training approaches in large enterprises were too much looking on large user groups delivering them all the same content and courses. Today, the key for success is personalization. Only if the offerings meet the individual need and competency gap, the learning activity will be accepted and be successful. The adoption of any standard course to the individual person is necessary. Some learners like to learn mobile and want to subscribe a podcast of their favorite teacher, others prefer to learn at home at the desk by doing exercises, others again are cognitive people that learn best by reading papers. It is important to offer a very diversified mode of access and content according to the learning style of every individual person. This does not mean that every type of content must be available in every kind of content format. It means more that corporate universities must offer flexible learning sceanarios. This can only be reached if they use the potential of combining web 2.0 social software elements with learning management systems and a large offering of classroom training.

5.2 Methodological framework

If companies want to follow the general guidelines for business-driven learning with integrationon of formal professional training and informal learning as well as social communication, they need a methodological approach how to do this. In the following, a methodological approach is being described that fulfils the requirements and is easy to implement and use. It is also designed to enable work at home, individual learning and team learning. It can be man-

aged as well as allows a high freedom of time management, which again is meeting the requirements of knowledge workers.

In this methodological framework, the spiral knowledge management approach of Nonaka and Takeuchi (1995) is enhanced to be used in informal and formal learning settings. Technologies for learning management as well as social learning technologies must be used in an integrated form. Companies can follow this approach easily when designing new professional training approaches for knowledge workers.

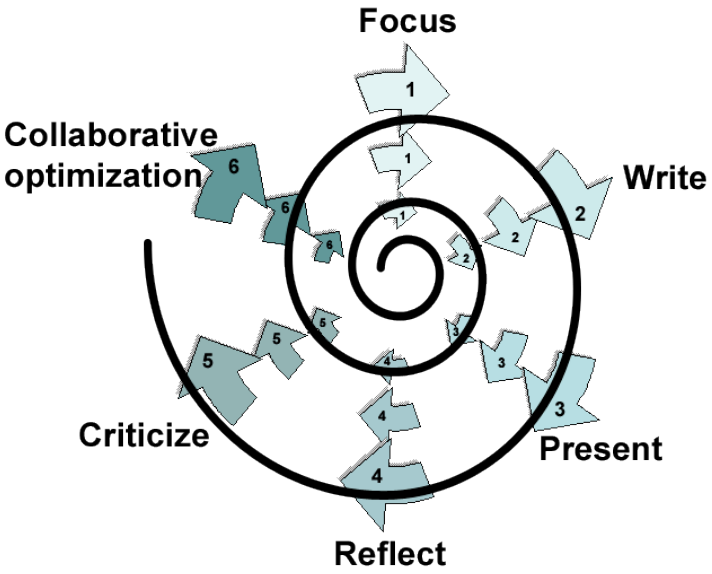

Figure 23: Methodological approach for companies forbusiness-driven informal and formal learning (Herget 2007)

Following the spiral model in Figure 23, professional training arrangements will fulfil better the needs of knowledge workers and help them to learn according to their own wishes and needs, if a training scenario combines 6 learning methods in an interative approach. Companies should follow this approach when they design courses and learning environments. The phases within this knowledge-enhanced learning approach are:

1. **Focus**
   Participants should search and retrieve information for the training topic and domain. Open issues and questions should be identified and discussed. Tools to be used are typcial web 2.0 tools and technologies ranging from search engines over content communities and online libraries to traditional technologies and printed books as well as papers.

2. **Write**
   Participants should collaboratively work in a team to create a position paper. Tools that should be used can be based on WIKI-Technologies, collaborative word processing tools, forums, communities to share content etc.

3. **Present**
   The participants should present their work in progress in front of the other participants either in face-to-face trainings or via virtual classroom technologies. They could also use lecture recording technologies to record a presentations, if a synchronous presentation does not fit into the schedule.

4. **Reflect**
   After the presentations, the participants should take part in a formal training session and use this session to analyze and reflect the work that has been done. The session should be used to learn new theories and case studies. This can be by commenting the results in online tools or discussion the work within the group. This can be done individually by person or in the team.
5. **Criticize**
   According what the participants have been learned during the reflection phase, the participants should develop critical statements to the work they have been done.
6. **Collaborative optimization**
   The participants improve and optimize the work they have been doing. This phase seamlessly leads to a refocusing of the work and new search and retrieval of content.

Figure 24 maps that the different phases and steps to the SECI-based knowledge creation approach of Nonaka/Takeuchi.

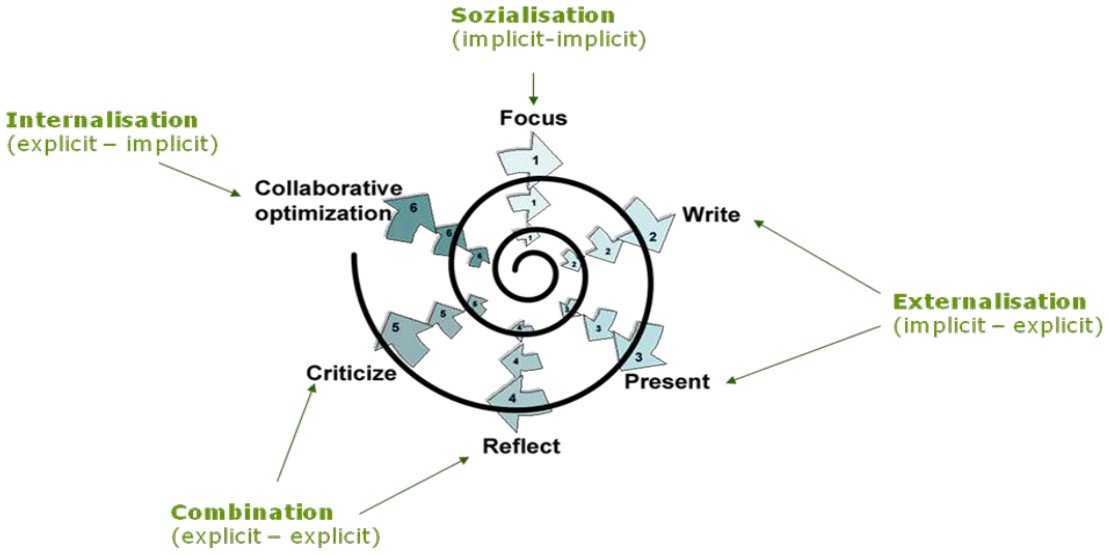

Figure 24: Mapping of the spiral model with the phases of Nonaka/Takeuchi

The approach combines the following aspects within professional training:

- Systematic and continuous professional learning
- Creation and use of knowledge bases
- Explicit use of experiences and knowledge
- Implicit integration of individual knowledge
- Informal learning through communication and collaboration
- Combination of individual and organizational learning

The approach allows a systematic increase of key competencies, if the right group of learners and knowledge workers are working together in the course. It integrates knowledge management aspects with learning technologies and social learning communities. The procdures

is iterative and by this enables the training organization to combine it also with other formal aspects such as certification tests and face-to-face trainings at the end of each iteration cycle. The approach is easy to understand and to implement.

Ten key aspects increase the quality and efficiency of training for knowledge workers:

- Knowledge will be constructed in courses that follow this methodology.
- The learning process efficiency increases as the learning is responsible himself for the learning progress and speed.
- The motivation of learners and knowledge workers increases as they can influence more the way and content they learn.
- The reflection is a sophisticated phase and creates engagement of the learners.
- The learning process is for every person individual.
- The learning process is based on experience and uses the individual competencies of the participants.
- The learning process is social and private, the time used can be defined very individually but also a team “pressure” is integrated in the process.
- The process creates high reflection and puts participants in the role of presenters.
- The process is iterative and finishes when the competency become strong enough.
- The learning process is chaotic and therefore creates interest for knowledge workers.

6 Conclusion

Corporate learning departments are effective organizations to increase an organisation's overall performance. Business-oriented learning is their mission. The instruments are a combination of learning management, knowledge management and social software. The backbone of a business driven corporate university is the learning management system which makes processes manageable and structured but also should incorporate the ability to create networks of experts and people to share knowledge and learning resources. Learning arrangements therefore must use modern methodologies, an approach for this has been given in chapter 5.

Many companies in the future will reengineer their corporate learning business, corporate university or training organization. It will be important, that these companies see the training organization as the department that is responsible to manage learning processes as a strategic instrument for enterprises to be or to get competitive. The more the digital natives come into the organizations and expect the company to enable them to learn and share experiences, the more arises the need to make use of learning technology and web 2.0 applications in a combined form. Traditional face-to-face learning arrangement are no longer accepted by knowledge workers that use the internet technologies within their day-to-day work. This PROLEARN deliverable described an empirical founded guideline and methodology to help training organizations to pay more attention on new forms of professional learning meeting the specific learning requirements of knowledge workers in business.

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