

## Educational Innovation with Learning Networks: some pertinent tools and developments

Peter B. Sloep<sup>1</sup>, Adriana J. Berlanga<sup>1</sup>, Wolfgang Greller<sup>1</sup>, Slavi Stoyanov<sup>1</sup>,  
Symeon Retalis<sup>2</sup>, Marcel van der Klink<sup>1</sup>, Jan Hensgens<sup>3</sup>

<sup>1</sup> Open Universiteit Nederland

{[peter.sloep](mailto:peter.sloep@ou.nl), [adriana.berlanga](mailto:adriana.berlanga@ou.nl), [wolfgang.greller](mailto:wolfgang.greller@ou.nl),  
[slavi.stoyanov](mailto:slavi.stoyanov@ou.nl), [marcel.vanderklink](mailto:marcel.vanderklink@ou.nl)}@ou.nl

<sup>2</sup> University of Piraeus, [retal@softlab.ntua.gr](mailto:retal@softlab.ntua.gr)

<sup>3</sup> Aurus KTS, [j.hensgens@aurus.nl](mailto:j.hensgens@aurus.nl)

**Abstract.** Professional Development is ill served by traditional ways of learning. It can profit from a Learning Networks approach, which emphasizes logistic, content and didactic flexibility. Three European projects are discussed – idSpace, LTfLL, Handover - which have developed tools befitting networked learning. Each in its own way, the projects illustrate the benefits of a networked learning approach.

**Keywords:** Learning Network, Professional Development, Handover, idSpace, LTfLL, creativity, language technologies, innovation

### 1 Introduction

In the present day and age professionals cannot afford to stop learning after their graduation, they should continue to learn incessantly throughout their professional lives. This is not a new observation, it has been made by many people [1]. However, it is not easy to unpack all that it implies. At first sight, it seems plausible to rely on the educational establishment for this - schools, colleges and universities. However, a moment's reflection reveals that one cannot just expect the rigid structures that they represent to exercise sufficient flexibility.

First, learning professionals need *logistic flexibility* that allows them to learn wherever and whenever they want as well as to take charge of their own learning. Second, they not so much need set degree programmes, but rather agile learning opportunities. These should address their specific problem at exactly the right depth (level complexity) and to exactly the right extent (size); they should also be offered in ways that are commensurate with their preferred learning modes. This is *content flexibility*. Third, the metaphor of knowledge transfer between someone who is in the know (a teacher) and others who are clean slates (the students) is inapt. Professionals are all experts in some way, be it all on slightly different topics and to differing degrees. So they alternate between the role of teacher (guide, advisor) and learner (student, train-

ee), depending on what the topic is and who asks. This is *didactic flexibility*, the ability to see learning as a social process of knowledge creation and exchange.

This list of demands shows why traditional forms of learning with one-hour lectures at weekly intervals do not work for professional learning. There is limited logistic flexibility as the institutional calendar dictates the students' calendar, rather than the other way around. There is no content flexibility as learning opportunities are packed in lectures, courses and curricula. And finally, there is no didactic flexibility because teacher and learner are not roles but occupations. It is our conviction that we should not start with educational institutions as we know them and wonder how we can make them fit the demands of modern-day professionals. Rather, we should develop - conceptually first, practically later - a novel learning environment that does suit professional development. This learning environment we have called a *Learning Network*, learning with it we refer to as *networked learning* [2].

In a Learning Network, learning takes place by accessing relevant resources. These are primarily the Learning Network's participants themselves, who act as sources of expertise. They then adopt a teaching role and direct fellow participants to (online) artefacts - presentations, videos, blogs, news feeds, shared bookmarks - relevant communities they participate in, or other experts they know. However, they may also act as providers of various kinds of support - as learning coaches, mentors, critical friends. Importantly, the potential of networked learning lies in exploring the weak links between its participants. They are the as yet unknown sources of new knowledge and support. Being only weakly linked to each other, learners do not know whom to contact for what. Broadcasting request for help to the entire Network of course would rapidly clog up communication. So participants need to receive requests for expertise and support that fit their profile, and recommendations that fit their requests [3].

This is achieved by equipping the Learning Network with a variety of request-and-recommend tools. To the extent that these tools function adequately the Network's continued viability is guaranteed. Many of these tools are similar to what existing social network sites offer in the way of social media. However, standard social media typically leave something to be desired when it comes to their supporting learning (knowledge sharing and creation) functions. These tools are unique to networked learning and therefore need to be developed specifically. Thus, tools are needed that help some participant find fellow participants in the Network who can honour requests for expertise or support; that help participants find fellow participants who would be suitable to jointly form a topical community; that help participants find artefactual resources and perhaps concatenate them in sensible ways.

## **2 The Projects**

Below we discuss three projects that each in its own specific way addresses aspects of networked learning. idSpace <[www.idspace-project.org](http://www.idspace-project.org)> assumes the existence of a community of innovators, for which it has built an online platform that allows them to share and ultimately create knowledge. LTfLL <[www.ltfll-project.org](http://www.ltfll-project.org)> also takes a tooling perspective. The starting point is the availability of texts that are online accessible for analysis. Networked learners are then given targeted advice on how to proceed in their learning efforts. Handover <[www.handover.eu](http://www.handover.eu)>, finally, is about 'hand-

ing over' patients in hospitals. Such processes may be optimized through staff training. It is at the level of sharing knowledge about how best to do so (a meta-perspective) that the networked learning approach bears fruit in this project.

## **2.1 idSpace: Tooling of and training for collaborative, distributed product innovation**

Inventing and designing novel products or services requires collective creative performance, i.e. creative action in combination with collaboration. Creativity is being seen as a "universal attribute, suggesting a need for greater creativity in order to both survive as well as thrive in the twenty-first century" [4]. Over 90 creativity techniques - such as TRIZ, SCAMPER, Six Hats- have been created in order to encourage people's original thoughts and divergent thinking. These techniques try to steer thought processes and help the individual and group to find a structured approach to answer questions, to see problems in their entirety, to generate new ideas, and to arrive faster at better decisions.

Fostering creativity is increasingly seen as a key direction and focus for pedagogic approaches. While individual factors and initiative were important to creativity, social environments made the difference [5]. According to [6], individual creativity can be mediated by the group and can be supported by the social environment. Collaborative creativity requires: (i) the generation of new perspectives, (ii) the articulation of as yet 'tacit' knowledge, (iii) finding common ground, (iv) learning from each other, (v) evaluation of ideas, and (vi) collaborative 'construction' of new propositions.

Existing systems that aim to support collaborative creativity processes are mere concept mapping or groupware tools. Usually, they offer real-time cooperation through text chat or a shared workspace. The idSpace project sought to develop a web-based platform that would allow a distributed team of innovators to elaborate on existing ideas, to create and preserve new ideas, and to learn about them. The platform employs techniques for exploring new ideas and refining existing ones. It contains tools to support traceability among stories, mind maps, concept maps, goals, new product features, as well as company values and policies. Finally, it also preserves semantic relationships among the different viewpoints for later exploration, retrieval, and navigation purposes. Importantly, the platform goes beyond mere communication and collaboration support in that it offers pedagogical guidance to its users throughout the creative process and elaboration on that process. Learning scenarios guide the use of the available creativity strategies, leading users to an effective and efficient session of creation and innovation.

Extensive evaluation studies were performed with the overall aim to analyse the usability and viability of the idSpace platform as a tool. Specific attention was paid to the platform's ability to support actively in a context-aware manner the creation of new ideas, as well as the elaboration (representation, storage and management) of ideas.

## **2.2 LTfLL: Language Technologies for Lifelong Learning**

The LTfLL project developed a set of loosely coupled, innovative tools that intend to improve the understanding and analysis of learners' textual artefacts, narrative and

conversational, using language technologies. They were built around specific pedagogic problem statements that relate to contemporary approaches in technology-enhanced, teaching and learning. With the inclusion of Learning Networks in the form of content and people, LTfLL acknowledges that social media are part of learning, together with the knowledge and resources generated by these networks.

The design of the LTfLL tools has been guided by a scenario based design methodology that includes the use of pedagogically sound scenarios that steer the theoretical underpinnings and design requirements of the proposed service. The tools have been validated to have a positive impact on reflective student practice in that they allow learners on-demand feedback during narrative or dialogistic learning processes, even without any tutor involvement. Feedback from LTfLL is of an advisory nature in order to support independent learners in their respective tasks and to allow intervention to be targeted in a suitable way. The tools cover three specific areas of application:

(1) *Positioning*: The automated analysis of covered and missing concepts in the positioning tools, not only helps learners to reflect on their domain coverage, but, in combination with the resource discovery tools (see below), they can be directly referred to valuable related learning objects.

(2) *Dialogue analysis*: Multi-user chats carry a high cognitive load. LTfLL developed a specific polyphonic method for analysing the discourse in collaborative online conversations with multiple participants (chat, forum). It is based on the observation of parallel intertwined discussion threads and considers implicit links that correspond to voices (in a metaphorical sense) being inherent between utterances. The tool returns feedback regarding concept coverage and user interactions on three levels: the entire discussion, for each participant, and for each utterance, in order to fit every user's needs and to provide a top-down analysis of the received system response.

(3) *Resource discovery*: The social resource discovery service is a multi-faceted search service that crawls and harvests a user's social network for relevant learning resources. The service relates resources and actors to each other and to a selected domain ontology in order to create semantic relationships. To achieve this, a methodology for iterative ontology enrichment from social media sources was developed. This allows enriching an existing (formal) domain ontology with additional concepts and lexicalisations used by a community of practice represented through social media. As a result, the service allows learners to get an overview of the domain.

The tools have been validated to the extent that they lower the cognitive load, they raise the quality of educational production through live feedback, and, last but not least, they increase motivation for self-directed learning.

### **2.3 Handover: A Novel Patient Handover Processes in Europe**

The overall objective of the Handover project is to optimise the continuum of clinical care. Handover does so by identifying the barriers and facilitators to effective handover and by creating safe and effective practices. For this, the project creates generic tools and training. In short, Handover focuses on continuity of care both at a patient's referral to hospital by a primary care specialist and at a patient's discharge from the hospital. Thereto, the project developed intervention training packages, e-learning modules which should (a) offer new knowledge and tools about handover; (b) share

this knowledge and tools with a wider audience of key users; (c) and provide opportunities for training customization.

To fulfil these requirements the idea of Learning Networks was adopted. The Handover Toolbox (HTB) is a learning environment that provides logistic, didactic and social affordances for supporting networked learning on handover. HTB offers tools and supportive information about the design of training, skills, knowledge, attitude, protocols, and checklists, empowerment of patient, external and organisational factors, methods of training, evaluation of training, and use and dissemination of the toolbox. For each topic there is a small community of practice. A member of the HTB can join several of them. Members of the HTB can not only find the information and tools they need to design effective training in handover, but they may also share and discuss information with peers, search for and find expertise on particular topics, rate and annotate tools and information, and create an own group if they want to. In addition, The HTB allows co-creation: members can not only find and share already available tools and information, but they can also adapt existing tools to better fit the conditions of the training, or even create original tools; i.e. in stead of the standardised protocol, the members of a community may create a new one.

The design of HTB used the idea of a Learning Network, but this concept was not imposed. It was rather grounded in and a result of the design approach we applied, which comprised design methods such as: literature review and search for best practices in handover, interviews with training specialists in health care, definition of personas, group concept mapping, software walkthrough, and a questionnaire.

The evaluation of the tools was not considered a separate phase of the software engineering cycle of the HTB. Rather, the evaluation activities, cut across the stages of conceptual design, functional design, development and implementation.

## **4 Discussion and conclusions**

As indicated, thinking about professional development and training in terms of networked learning, in terms of collaborating and connecting online through social media, existing and purpose built, amounts to taking a non-conventional perspective on learning. The projects discussed only highlight some specific instantiations of such a perspective. However, they do illustrate the benefits and viability of honouring the demands for flexibility discussed in the introduction.

All three projects profit immensely from the logistic flexibility that a networked approach affords. It allows people to learn from each other and share knowledge when and where it suits them best, be it with the intent to innovate, merely to learn on their own with social support from others, or to improve handover processes. Content flexibility is crucial to all three. The networked approach at least in principle allows for the delivery of customised content, be it through artefacts or people. In idSpace, the people are an obvious resource (which is why innovation teams need to be heterogeneous), but so will be in due time the stock of past projects that the platform has stored. LTfLL, being mainly tool oriented, is agnostic to this kind of flexibility, although its tools will be highly instrumental in providing it. Handover, finally, is similar to idSpace in that it creates a close-knit community that will provide mutual support. Training materials by their mere availability, of course, provide content.

Flexibility is incorporated in their design, which can subsequently be enhanced by allowing for user modifications.

Didactic flexibility is guaranteed by the very adoption of a networked learning perspective, by emphasising the social dimension of knowledge sharing and creation. This kind of flexibility is paramount in the idSpace project, one of the main underlying assumptions of the LTfLL project, and a key driving force behind the kind of change that the Handover project seeks to bring about. Clearly, the overall design of the Learning Network ultimately determines its quality of as an environment for professional development. If the network design leaves to be desired, any potential for knowledge sharing and creation that is hidden in the participants will not come to fruition. The tools discussed, however, all represent attempts, each in its own way, to optimise the design.

Finally, we began our story by pointing out that the kinds of flexibility needed for professional learning and exhibited by the projects discussed, are alien to traditional, school-based forms of learning. Let us hasten to add that this is not a matter of logical incompatibility. The ideas behind networked learning and the tools that are needed to implement it, may profitably be used in such environments as well. Actually, it is our conviction they should.

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## References

1. Sloep, P.B., et al., *A European Research Agenda for Lifelong Learning*. International Journal of Technology Enhanced Learning, in press.
2. Berlanga, A.J., Rusman, E., Eshuis, J. Hermans, H., Sloep, P.B., *Learning Networks for Lifelong Learning: An Exploratory Survey on Distance Learners' preferences*, in *7th International Conference on Networked Learning (NLC 2010)*, V.H. L. Dirckinck-Holmfeld, C. Jones, D. McConnell, T. Ryberg, Editor. 2010: Aalborg, Denmark. p. 44-51.
3. Sloep, P.B., *Fostering Sociability in Learning Networks through Ad-Hoc Transient Communities*, in *Computer-Mediated Social Networking. Proceedings of the First International Conference, ICCMSN 2008*, I.M. Purvis and B.T.R. Savarimuthu, Editors. 2009, Springer: Dunedin, New Zealand, June 2008, revised selected papers. p. 62-75.
4. Craft, A., *Fostering Creativity with Wisdom*. Cambridge Journal of Education, 2006. **36**(3): p. 337-350.
5. Glor, E.D., *What do we know about enhancing creativity and innovation? A review of literature*. The Innovation Journal: The Public Sector Innovation Journal, 1998. **3**(1).
6. Amabile, T.M., *Creativity in Context*. 1996, Boulder Colorado: Westview Press.