Collaboration, Knowledge Sharing, Communication: The "Enterprise 2.0" Model in Operation in a Research Centre, Csp in Turin

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Abstract

This article illustrates the experience of CSP (the innovation and centre of the Piedmontese public administration) regarding the adoption of a web environment for collaboration and knowledge sharing, describing the usage models and the organizational implications. The article focuses on two aspects: on one hand it describes the characteristics of the inhouse software environment eCollab, created by integrating various open source programmes into a single platform, according to the "enterprise 2.0" model; and on the other it illustrates the entire process of analysis, design, trialling and assessment of the environment itself within the organization.
eCollab came about in 2006 as an inhouse trial project to foster collaboration, communication and the sharing of ideas and materials, and it now represents an "enterprise 2.0" environment that has been adopted by CSP, put into experimental use by Regione Piemonte, Iride Energia and CSI Piemonte, and is being offered to companies as open software.

1 Introduction

CSP[1] is the centre for innovation and research of the Piedmontese public administration, concerned with information and communications technology. It operates on a local, national and international level, on applied research, agreements and projects in collaboration with public bodies, local administrations and large private companies. Around one hundred people work for CSP, including employees, freelancers, consultants and grant-holders. The organization is structured into three different divisions, which number various "laboratories", but in the main the work process is based on multidisciplinary groups. It is clear that a hierarchical organizational model is not suitable for a body involved in research and experimentation: the capacity to forge synergies between people with different skills is a vital, non-negotiable element. The organization must be flexible and foster the development of dynamics of collaboration between members of personnel. This is something that cannot be established a priori, but must be developed on a daily basis as projects take shape[2].

In the belief that the models and tools offered by web 2.0 are capable of fostering the combination of skills needed to develop complex, innovative projects, CSP decided to invest in developing an inhouse platform, called eCollab, based on the "enterprise 2.0"[3] model. This environment is designed to support processes of collaboration, knowledge sharing and enhancement, and to extend existing services such as webmail, shared calendar, the management of internal resources, lists of activities and a centralized phone directory.

The eCollab platform was created as an experimental project, and involved the following stages:
• Gathering and analysing needs;
• Definition of requirements and conceptual model;
• Identification of applications;
• Definition of architecture and development of prototype;
• Trial;
• Analysis of results;
• Product engineering.

2 Gathering and analysing needs

The needs were gathered by means of anonymous questionnaires and sample interviews, which enabled us to outline a structured framework of

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1 The web site for CSP – ICT Innovation is http://www.csp.it/

2 For a discussion of the relationship between company structures and the technologies used in organizations, see Gonella and Pantò (2008).

3 For a definition of the term "enterprise 2.0" and further information on the subject, see McAfee A. (2006) and Osservatorio Enterprise 2.0 (2008).

the processes, needs and expectations involved in the exchange of information within the company.

From the analysis performed, it emerged that people were strongly oriented towards knowledge sharing, collaboration and communication, but that the existing tools were not sufficient to support and facilitate dynamics and processes. The analysis highlighted a series of "needs", and below we list the principal ones:

* To improve the circulation of information between and within work groups;
* To enhance the skills of individuals;
* To make the information produced more accessible and visible;
* To promote collaborative work practices;
* To transform "tacit" knowledge into "explicit" knowledge;
* To reduce the use of redundant, non-categorized resources, such as emails, facilitating archiving, the traceability of work processes and the rational use of the skills base.

3 Definition of requirements and conceptual model

Following an assessment of the tools capable of responding to the framework of needs which emerged, we identified three open source applications characteristic of web 2.0: a social networking environment, a wiki and a social bookmarking environment4. The central concept was to integrate the functions of these three different applications into a single working environment.

The table shows the correspondence between the needs that emerged at the analysis stage and the functions of the applications capable of fulfilling those needs.

The social networking environment plays the role of the company's digital "connective tissue": users can introduce themselves to others using their personal profiles and can use their blogs to take note of thoughts and observations that may be of interest to other colleagues.

Using the social bookmarking system, users can recommend sites and online resources to the corporate community, without using email or risking losing information, which, on the contrary, is highlighted and commented with additional data such as descriptions and tags.

The wiki is the most important application when it comes to document sharing, and the collaborative writing of documents via web interface, organized according to a hierarchy or by key words.

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4 For definitions of and further information on the terms "social bookmarking", "social networking" and "wiki" see Marcellin et al. (2007).

TABLE 1
Correspondence between user needs and application functions

| Needs which emerged in the survey	Type of application	Main functions
- To increase the visibility of information about people and their skills - To facilitate contacts and connections between people	Social networking environment	- User profiling - Personal and group blogs - Networks of contacts - User communities
- To facilitate the collaborative writing of documents - To evidence the transition from documents in progress to finished documents - To facilitate the preparation and publication of project schedules, minutes, project accounting and progress reports.	Wiki	- Creation and editing of pages on the web - WYSIWYG (what-you-see-is-what-you-get) editor and HTML - Management of different versions and edits - Inclusion of attachments and management of edits - Conversion into PDF format - Ready-made templates
- To publish favourite web links - To share links - To describe links	Social bookmarking environment	- Recommending links via web interface - Inserting ratings of links - Bookmarklet
- To classify resources according to individual and group resources (folksonomies) - To evidence the connections between people, opinions, documents and projects - To facilitate the recovery of documentation - To monitor activities - To foster the exchange of ideas	Integration between the different applications	- Insertion of tags - RSS Feed - Search engine - Insertion of comments
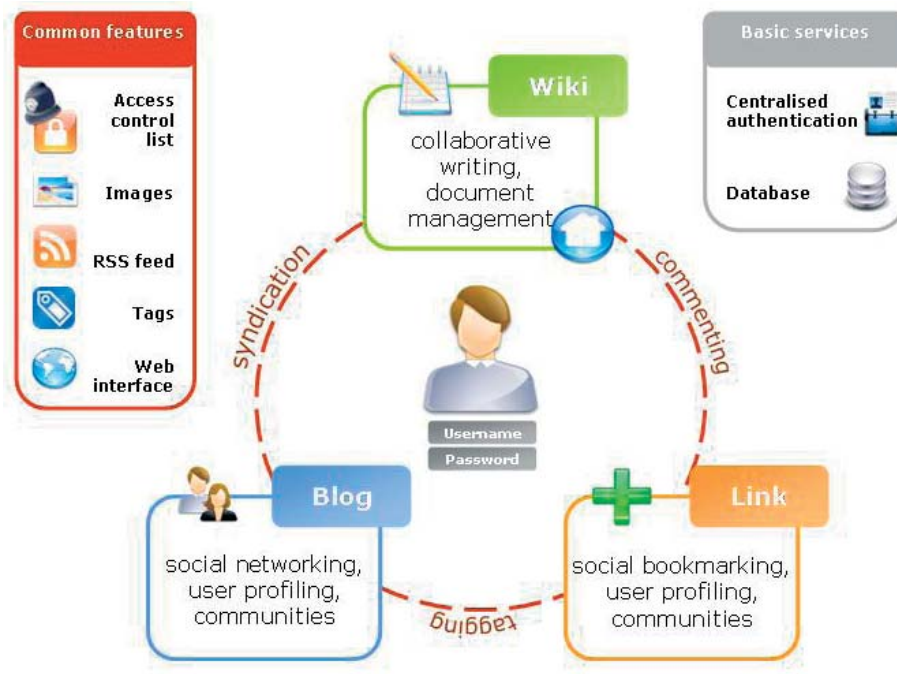
Figure 1. Conceptual layout of eCollab.

By integrating the various environments, we can fulfil needs related to the classification and retrieval of information. eCollab has various transversal functions, which are available for all three applications - wiki, social networking, social bookmarking (see Table 1 and Figure 1):

• Search engine: on all pages of eCollab there is an interface for the search engine, which sources contents from all three applications.

• RSS Feed 5: each application produces different feeds, which enable users to monitor the activities in that environment, and enable the different systems to interface, in order to bring together contents which are homogeneous from a logical point of view.

• Comments: each item of information can be commented on by users, meaning that each item can be discussed.

• Tagging[6]: all of the objects (documents, user profiles, files, wiki pages, articles and links) can be tagged by the users, enabling semantic navigation and searches.

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5 RSS feeds are flows of information from websites that can be received by users with dedicated devices. Users can thus stay up to date with the latest information published, and aggregate contents from different sources.

6 Tagging is the practice of attributing one or more key words to an item of content, in order to provide a description and facilitate retrieval.

4 Identification of applications

In order to select the applications capable of responding to the aforementioned requirements, we looked to the model for assessing the level of maturity of open source software solutions formulated by OITOS[7], the Observatory of the Emilia Romagna Regional Council. This method enables various different solutions to be compared by means of rating a series of set parameters.

This model was adapted to the context of collaboration software, identifying a number of specific technological and function-related parameters.

The results obtained provide a numerical estimate which takes account of the specific usage context. For this reason it was then necessary to make a number of corrections, distinguishing actual requirements (eg. centralized authentication) from functions not deemed indispensable.

The criteria used to evaluate the different open source software solutions, applying the aforementioned OITOS model, fall into four categories:
- Development: assesses the diligence of the software developers.
- Community: assesses the resources made available by the scientific community and private companies.
- Transition: evaluates the adaptability of the software to the specific needs and context.
- Technology: evaluates the software with respect to its category.

According to the numeric scores assigned to each area, and by grouping the data, it was possible to identify the most suitable applications for each software category (wiki, social networking, social bookmarking).

The applications selected using the aforementioned method are the following:
- Wiki: MindTouch Deki - http://www.mindtouch.com/Community;
- Social Networking: Elgg - http://elgg.org;
- Social Bookmarking: Pligg - http://www.pligg.com/.

5 Defining the architecture and developing the prototype

The applications selected were then integrated into a single shared working environment. The technological infrastructure is shown in Figure 2.

To integrate the three different applications we developed a unified interface for the front end, based on fixed, recurrent points of reference from each software application.

The environment was also given a centralized system to manage user profiles and access permissions.
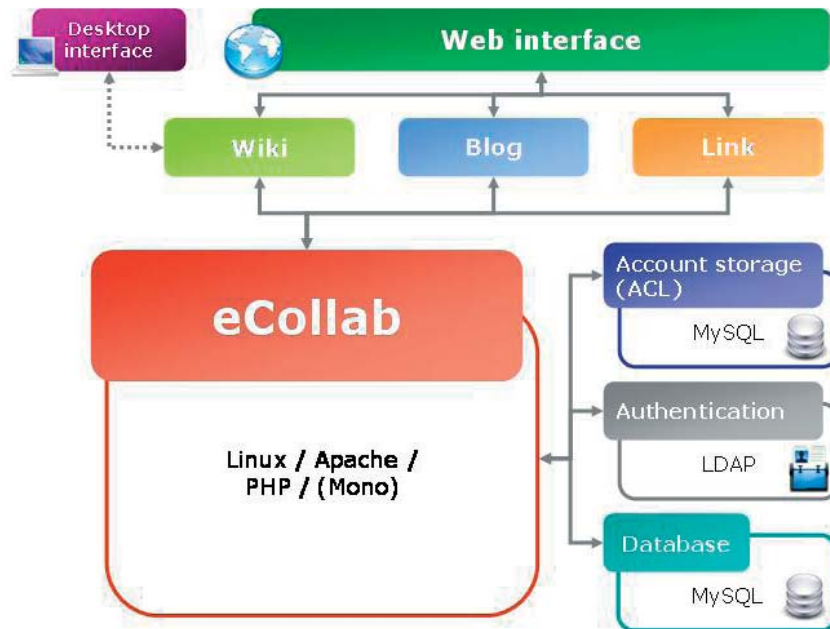
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7 OITOS (2006).

Figure 2. eCollab technological infrastructure

6 Field trial

The trial was conducted in the context of a transversal project and involved 36 people from three different divisions.

The start-up of the project was preceded by a brief training course on the use of the environment. From the organizational point of view it was decided to offer free access to all, and not to impose a formal organizational scheme. The environment must be fluid in terms of organization, reflecting and moulded around the projects in progress. For this reason the guidelines given to participants were very simple. Participants were asked to:

- Compile a personal profile;
- Use their blog to note down observations regarding the project and communications regarding the progress of the work;
- Use the wiki for the collaborative creation of documents such as project schedules, deliverables, reports and project accounting;
- Describe each element with appropriate tags. The choice of tag was at the users' discretion, with a number of exceptions, listed in the wiki.

7 Analysis of results

At the end of the trial we carried out an evaluation, identifying qualitative and quantative indicators regarding the use of the tool, and by means of a questionnaire. Overall the evaluation showed that the environment was useful (80% of participants rated it "very useful", the remaining 20% "fairly useful but interchangeable", while none rated it "impractical" or "of no use") but there were various areas to improve, in terms of management and interface, and from a technical point of view.

The assessment of the usage functions showed that most of the participants used the blog for project management purposes, internal communications within the work group, signalling sources and links, and – to a lesser extent – to report their opinions and critical areas. The main usage functions of the wiki were the collaborative writing and sharing of documents in progress, and to a lesser extent, project management and sharing information on activities.

The participants identified the following strong points:
• project information focused in a single point;
• constant updates thanks to the use of RSS feeds and personal and project blogs;
• collaborative writing of documents using the wiki;
• sharing of knowledge and opinions on specific topics facilitated by the blogs and social bookmarking function.

The weak points underlined by the participants regarded:
• a poorly-defined initial layout: participants wanted better organization of the environment in order to ensure that contents were uniform and legible;
• the functions of the wiki: participants wanted improved editing and document import-export functions;
• the interface did not make the connections between the various applications evident.

8 Product engineering

We attempted to implement the requested improvements by optimizing the various solutions. A study was conducted on the interface, with the aim of improving the user experience, and it was decided to use the wiki as the application that greets the user on the main page. The contents were organized according to a hierarchy of pages, to offer the user a more defined layout. At the same time, the use of tags enabled contents to be organized according to subjective criteria.

With regards to the requests for the improvement of the wiki, we optimized the functions involved in creating the pages, starting with the templates, text export in PDF format, maintaining the style of texts created using office automation programmes, and the management of attachments.

We also worked on integrating the platform into CSP's infrastructure. eCollab has now also been on trial for some months in Regione Piemonte, Iride Energia and CSI Piemonte, and is also offered to businesses as open software, through the project Innovation4Business[8].

9 Conclusions

The 2.0 model illustrated in this article as a system for collaboration and knowledge sharing has led to the definition of a technological architecture and applications capable of responding to the needs of an organization.

Two elements in particular should be noted:
- On a technological level, the decision to use an open source solution based on the integration of various 2.0 applications;
- On a methodological level, the decision to adopt a number of 2.0 paradigms, such as active participation and social tagging.

The trial of the environment showed the need to strike a balance between rigidity and flexibility when it comes to organizing knowledge. eCollab has therefore been structured to enable information to be organized and made available using either a top-down or bottom-up approach. While data in the wiki can be navigated in the classic manner, ensuring uniformity, the use of tags means that information can be organized and retrieved in a subjective, personalized manner.

Acknowledgements

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8 Innovation4Business is a technology transfer initiative of CSP and Torino Wireless, in collaboration with the Turin Unione Industriale and Finpiemonte, and with the contribution of Regione Piemonte. For further information see http://www.csp.it/it/news/I4B_materiali.

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