Elements of methodology for designing Participative Document Spaces

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Application within a project aiming at designing a radioactive waste disposal

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Abstract

This paper presents the first elements of a methodology for designing *Participative Document Spaces (PDS)*, as well as the initial results produced by this methodology within an industrial project aiming at designing a radioactive waste disposal. We define *PDS* as networked digital settings (such as blogs, forums, wikis) which enable their users to build documents and converse at the same time. Designing a *PDS* in a given situation thus implies modeling the links between existing settings for building documents and conversing, as well as the costs generated by replacing all or parts of these settings with a *PDS*. The analysis of our model project shows (a) that numerous settings, both for building documents and conversing, are being used to discuss document content, (b) that improving tracking those discussions could improve the "memory" of the project evolution. In this context, a wiki seems an appropriate tool in the extent that it would allow to directly attach to the documents most of the conversations related to them, thus fostering readability of those conversations and the "memory" of the project. Further studies remain to be conducted to determine the proper functions of the wiki, the rules applying to its use and the diverse costs generated by its deployment within this particular project.

Introduction

Several experiences in deploying collaborative digital tools, notably wikis (Giordano, 2007), stress the importance of analyzing both the tools at disposal and the situation(s) in which they are to be deployed. Building on this experience, we propose here to:

1) First analyze a relatively broad category of digital tools as *Participative Documents Spaces* (PDS), and derive from this analysis design principles.
2) Then analyze the links between settings for building documents and settings for conversing within a particular industrial project.
3) Finally present the type of PDS which seems the most adapted to this project and identify the questions which the deployment of this PDS raises.

1. Participative document spaces: definition and design principles

1.1 Conversational Document Building (CDB)

Our work deals with the activity of building documents, which we define as the activity of recording and articulating semiotic productions on perennial media (Zacklad 2006). Our idea is that this activity changes accordingly with the degree of certainty that one posses about the elements that one is trying to transform into a document. In context of certainty, the relations between a document and its production context are settled. When this is the case building a document can be automated. This is the case for instance with purchase forms used on the Internet. When there is a high degree of

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uncertainty, the document and its production context evolve in relation to one another. One may think, for example, of what happens when one takes notes during a meeting. The notes which are taken at one point may be modified later on, and they may enable to spot contradictions and change the orientations of the discussions. There is then a complex relation between the document and the elements around it. We will call this phenomenon *Conversational Document Building (CDB)*.

It is important to note that the more a situation is conversational, that is the more the relations between the elements which define it are unstable, the more difficult it is to build a document. One may think how challenging it would be for instance to synthesize in real time the notes taken by fifty people participating in a ten day long meeting about controversial matters. We propose to distinguish between two types of CDB related issues: (a) ***Technical issues***: what are the techniques which can be used to record modify or erase heterogeneous semiotic productions? (b) ***Social issues***: who can decide what should be recorded, modified or erased, and according to which criteria?

1.2 Participative Document Spaces as powerful CDB tools

What we call *Participative Document Spaces*[1] *(PDS)* correspond to recently developed digital tools which provide new answers to CDB related issues. Those tools are blogs, forums, wikis, folksonomies to mention only the most famous ones. They have two characteristics in common. (i) **The documents and the tools for building documents are together accessible via networked servers**. A potentially important number of persons can thus read and modify documents simultaneously. (ii) **Functions of "administration" enable users to dispatch document building tasks within a group of persons**, thus allowing to control CDB related social issues. All in all, these features enable users to combine processes of document building and processes of conversing to a level which was previously unattainable.

[1] Zacklad (2006, 2007b) names them E-Dopa

1.3 Design principles

Designing a PDS thus consists in translating[2] into a single space settings which were previously separated: settings for building documents and settings for conversing. A PDS will indeed both reflect those settings and transform them into something different. Designing a PDS thus implies assessing both the positive and negative perturbations that introducing a PDS would generate within a given situation. This assessment (which cannot be separated from designing and deploying the PDS) can be broken down into four steps:

(1) Modeling the links between the existing settings for building documents and conversing
(2) Designing and deploying a PDS which will optimize the functioning of those settings
(3) Modeling the costs generated when switching to the PDS (notably learning efforts from users)
(4) Designing and deploying an action for minimizing these costs

2. Building documents and conversing in the HLLL Project

Putting this methodology into practice, we will now present the links between settings for building documents and settings for conversing within the industrial project which we are working on. The understanding of those links has been derived from document analysis, informal interviews, and semi-structured formal interviews conducted between January and April 2008.

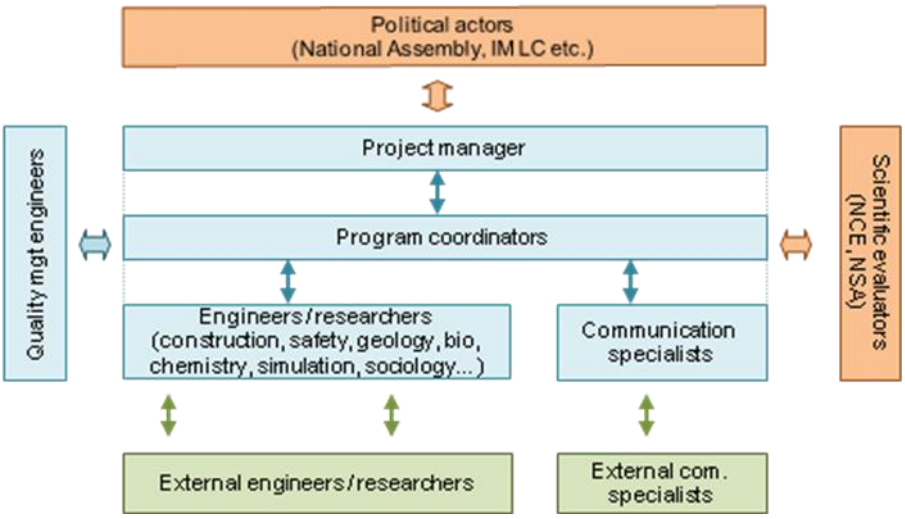
2.1 The HLLL Project: goals and actors

Our field of study is the *HLLL Project*. This project is an important part of the activities of the French National Agency for Radioactive Waste Management: "ANDRA" in French. It has two main goals:

1) Designing a reversible geologic disposal for High Level Long Lived waste (HLLL)
2) Characterizing on a scientific level the area which may receive the disposal.

[2] See Latour (1986) and Callon and al. (2001) for a presentation of the notion of translation to model innovation

Diagram 1: Actors of the HLLL Project



This project mobilizes several different types of actors:

- ***A Project Manager*** who coordinates the activities within the whole project
- ***Program Coordinators*** who coordinate the activities within groups of studies
- ***Engineers and Researchers*** in numerous disciplines: construction, safety, chemistry, biology, geology, numeric simulation, and social sciences. They coordinate the activities within each study or research project
- ***Communication Specialists*** who elaborate the messages intended for the non-scientific public of the project
- ***Quality Management Engineers*** who are responsible for the consistency of the rules applying to the activities of the Agency, and therefore to the project
- ***External Engineers and Researchers*** who carry out the studies and research of the project
- ***External communication specialists***
- ***Scientific Evaluators***: they are commissioned by the National Committee of Evaluation and Nuclear Safety Authority and evaluate the studies and research conducted within the project.
- ***Political Actors*** such as the National Assembly who elaborates the legal framework of the project, or the Information and Monitoring Local Commission who maintains a dialog between local representatives, national authorities and the Andra.

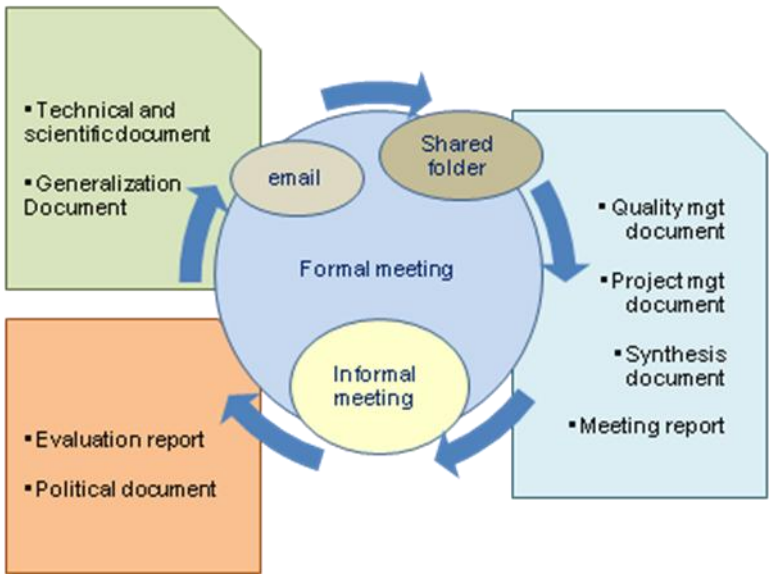
The relations between those different actors are represented into diagram 1.

2.2 Documents, meetings and CDB settings

The coordination between those different actors is ensured notably by elaborating and exchanging different types of documents:

- **Quality management documents** which describe the rules applying to ANDRA's activities
- **Project management documents** which organize the project's activities
- **Synthesis documents** which summarize the results of studies and check their consistency
- **Meeting reports** which describe the exchanges expressed during project-related meetings
- **Technical and scientific documents** which describe the methods and the results of the studies and research projects
- **Generalization Documents** which are intended to make understandable the studies to the non-scientific public

Diagram 2: documents and conversational settings



- **Evaluation reports** which present the evaluators' commentaries and demands
- **Political documents** which describe the exchanges expressed during political debates about the project.

Those documents have two characteristics in common. (I) Their status evolves as the project moves on. We can distinguish between three steps of evolution: (i) they are a work in progress, that is people working on them have not agreed yet to present them as finished documents, (ii) they have to be modified to match a new state of project activities, (iii) they are no longer relevant ("applicable") for the current activities of the project. (II) They enable to keep track of the decisions taken throughout the project. This is necessary for two reasons: (i) to ensure the global consistency of the actions throughout the project, (ii) to transmit the understanding of the project evolution to the future generations who may live with the disposal far after the end of the project.

The evolution of documents generally goes along with discussions. Those discussions take place through different types of settings. The first settings are meetings. We can distinguish between two subtypes: (a) **formal meetings** such as benchmark meetings where the Agency's engineers can evaluate the progress of studies entrusted to service providers, and (b) **informal meetings** such as work meetings or coffee breaks. The second settings are tools enabling a certain degree of *Conversational Document Buildings*: (c) **word processing software** enabling to both build and annotate documents, (d) **Intranet** enabling to gather unfinished documents within **shared folders**, and (e) "**email boxes**" enabling to exchange unfinished documents and comment them. The relations between the documents and those different settings are represented into diagram 2.

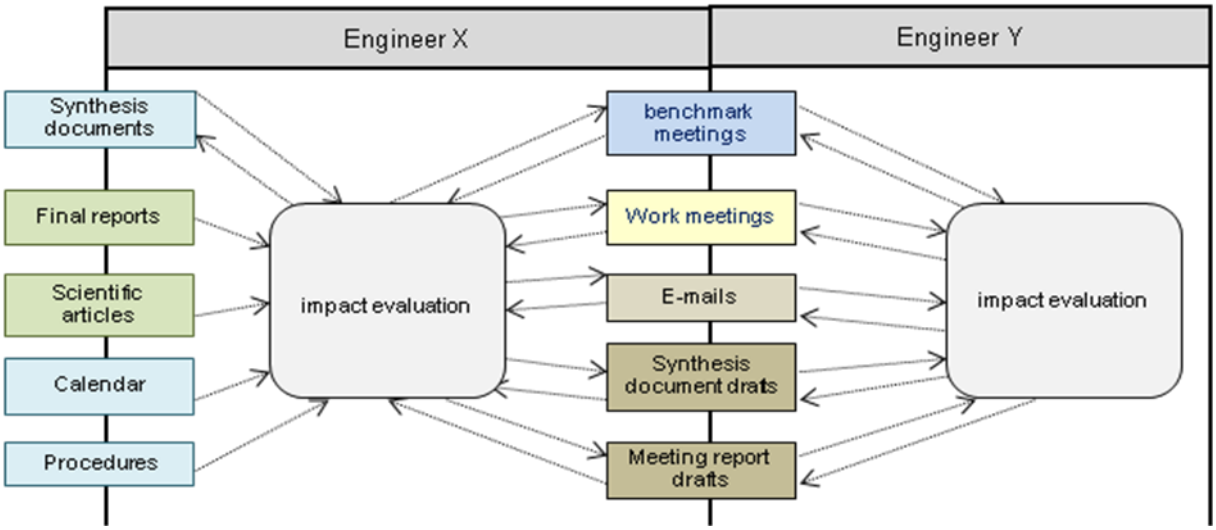
It is important to note that an important part of the decision making processes takes place within those conversational devices. An interesting way of improving the "memory" of the project evolution would thus be to track the evolution of the discussions taking place within those settings.

2.3 Conversing about documents: the case of synthesis documents

In order to illustrate how those different conversational settings are used to discuss the content of documents, let us present the process of modifying synthesis documents.

The modification of a synthesis document brings together several engineers generally within different disciplines. Those engineers have to take into account several documents:

Diagram 3: modification of a synthesis document



- The current state of one or several synthesis document(s)
- Final reports of several studies from which most of the content of the synthesis comes
- Scientific articles which may influence the content of the synthesis
- Project management documents which determine notably the calendar of the synthesis
- Procedures applying specifically to synthesis documents

Taking into account those documents will trigger discussions. One may wonder for instance to which extent the results of a new study change the interpretations of former studies. One may also wonder how to be organized in order to comply with the calendar or the procedures. Those questions will be addressed through different settings:

- Formal meetings as benchmark meetings
- Informal meetings as work meetings
- Drafts of synthesis documents or drafts of meeting reports. Both will be exchanged via
- Shared folders or via
- Emails

This is only at the end of this conversational process that the synthesis document will be modified. This process is represented into diagram 3.

3. Why a wiki is a proper tool

At the end of this initial analysis, we can see that an important part of the discussions which take place within the project relates to the way documents should be built and modified, and the way these documents can enable one to keep track of the project evolution. These characteristics speak in favor of using a wiki to facilitate this process.

3.1 Wiki functions

Indeed, wikis show functions which support the conversational processes which go along with producing and modifying documents collectively:

1) Functions enabling the collective building of documents, in other words, functions such as shared word processing. They are generally categorized as **editing** functions.
2) Functions enabling to discuss through writing about how a given document should be built. They are either ***talk pages*** or ***comment threads*** embedded within a document.
3) Functions enabling to store, index and compare different versions of a document. They are generally named ***modification history***.
4) Functions enabling to dispatch access to the former three functions among a

group of persons. They are named functions of ***administration***.

3.2 Expected benefits

The main benefit which can be expected from those wiki functions is (a) to gather discussions which were previously scattered inside emails, attachments, shared folders, formal and informal meetings, and (b) to directly attach those discussions to the documents which they relate to. This change should optimize readability of document related discussions and the "memory" of the project evolution[3].
One may also expect that improving the memory of those discussions will also allow the emergence of discussions which would not have happened otherwise. The benefit would thus be to enrich the conversational processes of the project.

3.3 Questions

At this point of our research work, we are facing three main questions:

1) We can first wonder how to take into account the different types of actors and documents when designing the wiki functions and the rules applying to their use. For instance, the way people converse is probably not the same whether they are engineers working on a synthesis document or communication specialists working on a generalization document. One may therefore wonder how to translate those specificities inside the wiki.
2) We can also wonder what the relations between the wiki and the others devices for building documents and conversing will be. For instance, most of the meetings enabling discussing documents will probably not be entirely replaced by the wiki. One may therefore wonder to what extent those meetings will be changed in relation to the wiki, and how the roles will be divided between the wiki and those meetings.
3) We finally can ask ourselves what the costs of introducing a wiki will be and how to minimize those costs. We can wonder for instance about the potential difficulties for the users to get familiar with the wiki functions, and how to surmount those difficulties.

3.4 Future actions

In order to find answers to those questions, we are planning several actions:

- Deploying a wiki
- Analyzing navigation patterns within the wiki
- Analyzing the use of *talk pages* and *modification histories*
- Interviewing the actors of the project who choose to use and not to use the wiki
- Writing collectively the rules for using the wiki

4. Conclusion

We have defined *Participative Document Spaces* (PDS) as digital tools enabling the combination of the process of document building and the process of conversing to a level which was previously impossible to attain. We argue that designing a PDS within a given situation implies understanding the links between existing settings for building documents and conversing, and the costs of replacing parts of those settings by a PDS. Analyzing the use of such settings within a project aiming at designing a radioactive waste disposal shows (a) that several settings are being used to discuss evolving document content, (b) that improving tracking of these discussions could improve the "memory" of the project. In conclusion, we argue in favor of using a wiki within this project to the extent that it would enable to directly attach to the documents most of the conversations related to them, thus fostering readability of those conversations and the "memory" of the project. Further studies remained to be done to identify notably the costs of designing and deploying a wiki and the way to minimize those costs within this particular project.

[3] The notions of readability and « memory » can be linked to the notion of awareness (Schmidt 2002), (Cabitza, Simone 2007).

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