

Socio-technical Appropriation of Web2.0 for continuing learning on the job

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ABSTRACT

Successfully adopting Web2.0 in companies for purposes such as continuing learning on the job has to take into account that the number of potential users and contributors is much smaller than in the World Wide Web. There the transfer into enterprises requires establishing a socio-technical system that includes organizational change: New roles and tasks have to be established, such as facilitation and content cultivation in the Web2.0 context.

INTRODUCTION

We investigate the question of how *Web 2.0 collaboration services and community models can be transferred to the enterprise context* by applying it to the area of continuing learning on the job. We cannot draw on empirical studies on applying Web2.0 for continuing learning but we attempt to transfer our experience with organizing continuing learning, with introducing knowledge management solutions at companies [Herrmann et al. 2003; Kienle & Herrmann, 2004] and with introducing CSCL [Carell et al. 2005]. Continuing learning on the job has certain relevance in companies: A great part of needs for learning is problem driven. In many companies or domains the need for learning or its relevant topics cannot be appropriately anticipated. Therefore, learning in courses which takes place outside of the workplace context is in many cases not suitable.

Problem driven, continuing learning on the job means to identify appropriate experts or content items at that moment when difficulties occur or become anticipatable. Identifying content or experts provides occasions to solve a problem. It does not guarantee that the problem can be overcome or avoided but starts a process of informal learning.

Another aspect in the context of continuing learning refers to the necessity that people who are going to leave a company or switch from one position to another are expected to transfer essential parts of their knowledge to their followers. These people usually recall their knowledge with respect to the problems they have experienced and solved. They tend to document their experience by referring to these problems and to embed their report into a story about what has happened.

Online-supported knowledge documentation and transfer supports processes of informal learning and the intertwining of learning at the workplace, learning during leisure time and learning during conventional courses. Web2.0 has certain relevance for these informal processes since it provides lightweight functionality with which people can be consumers as well as producers of information. Furthermore, Web2.0 supports learners to become members of communities where their process of learning can be understood by others and where they can receive feedback.

However, applying Web2.0 in a company requires its integration into a socio-technical system [Herrmann, 2009]. This means that Web2.0 components and human activities are not coincidentally connected but systematical integrated. We define socio-technical systems as the phenomena where human-computer interaction and human communication (face-to-face as well as technically mediated) are systematically integrated. Indicators for such an integration are that people frequently communicate about the features of the used technology, about the conditions of its usage, and about needs for improvement, and that the technical system mirrors the social relationships and the structure of the organization into which it is embedded. Establishing such a socio-technical system with Web2.0 components in a company requires not only technical measures but also organizational change. We will describe these organizational requirements with respects of new roles [Herrmann et al., 2004] and tasks which have to be established.

CHARACTERISTICS OF WEB2.0 AND ITS POTENTIALS FOR CONTINUING LEARNING

To understand the potential support of Web2.0 for continuing learning on the job we list typical characteristics of Web 2.0 [O'Reilly, 2005] and the relationship to learning in a first step. Secondly we will describe the shift which will have to take place if Web2.0 is appropriated in companies to support continuing learning.

- *Prosumers*: Web2.0 is characterized by the shift from the separation between consumer and producer to the so-called prosumer: Some users do not only access information via World Wide Web but do also provide content. Wikipedia, blogging etc. are the typical examples. Web2.0 can be used to document experiences for

own purposes as well as for the benefit of others. However, in the context of a company’s need for continuing learning, there is no guarantee that enough people are willing to take this role of a prosumer and that they do this regularly and systematically. Furthermore it cannot be expected that prosumers contribute content in a way which satisfies didactical criteria.

- *Co-activity*: An essential principle of Web 2.0 is active user participation which is characterized by the “Me-Mentality” [Koch & Richter, S.7]. Several people use an application for their personal aims (e.g. documentation of problem solution, photo filing) whereby a collaborative surplus value is created by the co-activity of other users: an individual can, for example, organize and archive his / her reports or photos effectively and label them with so-called *Tags* [Golder & Huberman, 2006]. When others do the same, he receives tips on who apart from himself, is interested in the same reports or manuals, which tags have been used by others for these sources etc, and thus acquires a multitude of new tips, cross-references and references to her/his documents. Therefore, Web2.0 offers the potential for smooth transitions between “Me-“ and “We-Mentality”. This overlapping of the “Me-Mentality” and “We-Mentality” can support continuing learning: while employees start to document their experience for their own purposes, others can benefit from these reports and can enrich them by cross-linking them with their own documentation.
- *Culture of Participation*: Prosumer activities and the overlapping of “Me-“ and “We-Mentality” establishes a certain culture of participation. It is different from those types of participation cultures which we have tried to establish in the context of CSCL [Dillenbourg, 1999]. In an experimental design we have challenged students to participate in a well organized project of collaborative knowledge construction and to commit themselves to certain rules of coordination [cf. Carell et al., 2005]. By contrast, the participative culture of Web2.0 is organized on a lower level: mutual support is based on coincidences, free will and spontaneous contributions. The types of contributions, which are combined in a Web2.0-application, can vary with respect to the invested effort: while some people contribute complete paragraphs for documentation, others do only add meta-data, such as tags, ratings, comments etc. However, this type of culture of participation seems still to be sufficient to support the paradigm change which is characterized by the term “from teaching to learning” [Barr & Tagg, 1995]. The teacher becomes the coach and adviser and takes a step away from the role as subject content expert.
- *Dissolving the learning space*: Through the use of Web 2.0 applications, people who do not actually belong to the learning group itself or to a certain course can be integrated into the learning activities without needing any great technical preparation or background knowledge. This makes the exchange of knowledge between experts and lay people much easier and thus creates new knowledge sources. While conventional courses of continuing learning require a homogeneous group of participants with respect to their pre-knowledge, their problem space and their context of work, Web2.0 draws on the potentials of heterogeneous knowledge sources and on the synergizing of multiple perspectives. It supports the principle of “crowd sourcing” [Surowiecki, 2004] where non-experts can contribute valuable contributions.
- *Community-building*: People with a similar practice background or with similar interests are supported by Web2.0 to build communities. They support each other without the necessity to know a lot of each other. However, applications such as facebook offer possibilities to get to know each other and to understand the background and the social context of other community members. Mutual support takes place indirectly: by contributing content or meta-data for oneself or for a small team, others of the community can also take advantage in a way which needs not to be intended and planned by the originators of a contribution.
- *Long-tail effect*: Using meta-data, such as tags, helps users to identify content which is interesting for them. While most search and recommendation mechanisms of Web1.0 focus on what might be interesting for a large audience, Web2.0 allows users to discover niches where they find documents and hints which are only interesting for them and a very small group of others who share a very specific problem space or topic of interest. This difference can also be transposed to the world of continuing learning: in conventional courses, teachers try to prepare and to use examples with which not only a few participants but a large part of their audience is familiar. Teachers intend to convey their message by illustrating it with examples. However, they mostly have to refer to examples which are generally understandable and therefore cannot refer to the particularities of the single workplaces where their addressees have to run a job. By contrast, exploiting the long tail [Anderson, 2006] means that employees can check at their workplace whether there are a few others which share the same task requirements and whose work context widely overlaps with their own conditions. Consequently, it is possible to find the few people who are familiar with problems which are similar to their own ones, and to learn from them.
- *Simplicity, flexibility and integration*: Web 2.0 applications are freely accessible and usually simple and intuitive to use so that no great training or preparation is necessary. Depending on the didactic teaching / learning scenario, pre-experience on the part of the teacher / student and the learning goal they strive to achieve, various technical applications can be flexibly combined

with one another: in this way a Wiki can be used to produce mutual contents and then embellished with blogs, podcasts and bookmark reading recommendations. The integration of RSS Feeds makes it possible to provide up-to-date information about current alterations and news.

- *Mash-ups*: It is an established pattern to use Web2.0 applications in a way where they are isolated from one another. Another pattern is the orchestration of various applications into a learning scenario. In these scenarios it is important how the various services can be interrelated, how they can be represented in an integrated manner and how awareness is provided about what is going on within in different areas, such as wikis or blogs. Netvibes¹ for example may be a possibility to meet this challenge. A higher level of integration is achieved with mash-ups. The most common example is the combination of search results with Google-Maps, if the searched objects have a geographical dimension. The variety of mash-ups should be extended for the purpose of continuing learning on the job. For instance, the search for documents which are related to a specific problem could also reveal hints to experts which can be derived by mash-ups with social networks such as facebook.

SOCIO-TECHNICAL WEB2.0 SYSTEMS FOR CONTINUOUS LEARNING AT THE WORKPLACE

Using Web2.0 for continuous learning on the job needs some organizational measures and their integration into a socio-technical system. These needs can be described with respect to the aspects being outlined in the previous section. Table 1 summarizes the shift from Web1.0 to Web2.0 in the enterprise context by explaining the roles which have to be established and their tasks.

Prosumers: To establish a sufficient number of prosumers the employees in a company have to be guided to produce content and meta-data. This can be the task of facilitators and coaches who prepare examples and structures which facilitate documentation activities [Salmon, 2000; Herrmann & Kienle, 2008]. An important facilitation support is the providing of questions which help the employees to understand that the documentation of their experience is needed and gives them a guideline of how to start and structure this documentation. The content which is delivered by prosumers may only be a starting point which requires further effort to be cultivated so that it complies with didactical criteria and can serve as a learning input for others.

Co-activity: Since the activities of Web2.0 usage can start on the basis of a “Me-Mentality” it is important to have facilitators who demonstrate the potential benefit of refer-

ring to what others have contributed. Examples have to be provided how tags, feeds, blogs etc. can be used to exchange information and to find valuable hints which support learning. A facilitator can help to build bridges between participants if they don’t realize the possibilities for exploiting valuable interdependencies. Within Web2.0, the detection of interesting and promising relationships usually happens coincidentally. Problem-driven learning on the job requires a more systematic support since the problems have mostly to be solved under time pressure and with a certain reliability. The collaborative “cultivation of content” can be promoted by appropriate facilitation.

Culture of Participation: The World Wide Web is based on a large number of users and produces sufficient effects, like the emergence of Wikipedia, even if only a small percentage of them behave as prosumers. By contrast, continuous learning in a company has primarily to draw on a relatively small group of users who are committed to the company (employees, customers etc.). The problem to overcome is to activate a larger percentage of prosumers within this group of users. This needs the support of facilitators or coaches, who provide a role model, promote active participation etc. They have to provide examples which demonstrate how the building of cross-references can increase the value of content.

Community-building: Facilitators can help to initiate community building; they can make people to know each other and propose to build sub-communities. For reasons of confidentiality, the extent of communities may be limited within the personnel of a company to exclude competitors of the information exchange. With respect to certain topics and interests it can be beneficial to extend the boundaries of a company’s learning communities. Therefore, the facilitator may also have the task of a gatekeeper or help to develop guidelines about what can be published to the outside and what has to be kept as a secret. Establishing a community within the boundaries of a company or even within a department increases the cold-start problem.

On the one hand, *dissolving the learning space* needs to be promoted. Facilitators can help to disclose potential synergies, can give hints about where to search for interesting content and can promote the integration of multiple perspectives. On the other hand problems can occur with respect to the quality and trustworthiness. Since information may be transferred from one context into another, misunderstandings can emerge; information may be incomplete or not reliable enough. Quality checks and evaluation can also be a matter of collective participation but in the context of a company’s duties, legal constraints, and contracts it is a necessity that a distinguished role is responsible for the quality of the information to be exchanged and to be a basis for learning.

Simplicity, flexibility and integration: The advantage of many Web2.0 applications is that they can be easily accessed and can be explored by trial and error. Users can

¹ Netvibes (www.netvibes.com) is a content aggregator combining widgets with access to multiple Web2.0-applications (www.netvibes.com)

Table 1: Shift from online Learning with Web1.0 to new roles and task for using Web2.0 in the Enterprise

Web1.0		Web2.0 in Enterprises	
ROLES	TASKS	ROLES	TASKS
Content provider, author	Selecting and editing of content,	Content-Initiator and -Cultivator	Providing a “starting-“content; providing a framework for structuring of content; delivering Examples; didactical improvement
		Expert in the Community	Content cultivation: Content completion, solutions for specific problems, answering of questions
		learner in the Community	Content cultivation: questions, examples for problems
		Community as a whole	Content cultivation: Adding meta-data, comments, feedback, building cross-references, rating, comments on quality, reliability and needs for learning; examination and validation of content and progress of learning
teacher	Entwicklung / Umsetzung eines didaktischen Konzepts Strukturierung des Contents	facilitator / coach	Initiation and stimulation of discussions and community building, asking questions, coordination of information exchange and feedback, summarizing of discussions; gate-keeping; developing rules Revealing relationships between content, problems and interests, Being a role model with respect to Web2.0 usage and providing guidance for others people
Technician, Software-developer	Developing a platform for content distribution, learn management functions	Power users	Selection and configuration of Web2.0 applications, consulting for other user
		Technical support	Helpdesk, integration of applications (mash-ups), data security
Learner	Learns individually with prepared content ,examples and fictive problems	Learner	Collaborative learning, own research, real examples and problems, documentation of own learning results for himself and implicitly for others, helps structuring a learning space with meta-data

proceed individually to decide what they want to use and how they configure the applications. It can depend on coincidences whether certain features are sustainably used or not. Within the context of enterprises a higher degree of reliability may be necessary, people have to react under time pressure and a high level of data security and confidentiality has to be achieved. This requires certain roles with the task to provide help and technical support.

CONCLUSION

Adopting Web2.0 in companies for continuous learning on the job requires establishing a socio-technical system that includes:

- A clarification of the difference between outside and inside the system. It must be clear who belongs under which conditions to the company related communities and which content can be exchanged.
- Establishing specific roles with specific tasks to promote the continuing learning, such as
 - Facilitators who initiate the building of communities, promote question-answer dialogues, provide feedback and points out valuable cross-references
 - Content cultivators who provide initial examples and structures, complete information items and help to evaluate and improve the quality of the contributed information

- Further roles who are responsible for Web2.0-related technical support for making decisions about the reliability of content.

Compared to conventional knowledge management solutions or to computer supported collaborative learning systems, Web2.0 provides lightweight solutions which allow the users smooth transitions between individual documentation of their own experience and an intensive exchange, value-adding and synergizing with other participants. However, transposing Web2.0 from a world wide application context to the economical and legal constraints of companies needs organizational efforts and a higher level of commitment. It has to be emphasized that the proposed organizational measures have also to be technically supported: Establishing organization roles, role taking as well as switching between them can be a matter of technical functionality [Herrmann & Jahnke, 2004]. Web2.0 functions must be extended to meet the organizational requirements of enterprises. Another approach (as presented by Prilla & Ritterskamp, 2008] proposes to extend conventional learning or knowledge management systems with the goal to support tagging, collaborative writing or a smooth transition between restricted and unlimited access rights.

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