Chapter 14
Using the Hybrid Social Learning Network to Explore Concepts, Practices, Designs and Smart Services for Networked Professional Learning

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Abstract In this paper, we define the notion of the Hybrid Social Learning Network. We propose mechanisms for interlinking and enhancing both the practice of professional learning and theories on informal learning. Our approach shows how we employ empirical and design work and a Participatory Pattern Workshop to move from (kernel) theories via Design Principles and prototypes to social machines articulating the notion of a HSLN. We illustrate this approach with the example of Help Seeking for healthcare professionals.

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14.1 Introduction

This paper considers the design of technology to support informal learning in hybrid networks of professionals. This design aims to reflect an innovative pedagogy, grounded in practice and supported by theory, and enables the fusion of the technology and the pedagogy to transform professional practice. In this paper, we define the notion of Hybrid Social Learning Network (HSLN), a 'conceptual framework for smart (informal) learning environments,' and propose mechanisms for interlinking and enhancing both the practice of professional learning and theories on informal learning.

The research reported in this paper has been influenced by Daniels' argument [1, p. 1] that 'Vygotsky and his followers provide a rich and vivid palette of theoretical and methodological ideas which can be utilized as we struggle to understand the process through which the human mind is formed.' In a similar vein, the conceptual work reported should be viewed as descriptive and experimental research and is being used here to make conceptual distinctions and organize ideas about 'hybridity in networked professional learning'; Vygotsky and those who have been influenced by him are used as sources to provide us with the appropriate ideas to assist this undertaking. This paper describes HSLN, a concept that has emerged from an extensive critical literature review and earlier co-design work (e.g., see [2]) as part of the Learning Layers Project (http://learning-layers.eu/). The paper attempts to reconcile post-Vygotskian theory (and particularly recent cultural-historical work on hybridity) with the core idea of social machines, the '50-50 partnership' between people and machine in order to design technology that fits with working and learning practices, in our case of healthcare professionals.

14.2 The Hybrid Social Learning Network

Social learning refers to a wide range of cultural-historical processes and practices where learners make use of social interactions to construct meanings and change behavior [1]. *Networked learning* is defined as 'learning in which ICT is used to

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promote connections: between one learner and other learners; between learners and tutors; between a learning community and its learning resources' [3]. We extend the notions of 'social learning' and 'networked learning' by the concept of hybridity. For us, hybridity in professional learning has two dimensions: (i) a hybrid combination of formal and informal social structures in an activity system, i.e., the professional role we adopt or are positioned into in terms of structural relations of the power and control in institutional and cross-institutional settings [1, pp. 148–178] and (ii) a hybrid combination of physical and digital tools; how cultural historically developed tools (physical and digital) mediate the individual's relation to the world where the competence to handle such tools is acquired in social settings through guidance from other persons or guidance from digital tools in a '50-50 partnership' [4]. In other words, people connect and interact through a hybrid network of physical and technology-mediated encounters to co-construct knowledge and effectively engage in positioning practices necessary for their work. In our vision, professional learning will be transformed by introducing tools which are designed for this HSLN mode of mediated learning. We suggest professionals learn from each other in groups (a Zone) that call for orchestrating social supports (navigation and bridging aids) so that learners can benefit from the ideas of others (Possibility). The HSLN can thus be seen as a framework for enabling a 'Zone of Possibility' [1, p. 164].

The concept of Hybrid Social Learning Network is being used here to make conceptual distinctions and organize ideas so that we can design concepts, tools, and services for professionals, in our case healthcare sector workers, enabling them to work collaboratively in groups and ask questions to people, networks and services that they trust. The Social Semantic Server or SSS [5] is the technological framework providing tools and associated users with a growing set of services of different granularities that generate and utilize social and artifact network data needed in a HSLN. We employ services that recommend relevant conversations, documents, and other resources from a person's wider hybrid network that allows them to build, maintain, and extend their network to support workplace learning. In doing so, we face a dual design challenge: (i) the design and technology need to fit with working and learning practices of a target group (e.g., healthcare professionals) and (ii) the technical development fits with our theoretical orientation of cultural-historical practice.

Shadbolt et al. [4] put forward the notion of the 'social machine' as an ecosystem that blurs the lines between computational processes and input from humans and describe a polyarchy (defined as hierarchy with multiple entity points) used to identify 'the polyarchical relationship between infrastructure, social machines, and large-scale social initiatives.' Consequently, we wondered how the 'theory' and 'design considerations' components that we are interested in could be brought into the polyarchy without destroying the original idea of Shadbolt of 'nested models of social machines' and while retaining recognition of the fact that theory is actually also constructed on different levels of abstraction in itself. So for us, there needs to be an unpacking of the theory and design that form the lowest level of the polyarchy, i.e., what Shadbolt et al. call the 'initiative' level.

In conceptualizing a theory-driven design of recommender systems, Arazy et al. [6] speak of a similar idea in that they separate a 'kernel theory' on the highest level of abstraction which is broken down to an 'applied behavioral theory' which is then turned into testable designs. This conceptualization, however, construes the relationship between theory and design as a one-way street (theory-driven design). Furthermore, in our understanding, Shadbolt et al.'s description is analytical, while Arazy et al.'s is prescriptive. Shadbolt et al. describe the current workings of socio-technical systems, and Arazy et al. describe a process for constructing tools. In contrast, we aim to give an equal weight to theory and practice. For us, design constructs mediate between theory and practice, constantly (re)shaped and (re) shaping both. Consequently, we have decided to conceptualize the top three layers of the social machine (infrastructure, frameworks, and services, all grouped on the right of Fig. 14.1) and their relations to theory and models to inform an 'initiative' or the bottom level of the social machine polyarchy (grouped at the top of Fig. 14.1). The design research cycle (grouped on the bottom left of Fig. 14.1), then, prescribes how to build an 'initiative.'

Figure 14.1 shows the HSLN with pathways that we have, or intend to, follow(ed) illustrating how we use this 'conceptual framework for smart (informal) learning environments' to drive the development of an 'initiative,' where the focus is on maintaining a fit with our kernel theories and on the use of recommender systems that can adaptively scaffold learners for supporting informal learning. The sequence
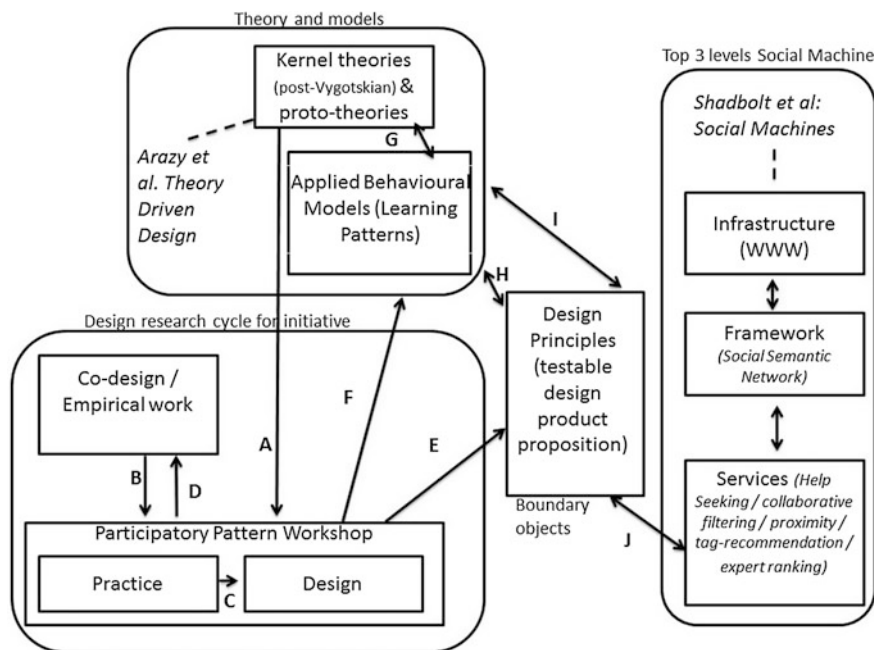

Fig. 14.1 Hybrid Social Learning Network: the paths followed

in Fig. 14.1 represents how we investigate which services (in a technical sense) are needed to enable us to realize tools thus articulating a HSLN; loops are indicated by arrows going in both directions. Path A from kernel theory and proto-theories (theories in progress) represents meta-requirements elaborated upon in the Participatory Pattern Workshops (PPW) that incorporate full theories, e.g., more capable peer [7], and proto-theories, e.g., '50-50 partnership' [4]. Vygotsky [7] describes how a range of skills could be performed with the assistance of a 'more capable peer': experienced peers who can assist in developing the person's skills, which cannot yet perform independently.

Earlier project co-design findings are added into the PPW (path B; e.g., we work with Practice Nurses based in UK General Practitioner clinics and found they were setting up a new face-to-face network because most of the nurses work in a single-handed manner at their practices, thus leading to isolation from similar colleagues; face-to-face meetings had the problem of variable attendance and that there is little communication by e-mail). We extended the PPW methodology [8] for the co-construction of design knowledge (path C and box in the bottom left of Fig. 14.1) by adding an emphasis on meticulous analysis of current practice. We first specify what the change in practice is that we wish to engender. This will be the objective of our design and the measure of its success. Design scenarios are proposed solutions to identified problems (path D where scenarios are used in more co-design; for the Practice Nurses network described above the main scenario was tools to expand their group, improve their sharing practices, and explore the potential for mentoring within the network). Design Principles (path E) are imperatives for design, derived from theory and validated empirically that act as boundary objects to drive designs of our tools and may also influence the choice of kernel theories that are employed (path F; e.g., participants argued for a stronger inclusion of communities of practice theory in the PPW workshops in February 2015). There are also paths connecting to the applied behavioral model: the links between kernel and applied behavioral model (path G) and between theory and Design Principles (path H; testable Design Principles may also apply some constraints on the development of the applied behavioral model of seeking help and recommendations). Path I shows how our planned evaluations will feed back to theory and model. Scaffolding is where effective answers emerge from the connection between peers and experts, and 'System Scaffolding' is where contextualized information will be delivered by technology. This combination is what we call the '50-50 partnership.' Path J is where we match the development of services and Design Principles. Specifically, we showcase a question/answer feature for Help Seeking in the KnowBrain tool [9], shown in Fig. 14.2, an open-source knowledge repository with smart social and collaborative learning features for informal workplace learning. KnowBrain's multimedia question–answer feature offers two kinds of realizations of the concept of the more capable peer for scaffolding a learner who is seeking help that articulates the concept of a 50-50 partnership: (i) More experienced human learners or experts can take the role of more capable peer in answering the stated questions in the form of text-based answers or via the provision of appropriate documents, media objects, or links; (ii) a recommender can take the role of more capable peer in suggesting
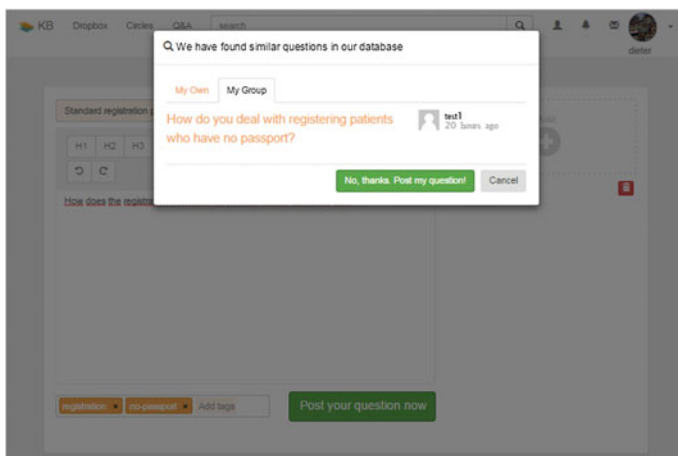
Fig. 14.2 Example of KnowBrain

preexisting questions about the topic of inquiry, i.e., when a new question is stated, similar preexisting questions are suggested first so that the learner can take them as a starting point and extend them with new and up-to-date knowledge (Fig. 14.2). If the preexisting answers are not sufficient, the learner can also discover more capable human peers who previously engaged in the same topic of interest. Finally, when we test our design products, we move them into 'live' systems (path J plus the right-hand side of Fig. 14.1, e.g., tools to support Help Seeking comprise bundles of services that use the SSS as backend).

14.3   Conclusion

This paper has provided details of a rigorous approach within which we investigate mechanisms for interlinking practice and theory to inform and enhance both. Our approach shows how we employ empirical and design work and a Participatory Pattern Workshop to move from (kernel) theories via Design Principles and prototypes to social machines articulating the notion of a HSLN. It offers a powerful explanatory frame and step-by-step guidance of the functioning and scope for learning in hybrid professional networks. In future work, we will test the impact of our tools on practice toward more effective social learning at the workplace and we will examine how HSLN supports multiple or extended learning theories. For example, Vygotsky focused more upon Culture as providing tools for thinking as a mechanism for collective problem solving. With this concern in mind, the following research question is guiding new work aimed at extending the notion of more capable peer: *Is there evidence of the 'power and authority' issue and how does social discourse involve positioning and being positioned?*

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