Improving organizational learning through Networked Learning

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Abstract: Sharing knowledge is one of the most challenging tasks modern companies have to deal with. A vast amount of knowledge exists within organizations; however it is often difficult to find and to judge its value. As a consequence, learning and knowledge building seem to be a lonely activity, separated from everyday work. In contrast, the way younger employees are communicating and learning is strongly peer oriented and collective. The generation that cannot imagine a world without the Internet learns through externalization instead of internalization, using colleagues and experts surrounding them. Sharing knowledge is a heavily familiar thing to them. The following article shows an approach of Networked Learning to link the professional learning experience to the workplace and to knowledge co-creation in a company. Through a tool that was developed for facilitating knowledge sharing and peer-learning the Networked Learning Model shows how this approach can work in practice.

1 Introduction

Technology enhanced learning in companies mostly supports a rather traditional single actor or cooperative learning practice as face to face training, shared data-bases and blended learning scenarios using learning platforms. The learning in these situations remains an individual act with no interpersonal interaction or connection to the daily working practice. New concepts of learning are needed to improve the use of technologies for companies' training and corporative learning of the employees. Companies do have to deal with challenges of knowledge (co-)creation and knowledge sharing. This is not only an issue that matters the organization as a whole, but it is also highly relevant for each employee within the organization.

Interestingly, younger employees show up as a new generation of learners, the so called net generation. This generation has grown up with technologies for communication and gaming, and appear to have extensive experience in learning collectively. Problems they encounter in games, in programming, and any other learning activity, are solved in communities (WoW, Slashdot.com, 3Bnet, Digg etc.). They easily share knowledge, externalizing what they know to others, as they have come to understand that sharing is winning. Reaching out in profiling sites they know that what you give away will come back to you and mostly with a multiplyer effect. This net generation, Homo Zappiens as Veen refer to them (VV06), is currently entering the labour market, and one of the issues to consider is how we can take advantage of this generation's networking attitudes and skills to enhance business outcomes while avoiding a disintegration of the workforce along the demographic structure of the organization. In this article a model of Networked Learning is introduced as a mechanism for companies to develop a more effective learning environment for their employees. It is based on the idea to improve trainings' outcomes by bringing learners together in a learning and knowledge sharing network. The model includes both non-technical and technical tools focusing on the enhancement of employee performance. This effort leads to an innovative technology which combines human intervention, tools and resources. Within the project "Networked Learning for Life Long Learners" (www.networkedlearning.nl) a model for Networked Learning was developed. On bases of this model a tool was built which was implemented at IBM and connected to the IBM infrastructure for experimental use..

2 Networked Learning

Today we are confronted with an educational challenge which is related to motivating and retaining talented employees. The characteristics of today's and future's worker is changing [Cr07, Si05, Si06, VV06]. For example, in the past process industries needed skilled workers to build products. Nowadays these industries seek employees who can co-create solutions by designing products collaboratively with customers using 'building blocks' of a multitude of companies from over the world. Skills of making a product do no longer suffice such companies, many other skills are needed, including designing skills, communication skills, and managerial skills. Younger employees, to speak in general terms, use technology in a functional manner, not touching what they can't use, and increasingly, they seem to take exploration and learning, discovering the world, into their own hands [VV06]. Organizational learning on the other hand still seems to be organized as a 'lonely learner' activity separated from the workplace. This can be said for traditional courses as well as for innovative e-learning courses. Collaboration is often meant to be part of e-learning courses, but it hardly really takes place in terms of collective learning.

The outcome of this individual way of learning often leads to storage of knowledge in companies' databases. This understanding of storing knowledge does not lead to lively shared knowledge which is always linked to people and context. In his book *Knowing Knowledge*, Siemens [Si06] discusses how knowledge is no longer a product, but rather a process of interaction and negotiation. Veen agrees on this line of thought and defines learning as the process of searching for meaning and knowledge as the process of communication about giving meaning to information (VV06). As a consequence, learning is a social process of negotiating references, and individuals learn by externalizing their knowledge sharing their input into the social network of peer learners, experts, and others that might be involved in the process. Collective learning explicitly aims at collaborative performance and innovative knowledge co-creation within a team. Most innovative ideas occur within the group of 'peer-learners'. In practice, this means that learners should be facilitated to communicate in organizations. Informal communication and activities within a group of people from diverse backgrounds, helps them to share knowledge and produce new knowledge relevant for business goals. Well-known examples of this kind of informal learning have been implemented at Google and Nokia. Younger employees are used to participate in society through networks, anticipating that different situations may require different roles and developing the competence to quickly switch between roles just as they switch between streams of information [VV06]. The innovative and creative nature of this team learning can be used strategically within organizations. This is the aim of the concept of Networked Learning.

To support Networked Learning the used technology plays an important role. Communication technology is changing rapidly and new tools offer new ways of interaction. Advanced technologies such as social software tools facilitate communication and collaboration as well as knowledge building and sharing. Communication within social networks is based on self-direction which also might enhance learning on the workplace. Our main hypothesis is that Networked Learning will enhance the employee's performance more effectively than traditional learning sequences.

Recent approaches [Go05; Si06; Ro06] define Networked Learning as a new way of learning. The focus of Networked Learning is on connectedness of people and artefacts in a network. The network exists through the help of technology which supports the integration of the delivery of knowledge on the one hand and the interaction, communication and application on the other. Networked Learning is today more evident because it finds its existence in explicit network structures, such as global networks like the Internet, the web [Si08], or collaborative group support systems which exist within certain organizations and companies. The other way around, the use of ICT, in particular the Internet is a basic prerequisite for Networked Learning. Unfortunately, it seems the use of ICT for learning in numerous companies is still in the first phase of substitution. E-learning as it appears in the corporate sector is providing printed matter in a digital format. E-learning materials stem from the printed stuff, the only difference is that the learner now have to switch his computer on in order to read it. It is focussed on individual learning by reading. In fact, it is hardly more than a computer-assisted form of traditional learning, mainly used for distance learning, as an overview shows [Da02].

In summary, Networked Learning is to be understood as a different way of learning which is different to ICT-supported ways of traditional learning. The focus of Networked Learning is on connectedness of people and artefacts in a network with the use of technology to integrate delivery of knowledge with interaction, communication and application. It is a way to find other experts and to share knowledge with them. In this understanding we want to use the following definition for Networked Learning:

> Networked Learning is learning through establishing and maintaining connections: between people, resources and technical systems, using tools which promote knowledge sharing and knowledge construction.

3 The Networked Learning Model

The project "Networked Learning for Life Long Learners" is an example for an attempt to develop new insights in the concept of Networked Learning as understood like the definition above shows. The aim of the project was to design a model for Networked Learning by combining the best of the existing definitions for it. On basis of this model an innovative tool to help employees to learn within social networks at their workplace was developed and experimented with.

The model itself is rooted on various existing educational theories and concepts. The theory of social constructivism is useful for a model of Networked Learning because it is based on the premise that, by reflecting on own experiences, and sharing these with others, learners construct their own understanding of the world they live in. Learning within this theory is considered as an active process in which learners construct new ideas based upon current and past knowledge [Br91]. The underlying idea of learning communities can also be found in the Activity theory. In its third generation it includes a network of interacting activity systems. The actor-network theory drives our attention to the point that social networks are almost always mediated technically by some form of material medium, for example the cyberspace as one of those. The learner is seen as an integral part of a network.

Those networks can also be seen as communities of practice. A community of practice is thus defined as a learning group in which new insights can be transformed into knowledge through mutual engagement around a joint enterprise [We98]. It gives some useful insights in the encouragement of change and learning and with this shows some implications for facilitating Networked Learning. Communities of practice imply the characteristics of situatedness, knowledge sharing and collective learning as well as the focus on practice, which are basic for Networked Learning. The engagement theory states that learners have to be engaged by several steps in order for effective learning to occur. These specific steps lead to creative, meaningful and authentic learning, which is the aim of Networked Learning, too. Technology in this way of understanding is seen as a facilitator for all aspects of engagement.

Networked Learning wants to address the challenges of organizational knowledge and transference. Thus the theory of connectivism [Si05] is very helpful to understand how decisions are made and how knowledge is acquired and shared. Knowledge that resides in databases needs to be connected to the right people in the right context in order to be classified as learning. In other words, it shows that information flow within an organization is an important element in organizational effectiveness. For the flow of information, trust is the needed utility, as is pointed out in the Theory of Trust. Different people have different roles in different networks. These roles have to be identified to become a trustful source or target for the flow of knowledge.

Besides the very briefly mentioned references to educational theories and concepts, the development strategy of the project of "Networked Learning for Life Long Learners" used the Corporate Learning Strategy Model (CLS model) [Vr05; Vr07]. This CLS model has been used and tested to develop technology enhanced learning solutions for the corporate world as well as for other institutions. It is a strategy framework for managing change on the level of organizational knowledge and learning and has been developed at the Faculty of Technology, Policy and Management at the Delft University of Technology. The CLS Model consists of three phases of development: a starting phase, a pilot phase and an integration phase (see figure 1). The model is based on the change-process approaches of Fullan [Fu2001] and of Rogers [Ro2003]. Fullan's contribution has its roots in the educational world. Rogers predominantly operated in the business world. In the project "Networked Learning for Life Long Learners" the CLS model is predominantly being used to develop the workflow for the project, which is shown in figure 1.
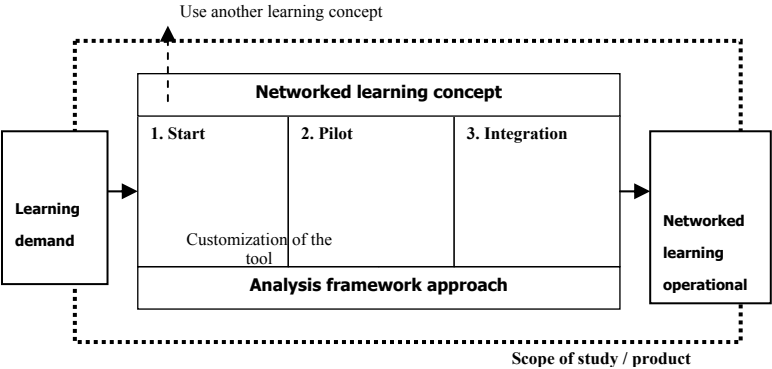

Figure 1: Workflow for the Development of Networked Learning

Another source of previous work being used in the Networked Learning project is the notion of changing demographics. Currently, the Baby Boom Generation (born 1940-1960) is starting to retire and the Net-generation (born 1990-2000) is steadily joining the work force. In general, the 'Homo Zappiens' is pre-skilled with computer proficiencies, at ease with multitasking, processing discontinued information, non-linear learning approaches, and highly networked [VV06]. They consider virtual worlds and virtual friends as an enriching extension of their physical existence. Profiling sites such as MySpace, Hyves, Facebook, PlaxoPulse, and Naymz are most familiar to them and are used for expression of self, communicate and share. Homo Zappiens has become part of a gift culture where sharing is winning. Slashdot.com is an example of a world-wide community where ICT professionals share information for their professional development. Companies could take advantage of this culture by supporting the way of knowledge gathering, selection, using resources and people alike.

This new labour force will rely heavily on technical and distributed social networks. Networked Learning refers to a context in which internet-based information and communication technologies are used to promote connections: between participants; between participants and experts; between a learning community and its learning resources, so that participants can extend and develop their understanding and capabilities in ways that are important to them, and over which they have significant control. These connections vary from face-to-face to distributed, across a variety of media, and with various degrees of time shifting. Crucial is the connectedness of participants.

The ingredients of the Networked Learning model can be seen in figure 2. There are four complementary areas that play an important role in knowledge development. Each of the elements that are connected to these areas is selected on the basis of their relevance for this development process in which the technology is a major facilitator for processes of communication, information retrieval and information sharing.

These areas are: Profiling, Connectedness, Knowledge and Business Development. 'Profiling' is the area describing a collection of social and organizational aspects of how individual employees function in an organization. It states that individual employees should take ownership of their professional development, ICT enabling them to do this through social software tools. 'Profiling' is the area of the Digital Me. 'Connectedness' stands for the connection between people and people and resources. It relates to social networks and the way interaction and human relations are relevant for people to perform in communities. These communities are fluent; you can take part for some time depending on the purpose of the community. Communities are based on peer references and are not limited to office hours. 'Connectedness' is the area of the Digital We. 'Knowledge' is the area that defines content and information in the Network Learning Model. This content is distributed and discontinuous, stored in databases. Learners have to aggregate bits and pieces (modules) into a meaningful whole. They do this collaboratively, sharing their expertise with others. 'Business Development' is the area that describes the major companies' business goals. These goals are the reference framework within learning takes place, it provides the organizational context.

Networked Learning is a way of learning that is work-related and mostly informal. Employees learn when needed, just-in-time, they are active seeking for solutions, hence producing new knowledge. These aspects of Networked Learning apply to many forms of learning, from novice training to expert learning.

The elements that constitute the Networked Learning Model are not new or innovative. It is the combination of the areas and the elements represented in this model that makes it innovative and different from the existing Computer Support Collaborative Learning approaches.
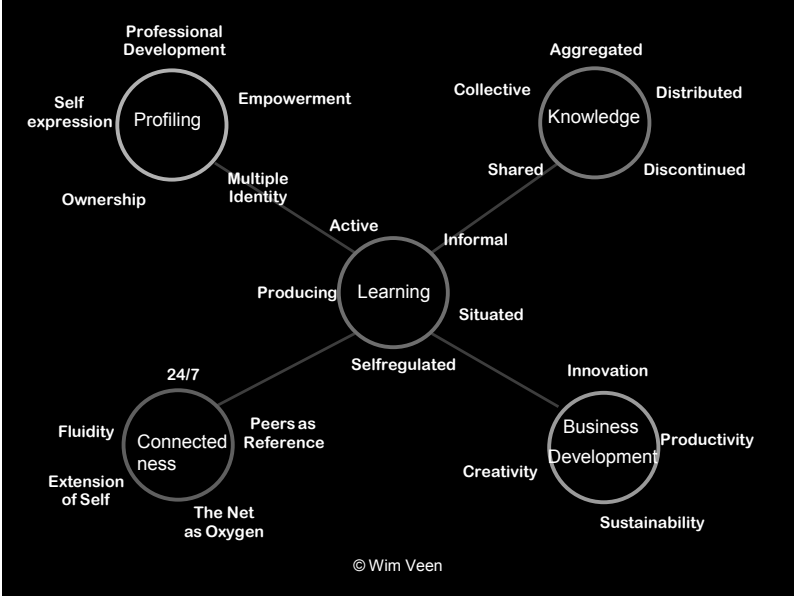

Figure 2: A Model for Networked Learning: enabling people to connect, share and co-create.

4 An innovative tool for Networked Learning: YUNO

The Model of Networked Learning has been worked out in a tool which has been implemented to support IBM employees to easily and efficiently find peers and resources, and to create communities for short or longer term purposes. It is based on the functional design of the Networked Learning Model as shown above. Not all functionalities that have been primarily designed could be implemented due to limitations of time and resources. It has been developed for IBM and was connected to the IBM infrastructure.

The Yuno tool consists of two major 'views', the 'search view' and the 'community view'. The search view helps to find people and resources alike, represented visually in the biggest window of the search view (see figure 3). The connection to the search engines supplies all sorts of information, which are categorized by the tool to allow for quick search not only for documents and other 'frozen' information, but also for experts, current projects, discussions and other sources that connect to the search topic. The tool accesses all relevant databases that are available for all IBM employees, including the IBM LDAP server. From the result of a search the user can drag and drop people and resources into a window which is to become a topic map or personal knowledge map. Users can publish their topic maps that are stored and retrievable for others.

Once a topic map has been published by the owner he can use the 'community view' of the tool for inviting colleagues to contribute and amend the topic map. Thus, this community suggests other relevant people to contact, other resources to refer to, and discuss possible solutions. The result of this social learning process is a better topic map that will be retrievable for all employees in the organization even after the original owner has left the company. In this respect topic maps are meant to function as a form of knowledge retention. The topic maps that are built up this way can be stored, shared and reused by any other community of interest. Each time the topic map is selected on a particular issue, it will be updated. Through this a repository of topic maps is designed.

To provide quick contact facilities among employees, the IBM tool Sametime 7.5 was integrated in the Yuno tool. By 'drag and drop' employees found by the Yuno tool, could be contacted easily. In fact, by adding persons to his contact list in Sametime 7.5 an individual employee is extending his social network within the company. This has been an explicit goal of the Yuno tool.
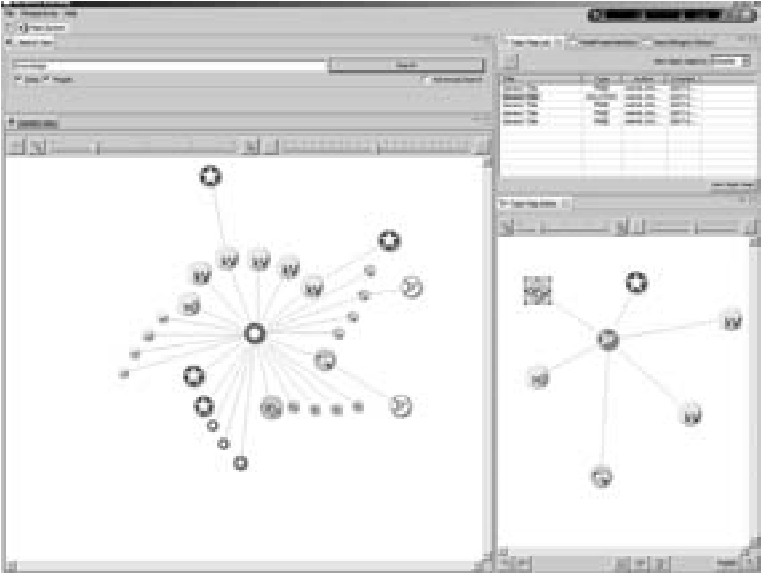

Figure 3: Screen shot of the Networked Learning tool

The tool has been tested by a selected group of employees at IBM. The Yuno tool has proven to function as a vehicle for the transfer of the Networked Learning concept onto the different organizational levels of IBM. Findings have been:

o   Yuno, qualified as a meta search and information rating engine, was considered a timely and refreshing application. This can be considered a good qualification from people who are IT-savvy and work with technological innovations on a daily basis.
o   Not all participants use the IBM databases or use engines outside the intranet environment. This certainly strengthen the performance of a Yuno tool, because these IBM databases contain huge amounts of information that now are accessed and used in an usable format, hence extending personal networks.
o   The search action patterns of most participants appear to be rather traditional. They rely on their contact base of face-to-face, my colleague and my old colleague and their cellphone strategy. These traditional strategies are hard to change and a tool such as Yuno, should provide quick wins and early successes to convince them to do things differently.

Next to these experiences, there were suggestions to improve the usability of the tool, like:

o   Add a search history
o   Adapt to the mainstream page layout and functionalities to shorten the learning curve.
o   Yuno is not easily transferable from one to another company network, because the tool has to be accommodated with the lay-out of the other network. Facilitate these transfers with supporting tools.
o   Yuno is about collaboration, information exchange and retrieval and needs a business case to allow integration relative to the existing services.

The pilot was not successful from the perspective of developing measurable innovation, which was obviously a too ambitious goal for the project setting. It did though contribute to the understanding of the Networked Learning concept and the acceptance of this concept by the IBM employees as a good basis for collaboration and innovation in the field of life long learning in daily practice. This result could never have been achieved by the Networked Learning Model alone.

5 Conclusion and further work

The tool which was developed based on the Networked Learning Model described above provides a structured way to collective learning. It is a challenge to find knowledge linked both to persons and to situations and allows capturing part of reality in a framework in order to reduce the complexity and allow closer examination.

The concept maps made with help of the tool can be used companywide to be applied to new projects or upcoming problems. The Yuno tool supports the behaviour of peer-learning which is a familiar way of knowledge building for the younger generation of workers. It includes their preference for images and symbols as an enrichment of plain text, their seemingly effortless adoption of technology and their cooperation and sharing in networks.

In summary, we can consider the Networked Learning Model as a useful strategy for dealing with the large amounts of information available in knowledge intensive companies. It is an answer to the challenges of informal, goal oriented learning on the workplace. Further work is now to be done on the evaluation of the learning model and the tool. The tool can be transferred to other companies to lead to an innovative product for the learning market which combines human intervention, tools and resources. It has been built for a worldwide knowledge intensive company, but can be also useful for any other business where many experts work together in a network. It can also be used by associations of companies to get to know about the knowledge and the resources of each other. They just have to take over a networked perspective as shown in this article.

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