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Hybrid professional learning networks for knowledge workers: educational theory inspiring new practices

Abstract

Knowledge workers need to acquire new knowledge and competences at an ever-increasing pace due to the fast changes in today's knowledge society.. In addition, new (online) technologies revolutionise the way we communicate, learn and work. They trigger structural changes in the context and nature of professional work.

For knowledge workers such as journalists, librarians or product designers it is not only the tools they work with that change. Structural changes also affect the core of their profession, as ubiquitous information, delivered via new media, is readily available any time any place. Traditional professional learning cannot cope with these changes. Hence, new ways of professional learning are needed.

The question we need to answer is how to address the specific learning needs of knowledge professionals. Experience shows that these needs are not sufficiently met by existing learning technologies, neither by institutional (virtual) managed learning environments (MLE) nor by web2.0 based personal environments (PLE). Both approaches have crucial shortcomings for the highly contextualized teamwork of knowledge professionals. Hence this paper introduces the concept of hybrid professional learning networks as combining the best of both worlds, by offering manageable open flexibility and connectivity as well as the safety and control that matches the professional knowledge workers' needs.

1. Introduction.

In this introduction, we situate our research and development work by defining the major concepts we will deal with and we introduce the focus of our study. In the second paragraph we expand on technological systems that are currently used to support professional learning. In the third section we introduce the concept of hybrid professional learning networks as a way to combine the strengths of existing learning support systems. We conclude by briefly outlining future lines of research.

1.1. Continuous professional learning

In this paper we discuss situations of (continuous) professional learning (PL). Interestingly enough, a search of official educational thesauri by Verjans (2010) reveals that the term 'professional learning' does not occur in thesauri such as the VOCED thesaurus (NCVER 2008) or the ETT (CEDEFOP 2007). We conceive professional learning (PL) as different from professional development (PD). A recent literature review (Webster-Wright 2009) shows that whereas the term PD is mainly related to knowledge that is 'delivered' to professionals by 'experts' in programs, the term PL more often refers to learning activities initiated and performed by the learner. We define (continuous) professional learning as learning initiated and performed by individuals in relation to their professional, i.e. work-related, activities. In our definition, professional learning is not limited to a specific time or place, i.e. it can happen in preparation of, during, or after professional activities, and it is not limited to a single location, i.e. it can take place in the workplace, at home, during a conference or training session. "Professionals learn, in a way that shapes their practice, from

a diverse range of activities, from formal PD programs, through interaction with work colleagues, to experiences outside work, in differing combinations and permutations of experiences." (Webster-Wright 2009, 705) This definition of continuous professional learning therefore encompasses aspects of community-based learning, workplace learning and professional education. (Brown & Duguid, 2000)

1.2.   Knowledge worker

Interestingly enough, the term 'knowledge worker' has no officially agreed definition either (Brinkley et al. 2009). The term is said to be coined by Peter Drucker (1957), and is commonly defined in dictionaries as "someone who works for an organization who is valuable to it because of the knowledge and ideas that they have" (knowledge worker, n.d.) Following Thomas Davenport (Hammer, Leonard & Davenport, 2004) we will use the term to refer to people "with high levels of education and expertise whose primary task is the creation, distribution or application of knowledge" and who use their knowledge for the benefit of the organisation of which they are a member. In our current knowledge society, the speed at which information and knowledge increase is astounding. In 2003 it was estimated that the amount of information created doubles every three years (Lyman & Varian 2003), which implies that knowledge workers continuously need to update their knowledge and skills to cope with their fast-changing environment (Bitter-Rijpkema et al. 2006).

1.3.   Networked learning

The increasing speed of information and knowledge creation has important implications for the professional learning of knowledge workers, which traditionally consisted of knowledge sharing through courses, training sessions or workshops. New - complementary - ways of learning are now needed, partly because the developers and providers of traditional professional learning materials and activities can not cope with the speed at which relevant knowledge changes. Moreover, due to the large amount of relevant knowledge and the need for in depth specialisation within a professional domain, a single person can no longer act as 'the' expert within that domain. Notions such as distributed expertise (Brown et al. 1993, Pillay & McCrindle 2005) or distributed cognition (e.g. Hutchins 1996, Salomon 1993) have been suggested to capture the concept of professional knowledge and expertise as distributed across multiple people, artefacts, communities and organisations. When performing complex tasks, individual knowledge workers need access to other professionals and/or resources within their domain in order to increase their own level of knowledge. Previously, such expert-to-peer and peer-to-peer networked learning arrangements were limited to face-to-face workshops, colloquia or training sessions. Nowadays, such professional networked learning arrangements - often referred to as Communities of Practice or CoPs (Amin & Roberts 2008; Buffum & Hinman 2006; Lave & Wenger 1991; Hildreth & Kimble 2004; Minna et al 2009) - are becoming more and more virtual in nature, as they make increasing use of online collaboration technologies. The typical nature of (online) CoPs is that they are often fairly closed, members-only type organisations that tend to focus on sharing (external) knowledge internally in the community (Amin & Roberts 2008). In this article, we define networked learning as "learning in which [ICT] is used to promote connections: between one learner and other learners, between learners and tutors; between a learning community and its learning resources." (Jones & Steeples 2002, p. 2) Networked learning is based on the assumption that learning mostly happens within individuals: by making connections, learners increase their own knowledge.

1.4. Connectivist learning

An extreme conceptualisation of networked professional learning is voiced in the tenets of connectivist learning (Siemens 2005; Downes 2005), a fairly recent learning theory. Siemens (2005) states that "Chaos is a new reality for knowledge workers" and quotes Karen Stephenson as saying: "Experience has long been considered the best teacher of knowledge. Since we cannot experience everything, other people's experiences, and hence other people, become the surrogate for knowledge. 'I store my knowledge in my friends' is an axiom for collecting knowledge through collecting people (undated)." Connectivist learning centres on the concept of a network of nodes (individuals, but also information, data, images, etc.) and the connections between the nodes, which can differ in strength. Learning is the process of creating connections and developing a network, thereby making use of the expanding online network of information and connections. Connectivism also impact on the design of learning environments (Siemens 2005). The Internet-savvy knowledge workers have been quick to build their PLE or personal learning environment (Wilson, 2005), making combined use of institutionally-managed learning environments, publically available web-based sources and tools and online social networks to meet their learning needs (Attwell 2007; Downes 2005; Johnson & Liber 2008). An integral part of such a PLE are the people that the learner interacts with, and derives knowledge from within his/her personal learning network (PLN). A main assumption within the connectivist learning theory is that people not only 'consume' knowledge, but also share their knowledge as much as possible.

1.5. The issue: how to design a collaborative professional learning network that combines the best of both worlds?

The issue that we elaborate on in this paper is the following: Given a geographically and organisationally distributed group of knowledge workers within one knowledge domain, how does one proceed when commissioned to design and develop a suitable professional learning environment? Especially when such a learning environment has to be sustainable and extendable, yet dependable and manageable, and open and private at the same time? How to combine (a) support for closed communities with a high need for trust and personal security with (b) support for open and public sharing and connections to existing networks and online social network sites?

2. Supporting the specific learning needs of knowledge professionals.

Today's knowledge revolution causes structural shifts for all learners. The effects of 24/7 connectivity and the increasing power and variety of Web2.0 tools are astounding: they are fostering new forms of interactivity, information access, awareness of active peers, knowledge representation and processing. New opportunities for learning present themselves, but these opportunities require new strategies to ensure effective and productive learning. Moreover, the way in which these changing conditions affect learning needs differ quite substantially for various groups of learners.

Our concern here is to find optimal support for the continuous professional learning of knowledge workers taking into account their learning objectives and context, their work rhythm and existing learning patterns. It is about defining learning methods that match the professionals' specific learning situation: aimed at collective performance coping with the aspects of continuous change: changing contexts of work, changing ambitions and changing technological possibilities.

In this paragraph we try to determine which aspects of the professional learning situation are so special that they warrant specific support strategies and tools. The characteristics of the professional learning situation will provide us with arguments for why the autonomous use of a PLE or private combinations of sophisticated 2.0 tools in their current forms is deemed insufficient, but also for why full fledged, functionality rich managed learning environments or MLEs seem to fall short in accommodating precisely these professionals' learning needs.

2.1.   Characteristics of professional work based learning.

Due to the growing complexity of work, specialist have to collaborate and combine their knowledge to come up with new solutions for customer demands or societal issues. Thus professional learning occurs primarily on the job in connection with fellow professionals whether at the same office or distributed across locations and organizations.

As Billett, Boud & Middleton and others (Billett 2001; Boud & Middleton 2003; Bitter-Rijpkema, Sloep & Janssen 2006; Koper 2009; Sloep 2009) have observed, learning is an integral part of a job. Professional learning is strongly focused on the envisaged performance goals of a professional, and it is not something separate or special. Professional learning aims at specific outcomes, and for professionals these outcomes often require inventive problem solving rather than the application of known procedures. Moreover, professional learning often takes place under high time pressure, which has given rise to the term 'just-in-time learning'. Contrary to traditional formats of vocational or professional training, professional learning can seldom be specified beforehand. Knowledge gaps and learning needs are often identified 'on the fly' at some stage in the ongoing work process.

As a consequence, determining appropriate strategies for professional learning at work becomes a matter of finding learning methods that fit the specific performance objectives and learning context (Bitter-Rijpkema, Sloep & Janssen 2006; Jacobs 2009). These strategies include (a) finding the right people, (b) generating necessary knowledge, (c) acquiring the necessary information or capabilities, (d) assessing their quality and appropriateness for the task at hand and (e) applying or transforming knowledge to the task at hand (Berlanga et al 2009; Billett 2001).

The fact that learning and performance occur in parallel means that professionals are looking for learning options that can be integrated with their work. (Billett 2001; Eraut 2007; Van der Klink & Streumer 2006). As a result, professionals continuously want to assess whether what they learn is transferable to their work. Moreover, this process in incremental, because once a project or issue has been solved, new ambitions and issues arise and learning needs change.

By way of summary, we can list the following relevant characteristics of professional learning. Firstly, professional learning needs tend to emerge very much ad hoc during work activities. Secondly, professional learning is an ongoing process, an integral part of work performance. Thirdly, learning strategies and outcomes need to be relevant to work performance. Finally, at the end of a specific project (i.e learning journey) former learning targets become obsolete and attention shifts towards new learning objectives. Thus learning takes place in an iterative and incremental process, with ad hoc starting and ending points, depending on the orientation and dynamics of the ongoing project and actual "flow" of work. As Siemens (2005) puts it: "[…] decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical."

2.2. Exploring 2.0 PLE self-serviced learning for professional learning at work.

In paragraph 1.4 above we mentioned how the Internet-savvy knowledge workers have found ways of combining an array of powerful Web2.0 tools and of adapting and combining them for individual use. Thus, professionals can develop their own personal learning environment or PLE, tailored to their individual learning style, work rhythm and environment. Each individual is able to compose, via mash-up tools like Netvibes[1], his or her personal environment, neatly fitting the person's preferred style of on-line interactivity. Through an on-line home base such as Netvibes one can connect to communities, discussion forums, social networking sites, repositories, newsfeeds, etc. to share interests, discuss and exchange knowledge, etcetera. Learning through a PLE is most often restricted to informal learning, from the discussions people share in communities, from the result of their searches and queries, from the feedback on their questions and vicariously via web or twitter contacts. In essence, personal learning environments are organized around the individual person, his/her individual focus or broad orientation, and the person's fluid, ad hoc and more structural needs and questions. The issue in our discussion is whether these PLE's – with their strong focus on the individual – can adequately respond to the particular learning needs of professional teams or communities that work together on solving larger-scale problems, especially when these problems are related to confidential issues or matters of trust.

Quintessentially, the quality of a PLE is related to the quality and relevance of the nodes in one's personal learning network (PLN) and the strength of the connections within the network. Say, for instance, that a knowledge worker is using web2.0 tools to search for information and ideas in a domain that is only distantly related to his/her own. If that worker is member of a fairly heterogeneous network chances are that (s)he may find the persons or resources with relevant knowledge or expertise. If that worker is a member of a homogeneous network limited to his/her own professional domain, it might take quite some time or effort to come to the conclusion that the necessary expertise is not to be found in his/her personal network or that the available information doesn't fit the problem at hand.

Use of a PLE for professional learning assumes that individuals have a good understanding of their own knowledge-ability, and that they can effectively apply the relevant learning strategies. Available web2.0 and semantic web technologies are powerful tools for learning, but users require new competencies to appropriate the learning capabilities of the tools and integrate the tools in their learning strategies (Minna et al. 2009). Moreover, in a team situation the success of the learning process depends on how these personal learning strategies come together in the team process and contributes to the collective performance.

The latter is especially important since professional work is essentially becoming teamwork in which individual specialists need to integrate their expertise to come up with effective and efficient solutions. The strength of a PLE lies in its optimal fit for the individual owner. Its prime objective is not to synchronize with others or to collaborate with others to find common ground. Personalisation and the flexible integration of functions focus on the individual user and not on the individual as a team member. Team awareness and collaboration are not at the heart of a PLE.

Moreover, comments from colleagues, clients and workshop participants show that PLEs are often perceived as unsafe collaboration environments, due to their heavy reliance on cloud-based applications and platforms. In previous professional learning projects at our institution

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[1] http://www.netvibes.com/

we have found that people often formulate the need for a safe environment, where they can freely express immature ideas or remarks of a sensitive nature in closed communities, to which their colleagues or bosses do not have access. Trust is a vital ingredient in (virtual) collaborative communities, and therefore issues of access control, privacy, trust, safety and security are deemed critical for the eventual success of a collaborative professional learning environment (Rusman et al 2009).

For all the reasons mentioned above we have to conclude that using PLEs in professional learning of knowledge workers is suboptimal for providing learning support on the key dimensions relevant for these professionals. In the next paragraph we will evaluate whether managed learning environments are a better match for the learning support needs of the professional knowledge workers.

2.3.   Possibilities of MLEs for professional learning at work.

Through the years, a number of managed learning environments (MLEs) have been developed for higher (university) education (Becta, 2003; Wasson 2007; Weller, 2007) and for well defined professional computer based training purposes (Wilson 2005). In the design and development of these MLEs, learning theories have been taken into account (Dillenbourg & Tchounikine 2007; Mina et al 2009; Muukkonen et al. 2005), and learning and content management standards and platforms have been defined (Koper 2009) and implemented. MLEs provide learning platforms that combine multiple functionalities in an integrated way. They are often characterised by rigid access rules, are structured according to classes or topics, and leave little control to the user. They are usually managed and controlled by an (educational) institution, and have an internal scope, i.e. they seldom refer to 'the world outside the institution'.

Evaluations of the experiences with these MLEs have been mostly limited to well defined educational settings, where the learning curriculum is explicit and learning objectives are clear and predefined. MLEs function primarily in education with cohort based groups of learners, working in rather homogeneous groups, studying the same subject, with similar prior knowledge etc. The learning path is well defined and optimized by the tutor, including the type of outcomes predicted. In short, these MLEs manage learning support very well for known groups, learning conditions and guides the learners via predefined learning paths. Exactly the qualities that make MLEs useful for use in formal education restrict their use for professional learning of knowledge workers.

MLEs have also been used in professional learning situations, but these situations were also characterised by a rather formal setup, with pre-defined scripts to optimize inquiry, information finding, collaborative learning, etc. (Harasim 1995; Bitter-Rijpkema, Sloep & Janssen 2006). However, as argued above, the professional learning context of knowledge workers can not be adequately supported by pre-defined scripts, as that context is often characterised by unpredictability and change.

So the learning support options offered MLEs are only suited for those activities within professional learning that can either be pre-structured, consist of a limited number of well-defined alternatives, or need well-structured communication, discussion and sharing spaces. MLEs are not suited for unpredictable learning situations in ongoing work, for just-in-time learning, or for work that involves a great deal of external knowledge or people.

In the next paragraph we will suggest the concept of hybrid professional learning as a potential solution to the professional learning requirements of knowledge workers.

3. Theoretical heuristics guiding the design of hybrid learning networks for professional learning.

In recent months, the authors have been involved in design and development of projects commissioned by professional organisations in the public domain, such as the public library and social service organisations. These organisations have observed that their professionals need to be able to collaboratively learn on the job. Experiences with conventional seminar or web-based training have not led to sufficient knowledge transfer nor to the necessary knowledge creation and exchange in cross-border professional teams working in the same field. Consequently, their question was how to address the challenge of effectively supporting non-formal learning of these knowledge workers in parallel with and preferably integrated in their daily (problem solving) activities together with peers from other organisations, in short learning situations which Webster-Wright (2009) labelled 'authentic continuous professional learning'. In essence, our task is to develop modern communities of practice, knowledge networks or digital habitats (Wenger, White & Smith, 2009), making optimal use of current learning technologies and learning support strategies. We are currently in the development and testing stages of these projects.

The basis of the solution that we are working on builds on the work of Koper (2009), Sloep (2009) and colleagues. The underlying idea of their work on learning networks and learning communities is that individual learning takes place in a social context. Learning support for professionals however has to allow maximal flexibility to match the dynamics of organisational teamwork concurrently coping with the individual's autonomy on the one hand and structured support for collaboration and team learning on the other hand (Webster-Wright 2009).

This balance between structure and freedom or accountability and agency (Borko et al. 2007) distinguishes hybrid professional learning networks (HPLN) from PLEs and MLEs. The learning design in our projects focuses on triggering the emergence of learning communities capable of supporting the knowledge worker's (learning) objectives for their task at hand.

Various researchers have investigated which circumstances are helpful and which pedagogical interventions trigger social interactions and learning amongst a learning community's participants (Sloep 2009; Berlanga et al. 2009; Mandell et al 2009) or to make better use of the collective knowledge that emerges in these working environments. Recent research (Berlanga et al. 2009) suggests critical issues to take into account and pedagogical strategies to trigger learning in these communities. (Sie, Bitter-Rijpkema & Sloep, .2009) These suggestions have been tested in a prototypical setup with users and now serve as the basis of the design of real life learning networks for knowledge professionals in public services.

Some of these suggestions are: firstly, to offer community members self management, i.e. functionalities to create their own profile, contacts, etcetera by which they can decide on how to profile and position themselves in this work community; secondly, to offer affordances that permit users self organization as community members and as a team, so that the members themselves have options to configure and organise interaction, to comment, recommend, search and rate and combine this with possibilities of autonomous knowledge categorisation, enabling professionals to decide on methods to classify and evaluate contributions. Last but not least, it is very important - especially for professional learning communities - that community members themselves can regulate access to their professional learning, and thus have control over their decisions regarding private, limited or public activities or knowledge (Berlanga et al. 2009; Wigman, Hermans & Verjans 2009). The learning environment in

which these communities emerge need to support a high degree of flexibility as to the nature of each learning community.

Finally, the current design builds on the benefits of PLEs in the sense that users can choose to automatically publish their knowledge to their personal learning environments, can make use of online services such as social bookmarking, and/or integrate external knowledge feeds in their learning community (Hermans & Verjans 2009).

The resulting hybrid personal learning network infrastructure will provide a portal-like online environment, hosted and managed by their own organisation or by a trusted partner, an environment in which the user has maximal control. The more MLE-oriented network members can setup communities and groups and decide who gets access to these groups, both internal and external. They can then use these closed or semi-open communities to develop and share knowledge, which they can later open up to the public or a wider community if they choose to. When information becomes publicly available it can then be syndicated on external (personal) learning networks through RSS-feeds. PLE-oriented members – on the other hand - can continue using their PLE, and choose to provide the organisational MLE with - filtered or unfiltered - RSS-feeds from their personal environments. An early prototype of such a HPLN was used during the online course on Connectivism and Connected Knowledge '09 (Siemens 2009). During this course the more MLE-oriented participants could enrol and participate in a closed learning environment (Moodle), web conferences (Elluminate) and receive a daily mail update, whereas the PLE-oriented participant could go on using his PLE. In order to get their contributions from their PLE into the course discussion, these participants could tag them with an agreed-upon tag, and inform the organisers about his RSS-feeds, so that their input could be aggregated and fed into the closed environment.

4.   Conclusions and future research.

In this exposé we observed that today's professional learning requirements of knowledge workers aren't completely met by existing learning technologies, neither by institutional MLEs or web2.0-based PLEs. We concluded that we need to combine the strengths of both types of learning support. We need some of the safety, access control and predictable structure of an MLE combined with the personalisation, openness and flexibility offered by PLEs to fully accommodate the learning needs and constraints of knowledge workers.

We introduced the concept of hybrid professional learning networks (HPLN) as an option to address the professional learning requirements of knowledge workers. Firstly, HPLNs support the building of an online learning network as a social network. Secondly, they can be designed to optimize learning, to support the continuously changing learning needs in the real life practices of (working) professionals, since they do not link to predefined structures, which would limit their flexibility. HPLNs are environments that afford self-expression and self-organisation of the participants according to their wishes. And they need to present supportive recommendations and collaborative guidance suggesting appropriate learning strategies based on sound scientific heuristics.

The next steps are to further implement and evaluate the prototypical HPLN for our public service, building on the positive feedback on our first prototype. Multiple case evaluation of such hybrid networks in different contexts will have to show which learning effects are generated and how can these be interpreted. These evaluations can then be fed back into the theory building process.

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