KNOWLEDGE CAPITALIZATION IN AN ORGANIZATION SOCIAL NETWORK

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Abstract: Organizations need to face the rapid growth of social networks and its adoption by their collaborators. While organizations require collaborative tools to get their work done, their collaborators seem to prefer social tools like Facebook or Twitter. We present in this article a new kind of organizational Content Management System that takes care of both documentary and social sources of knowledge.

1 INTRODUCTION

Organizations need to face the rapid growth of social networks and its adoption by their collaborators. Many enterprise services providers have added such features to their flagship products (Salesforce and Chatter[1], Microsoft and Social Connector for Outlook[2]). These features let enterprises benefit from their social capital and ease the communication between collaborators generating a good atmosphere for innovation (McAfee, 2006a). Nevertheless, these social softwares still do not correlate with the classical information systems, and viewed as separate knowledge source.

This distinction of status in Organization Information Systems (OIS) causes a loss of knowledge for the organization, due to the poor capitalization of social information. In this paper, we present a finely integrated model of a social network in an OIS and how to capitalize social information in the same way than other organization information – documents, wiki, *etc.*

After having described our interest to develop what we call a Social Organization Content Management System (SOCMS), we will define the primary features such a system must provide. Then we

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[1]http://www.salesforce.com/company/news-press/ press-releases/2009/11/091118.jsp – *Note:* all URL in this article were accessible on Mai 8th, 2011.

[2]http://office.microsoft.com/en-us/outlook/social-connector-HA101794273.aspx

present a model of this system. We will eventually see how and why we implement this model in the E-MEMORAe 2.0 project before concluding.

2 INTEREST FOR A SOCIAL ORGANIZATION CMS

Organizations have always had to deal with huge amounts of information. For a long time this information was stored in paper archives and not easily usable. With the increase of digital archives and associated search engine, information retrieval became instantaneous and organizations seem to have won an important battle against its own internal knowledge management.

However, this "over-availability" of data did not drive to efficiency. Another problem organizations meet in their daily information management tasks is the duality in the origin of information. With this document centric approach, relevant information is often seen as coming only from documentary fragments. But as the recent growth of social network proves, user and more specifically social fragments produced on social networks (Deparis *et al.*, 2011) can also be viewed as knowledge sources.

Users themselves can be viewed as part of the Organization Information System (OIS) because they hold valuable information on the organization and keep part of the organization's knowledge.

Collaborators are not alone in organizations and build communities around various topics. These communities of practice ((Wenger, 1998) and (Wenger *et al.*, 2002)) share problems, concerns, but also solutions or try to resolve their problems with continuous development of their indepth knowledge around their topic of choice. Knowledge in organizations can be discovered in such networks of interactive people, as thought by (Davenport and Prusak, 1998). Already in 1998, they showed that organizations should formalize such internal and informal networks.

The activities driven by these communities leave tracks in the OIS. But OIS are not ready to capitalize nor capture this new kind of information, and the knowledge fragment they possibly hold are lost, because nothing exists yet to permit their indexing, retrieval and valorisation.

The problem organizations have to face is to associate their social based information with their classical content management system, in order to perform complete searches which take care of all possible knowledge sources. This raises complications, including the high contextual origin, multiple forms, *etc.* of such information. This leads specify a new generation of OIS: the Social Organization Content Management System (SOCMS). These systems integrate the social and classical fragments of the organization in one centralized and easily accessible Knowledge Base.

3 PERTINENT FEATURES FOR A SOCMS

As (Ermine, 2000) presented, modern OIS require three main features. We have slightly adapted his list to fit our vision of a SOCMS:

1. Knowledge capitalization;

2. Information sharing;

3. Knowledge creation (*i.e.* innovation).

3.1 Knowledge Capitalization

The key point of a SOCMS is the capitalization of all the fragments from the OIS. This means that even fragments produced on Web 2.0 tools – *i.e.* social fragments (Deparis *et al.*, 2011) – have to be capitalized alongside the documentary ones. It is done by sharing common concepts over the OIS to easily feed the organization Knowledge Base. All of the collaborators' activities must refer to the same vocabulary, defined in a central ontology.

This capitalization process follows the same ideas than the semantic portal solution sold by Mondeca[3] in the industry.

3.2 Information Sharing

Today's Organization Information System (OIS) does not take into account the social fragments which are immediately lost after publication. But social fragments does not mean senseless fragment. That is why we recommend the creation of a SOCMS. As we have said, it is a new generation of Content Management System (CMS), which allows organizations to capitalize Knowledge from social activities.

As (Davenport and Prusak, 1998) showed, groups of collaborators must be taken more into consideration and need to be formalized. In order to do that, we suggest that SOCMS integrate sharing spaces, where collaborators can easily interact with each others. These sharing spaces improve the overall collaboration of a team or an organization by facilitating exchange processes. They involve different sort of user groups inside the organization. Two types of sharing spaces must be distinguished: the institutional ones, created by some executive and the dynamic ones, led by users' will.

The user groups around these sharing spaces generate social activity and, as shown by (Fisher *et al.*, 2006) – with the example of exchanges on Usenet –, any electronic media which allows users to talk to many others can be viewed as social networks, as users will continue to use them to build micro-societies around various topics.

The aim of a SOCMS and its sharing spaces is to provide a new type of collaborative platform. Inside the sharing spaces, collaboration is carried out by many different tools.

The main activity of users on a collaborative platform is to share information. This information can be documents, URLs, or any other resources produced or added to the platform.

We can also define another type of exchange: when a user adds an annotation to a resource or when he joins a thread on the forum or modifies a wiki page, he is sharing his knowledge with his collaborators, and this exchange leaves tracks in the OIS.

It is also important to provide all possible meaning for them to follow the last events on the platform. Web 2.0 has introduced various types of technology to achieve this, like RSS[4] stream, the API[5] providing habit, *etc.*

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[3]http://www.mondeca.com/

[4]http://en.wikipedia.org/wiki/RSS

[5]http://en.wikipedia.org/wiki/Web_API

When they come back on the platform, the activity stream shows them what other users had done, optimizing the overall collaboration process.

3.3 Knowledge Creation

As (Ermine, 2000) presented, enterprises have to be innovative and thus to be creative. The creation process goes today through constant collaboration of the members of the enterprise.

The Web 2.0 tools (O'Reilly, 2009) allow easily this collaboration and so have enterprises recently followed the Web 2.0 and adapted it to their needs, creating what is commonly called "Enterprise 2.0" movement (McAfee, 2006b).

This movement drives new practices into the organizations, particularly with new management method, *i.e.* flattening of hierarchical structure and revitalization of collaboration between enterprise members. Enterprise 2.0, as for Web 2.0, which is not a real revolution, pushed however new tools in the OIS in order to improve collaborators' exchanges.

SOCMS does not replace any software in the OIS. It tries to fill the gap among documentary OIS and other collaborative tools the organization has deployed over the years.

These new collaborative tools include blogs, wiki, fora, calendar, document management, *etc.* Commercial offers exist already like Livelink[6] – a complete suite of tools which combine chat, blog farm, wiki *etc.*

But in their current implementation, no global indexing solutions exist. Fragments stay in their original data stores and cannot be shared through different tools. For example a wiki page can not be easily linked to a forum post other than giving a senseless URL.

4 OUR MODEL OF A SOCMS

The model of a SOCMS follows the required features we identified in the previous section.

4.1 Knowledge Capitalization

A SOCMS is a CMS and so its main purpose is to provide all the features we need to capitalize the organization information. With the help of an ontology, information is semantically indexed in the Knowledge Base. This permit an interesting way of information

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[6]http://www.opentext.com/2/global/products/products-all/livelink-landing.htm

retrieval, with the possibility of browsing in the conceptual network of the organization.

The SOCMS is designed on a domain ontology which helps to give sense to the structure of the system by defining the concepts of groups, users, the different kinds of resources, *etc.* Resources are themselves indexed in application ontologies where groups can define the concepts they handle, as depicted in Figure 1.

4.2 Information Sharing

SOCMS must capitalize both documents and social fragments in different sharing spaces owned by their respective groups. This ensures that both documentary and social information are available and equally reusable for the users of the system. As seen in Section 3.2 and depicted in Figure 1, these spaces should be of two types : the institutional ones and the dynamic ones.

1. *Institutional Spaces* are entities, who have been created by some hierarchical entity, *i.e.* an executive has gathered some people who follows the same training course and may have some documents to share to each others.

2. *Dynamic Spaces* describe two different situations:
   - a user wants to create a community around a precise topic;
   - a user wants to create a community of people with whom he wants to talk and invites them to join.

A sharing space belongs to only one group, so one has to be part of this group if he wants access to all the information exchanged on a particular space. Nevertheless, a user can be part of several different groups. We reproduce here the reality of organizations where collaborators take part in different communities – institutional project groups or dynamic groups like swimming pool team mates or office mates. It is not because he is at one point with one group that he instantly forgets what he did or shared with other communities. He thus becomes a master piece, a pivot between two groups inside the organization for example, that could be viewed as a potential starting point for collaboration among these groups.

4.3 Knowledge Creation

By using the Web 2.0 tools provided by the platform, users produce new fragments or share them inside or among the groups they belong to. These fragments
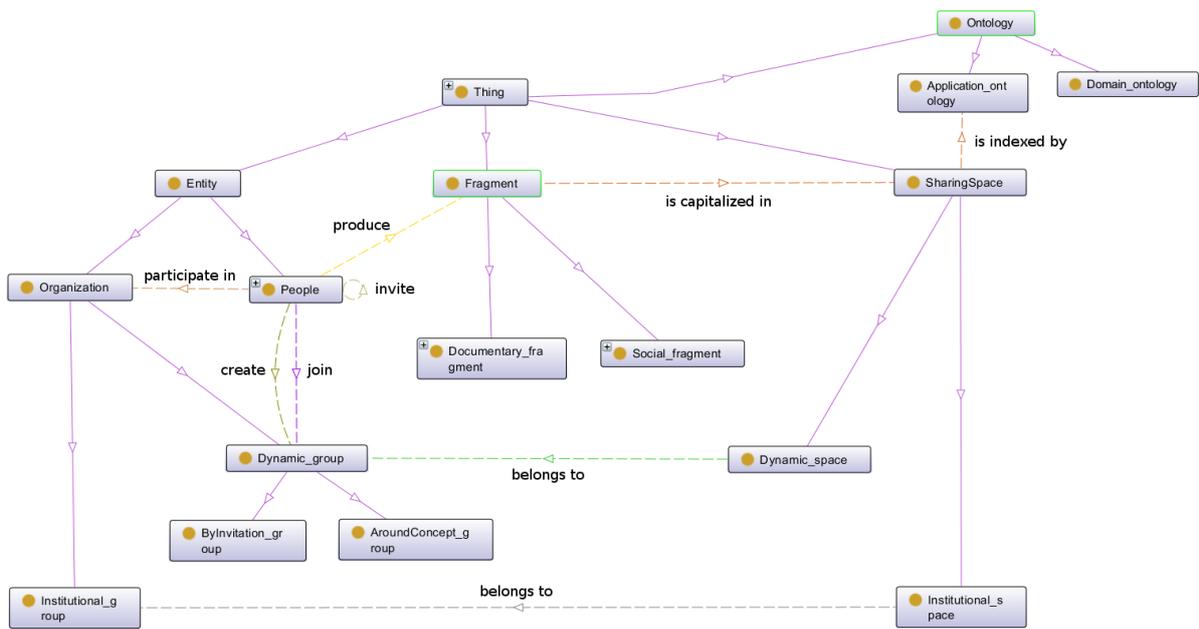
Figure 1: Excerpt of our model of a SOCMS.

can be blog posts, forum messages or less conventionally opt-in of users for a group, or tagging a user to a resource.

All these activities are stored to allow later reuse. Users can then share this new fragments with each others or simply retrieve an information they need.

The availability of both social and documentary information permit a monitoring activity on the knowledge base. With only documentary information, executive had a project oriented view on the knowledge of the organization: when a project started, what materials it concerned, what patent it created etc. With the addition of the social fragments they access a more global vision including who are involved in a project, which team, and how collaborators achieve the different goals of a project. This can possibly help executive to identify new ideas to explore and innovative way to follow.

5 E-MEMORAe 2.0

The aim of the MEMORAe project is to model and design a collaborative platform facilitating organizational learning and knowledge management. Following previous work around knowledge management, semantic Web and Web 2.0 best practices, the project has built an e-learning organizational memory based on ontologies (Leblanc and Abel, 2009).

E-MEMORAe 2.0[7], the environment designed during work on the project, defines the knowledge of an organization in an ontology, and let its users navigate in this ontology to retrieve the resources indexed.

E-MEMORAe 2.0 already allows an administrator to define several groups of users which share a common point of view on an ontology. Several Web 2.0 tools – *i.e.* wikis, fora, chat, blogs – are yet implemented in the platform (Leblanc and Abel, 2008) and can directly interact with the ontology.

Although the actual implementation does not allow dynamic community to appear, the fine integration of Web 2.0 tools to an ontology and the existence of institutional groups ease the design of a prototype.

So, we chose the E-MEMORAe 2.0 environment as basis platform to complete an implementation of this prototype. It takes the form of an alignment of the E-MEMORAe 2.0 internal domain ontology and our model and the development of suitable interfaces to manage dynamic groups and social fragments capitalization.

6 E-MEMORAe 2.0 AS PROTOTYPE

The E-MEMORAe 2.0 environment has been built with a strong notion of institutional groups, due to its primary dedication to e-learning, where groups stand
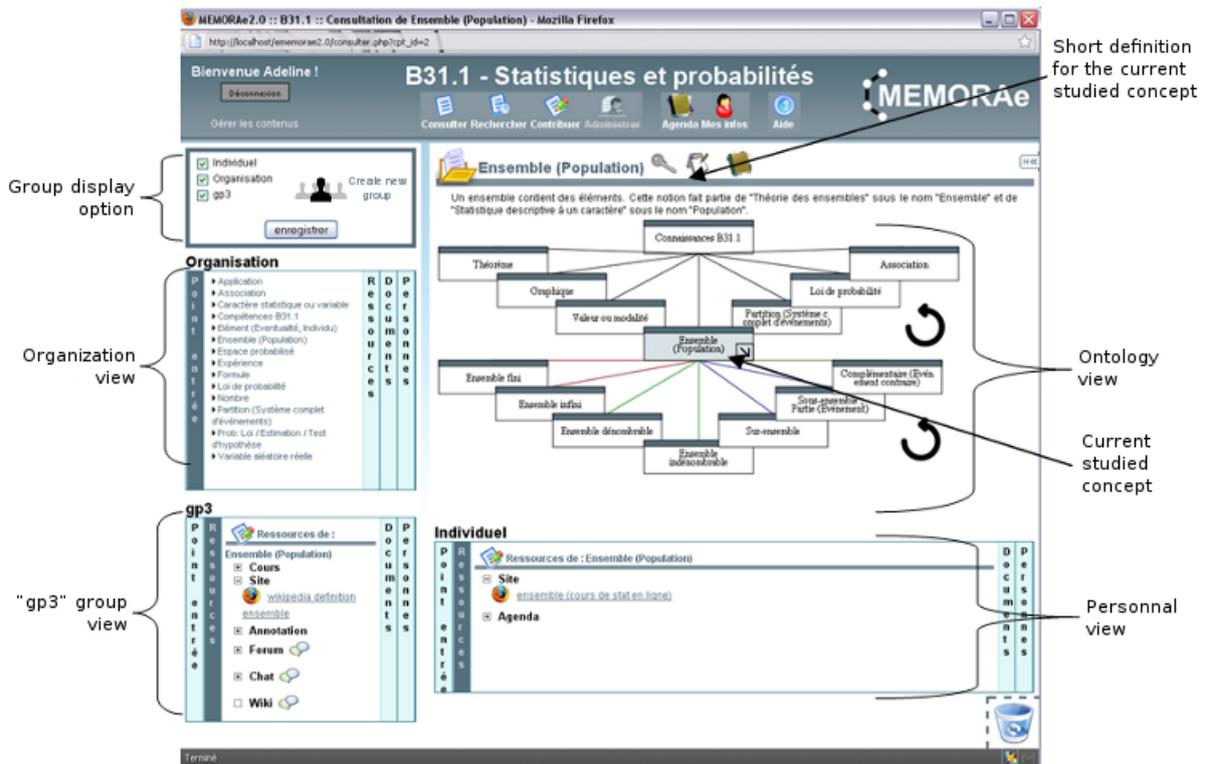
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[7]http://www.hds.utc.fr/memorae/

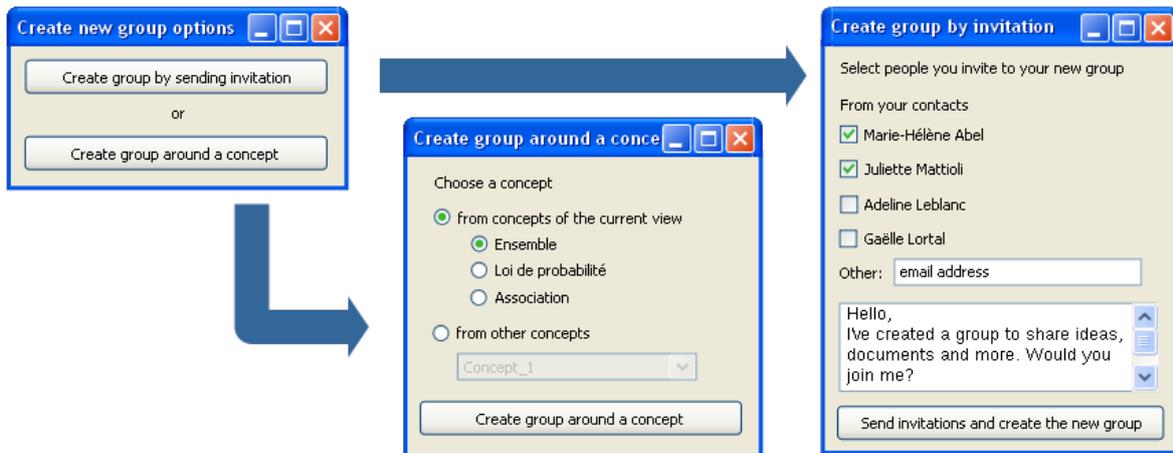Figure 2: View of the E-MEMORAe 2.0 environment, featuring an e-learning collaborative platform.

Figure 3: Workflow of dynamic group creation.

for classes of students, organized by a teacher.

A group shares a particular point of view on the resources indexed in the central ontology. Inside this view, users are able to share with the other members of the group any resource they want, from article to forum message, through annotation or Web page. Figure 2 shows the representation of these views in the environment.

Exchange of resources is only accessible within group members of a particular sharing space. No one from any other group would be able to access these resources, unless one shares explicitly one resource with another group by dragging and dropping the resource between the different views – *e.g.* between the institutional group "organization" and the dynamic group "gp3".

The "create new group" button in the "group display option" frame in Figure 2 shows how simple it is for a collaborator to initiate a new dynamic group around either himself to talk about various topics after having invited some people, or the concept he is currently viewing in the ontology view. Figure 3 shows the popup window where the user can define which kinds of dynamic group he wants to create. We rely on the current implementation of the E-MEMORAe 2.0 platform for the institutional groups.

7 CONCLUSIONS

In this article, we present our vision of a Social Organization Content Management System (SOCMS), as we think it is a solution to the problem many organizations need to face, when they try to capitalize new kinds of information from social network tools and collaborative platforms.

We designed a model of such a system, then a prototype around this model. The prototype will be tested in an industrial context with projects tracking in Thales, and in an academic context at the *Universit de Technologie de Compigne* where students will use it to capitalize information they found during a technological watch. These experiments will serve for the evaluation of the prototype and more generally the model.

We are working on the alignement of our model on top of several current semantic web vocabularies: FoaF, SIOC, SKOS and BIBO[8]. This alignement will allow interoperability between the prototype and others related projects.

All of these works related to collaboration and tracks reuse raise privacy concerns too, which have to be treated carefully.

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[8]See http://en.wikipedia.org/wiki/{FOAF, SIOC, SKOS, Bibliographic_Ontology}