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KnowBrain: An Online Social Knowledge Repository for Informal Workplace Learning

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Abstract. We present KnowBrain (KB), an open source Dropbox-like
knowledge repository with social features for informal workplace learn-
ing. KB enables users (i) to share and collaboratively structure knowl-
edge, (ii) to access knowledge via sophisticated content- and metadata-
based search and recommendation, and (iii) to discuss artefacts by means
of multimedia-enriched Q&A. As such, KB can support, integrate and
foster various collaborative learning processes related to daily work-tasks.

Keywords: Collaborative Learning, Meaning Making, Informal Learn-
ing, Workplace Learning

1 Introduction

Today's challenges in industry and research require workers and learners to ef-
fectively and efficiently communicate and collaborate with different disciplines in
the digital world. Hence, tools are needed that facilitate social and collaborative
learning or working in informal settings by supporting underlying meaning mak-
ing processes[1]. KnowBrain (KB) aims to do just that. It is a social Dropbox-
like system representing an online knowledge repository enriched with social
features beyond sharing and organizing mechanisms: e.g., multimedia question-
answer (Q&A) functionality, activity stream, grouping, or social recommenders.
Since KB is self-hosted, i.e., it can be hosted on the own servers within an enter-
prise, which ensures data privacy and gives direct control over the whole system.
Together, those features aim for unfolding the potential of meaning making to
enable collaboration in an online social knowledge repository for organizational
learning contexts.

2 Background

Informal workplace learning takes place alongside the daily work-tasks on a just-
in-time basis. It is problem based, contextualized, episodic and includes the com-
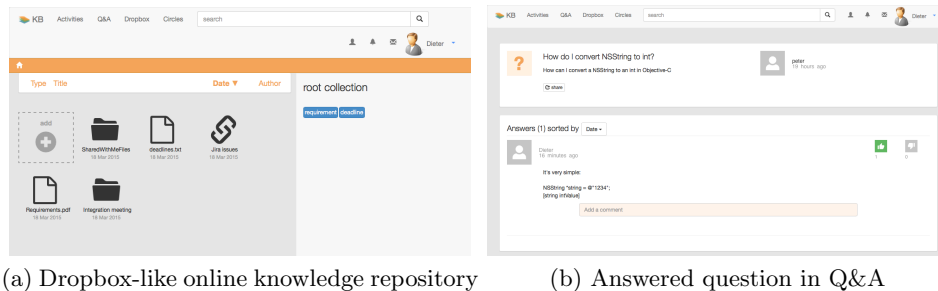munication and transfer of knowledge and experiences [2,3,4]. Hence, informal

(a) Dropbox-like online knowledge repository   (b) Answered question in Q&A

Fig. 1. KnowBrain's knowledge repository and question-answer (Q&A)

learning experiences often involve other persons and lead to a social context [5]. In other words, informal workplace learning reflects complex situations with many interwoven actors and artefacts (e.g., documents, links, pictures). This situation requires that we repeatedly establish a shared understanding to be able to collaboratively solve problems and arrive at an agreed solution. This can be achieved through meaning making, which takes place when multiple collaborators contribute to a composition of interrelated manipulations of digital artefacts [6]. Hence, meaning making processes have to be considered, supported, reflected and exploited as part of social and collaborative learning tools [7]. KB builds the ground for such meaning making processes by enabling manifold ways of sharing and collaboratively manipulating artefacts, which are a necessary prerequisite for collaborative and organisational learning [8]. In addition, KB makes use of respective outcomes (i.e., metadata) via recommendations such as collaborative filtering to further stimulate meaning making.

3 KnowBrain: Prototype Description

KB provides an integrated solution to (collaboratively) collect and structure knowledge; to reuse and share information within a single platform; to access information via search and intelligent recommendation mechanisms; and to enable multimedia-enriched Q&A, discussions and chats. It opts for openness and loose coupling of functionality by decoupling client-side business (i.e., solely relying on HTML, CSS and Javascript backed-up by the AngularJS framework) from server-side REST-based infrastructure (i.e., the SocialSemanticServer - SSS - a service-framework for social semantic network data[9]), in comparison to monolithic and closed systems as they can be found in (organisational) knowledge repositories (e.g., Moodle or Blackboard from within the e-learning scene, or Sharepoint from within the enterprise content management area). Thus, KB is easily extendable, if new affordances are required to fully support informal workplace learning. It aims to integrate popular approaches of otherwise separated environments such as content management platforms (e.g., Dropbox or Google Drive), social platforms (e.g., Facebook or Google+) and help seeking
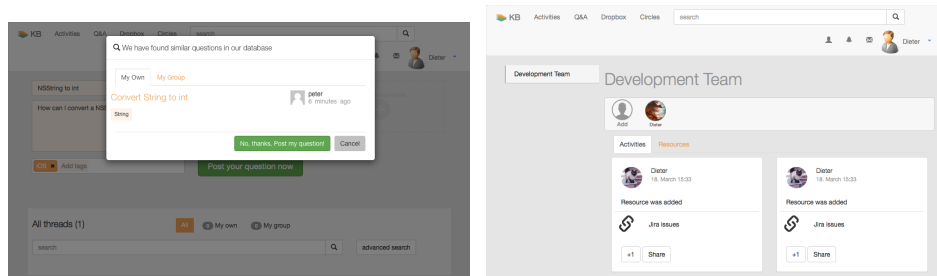
(a) Recommendations in Q&A

(b) Activities within a grouping

Fig. 2. Example for KnowBrain's recommendations and activity stream

platforms (e.g., StackExchange) with research findings in the area of recommendation, search and meaning making. Fig. 1 and 2 show the current status of the prototype which enables sharing, social tagging and collaboratively organizing of (uploaded) artefacts such as learning or working material, in addition to hierarchically structuring the same in folders (see Fig. 1a). Thereby, sharing can be done directly with colleagues, friends, groups or the whole community. Collaboratively enriching artefacts with more or less formal concepts (i.e., tags or categories) is inherent to meaning making driven by technology. Hence, KB also supports learners in their needs to discuss artefacts or to raise questions with regard to particular topics of interest as shown by Fig. 1b. Interaction threads in KB can not only be enriched with comments and metadata, but also with multimedia artefacts from the local file system, or from already organized content in the platform. To scaffold learners with the task at hand, KB recommends similar threads or answers before new communication threads are created (see Fig. 2a). These threads can in turn be shared with others to make them visible to a broader community. To allow KB users to keep track of meaning making outcomes and their evolution, activities of collaborators can be followed via user- and group-based profiles as shown in Fig. 2b. These profiles also provide insights into the interdependency of artefacts, users, metadata, activities and communication threads. This way, users can better understand their learning or working groups and acquire relevant knowledge to further minimize interruptions of the ongoing meaning making process. Search can be utilized to find (multimedia) artefacts, users, groups and metadata using metadata and content-based keywords. On top of this, KB offers recommendations to enrich search results with interesting and relevant learning materials. Thus, the emerged traces of meaning making are reused and exploited to scaffold community members.

4 Conclusion and Future Work

The current prototype of KB leverages essential meaning making processes via collaborative (re)structuring, discussing and enriching of learning materials to

enable online social learning and collaboration. In the future, we will integrate further intelligent services that take into account research in technology enhanced learning from within various areas such as sense making or expert and community identification. Planned features include graphical interaction mechanisms facilitating social categorization processes, as well as opportunities for collaborative writing to formalize and mature ideas into other formats. All these efforts aim for a seamless connection of workers and learners via thoughtful integrated features in a self-hosted knowledge repository that shall also effect real-life working processes in the long run.

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