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Collaborative Tools in Project Management

Abstract

The paper presents a brief introduction to the issue of collaborative tools and provides the survey of those that can be used for project proposal development and for project management. Several categories of tools are investigated (collaborative text processors and other authoring tools, dropboxes, whiteboards, shared calendars, teleconferencing, etc.).

On the basis of their own experience from project proposal preparation and project management the authors summarize the advantages of these tools over the traditional methods based on sequential processing of various files and documents and present arguments for their use, as they can significantly facilitate the work of the project team, especially in projects with geographically distant partners. Using currently available collaborative tools prepares the users for the work in rapidly developing cloud computing environment.

The role and stages of project management office as a supporting structure for project development and managenent is briefly described in the third section of this paper. In the concluding part the authors provide a list of available tools with links and references; many of them belong to the shareware or freeware and can be therefore easily implemented and tested.

Key Words

project management, collaborative tools, project management office

JEL Classification: M10, M15

Introduction

A collaborative tool is a groupware application that allows members of the team to work on one (or more) tasks using different computers. There are two types of collaborative tools:

- Synchronous (real time, simultaneous), allowing team members performing tasks at the same time; each member sees what the others are doing; all modifications are included in one final document.
- Asynchronous, meaning that team members perform the tasks at different times; the workflow between members can be controlled (only one person has access at any given moment) or random (every team member modifies the document separately and in the end one person summarizes all work done and creates a final version).

If we take into account that the tasks can be performed at one place or at geographically distant places, the groupware applications can be classified according to Table 1. Collaborative synchronous applications generally permit both synchronous and asynchronous work.

Tab. 1 Groupware classification

	Synchronous	Asynchronous
Different places	Chat, videoconferences, Skype, web-based and client-server applications	E-mail, text conferences, workflow for distributed team, dropbox
Same place	Face-to-face, team work, shared boards	E-mail, workflow for local team, KnowledgeTree

Source: authors

In the following sections of this paper we will focus on the use of collaborative tools in project management and we will give references and links to some useful tools. The role and stages of project management office as a supporting structure for project development and managenent is briefly described in the third section of this paper.

Our goal here is to use our experience with the preparation of project proposals with many, often international, partners and their management. Even if it is not the high-level research, we hope that presentation and comparison of available tools can be interesting and practically useful for potential project managers. The bibliography includes links to resources providing more detailed information about the tools and their availability. Many of them belong to the shareware or freeware and can be therefore easily implemented and tested.

1. Advantages and disadvantages of collaborative tools

As in the synchronous mode the speed of communication is limited by network lag and the users need incorporating their modifications instantly, then, due to communication lag, their modifications may be inserted into different versions of the document. This problem can be solved in a client-server architecture: one of the application instances is assigned the role of collaboration server when the document is opened. This server receives notifications of changes made to the document by other users, determines how those changes should affect its local copy, and broadcasts its changes to the collaboration pool. As a result, we obtain a single final document incorporating all modifications done by the team members. This approach is used e.g. in Zoho [15] and Google documents [16].

If we compare this approach with traditional one, when the document is distributed to the team members, each of them inserts the modification to the local file and sends it back to the common editor, than this person can get back many files and must combine them into one resulting document. Often different modifications are proposed at the same place and the next round of revisions is necessary. Probably the majority of us have experience with this kind of work, e.g. revising the word document in the revision

mode and trying to create the final document from different (maybe 10 or even more) versions. For the final editor this is quite cumbersome experience.

What can be a disadvantage of collaborative tools using shared data pools in the cloud is the security of documents. The user loses direct control over the files and therefore, when working with sensitive data, the additional security measures must be applied. One of the possible solutions – decoding and encoding the files – practically eliminates synchronous option, but can be well realized in asynchronous applications, e.g. in Dropbox [21] or KnowledgeTree [22].

These applications are also suitable for building the project document repository; University of Bohemia supports Knowledge Tree as the shared document pool [23].

2. Collaborative tools and project management

The project management is nothing but planning, organizing and managing the resources. But what is the right way to do it? Are there any tools facilitating project preparation, management and assessment? Under what conditions are they available, how user-friendly they are and what are their main features? We will try to answer these questions in this article and, on the basis of our own experience, give some hints to potential users.
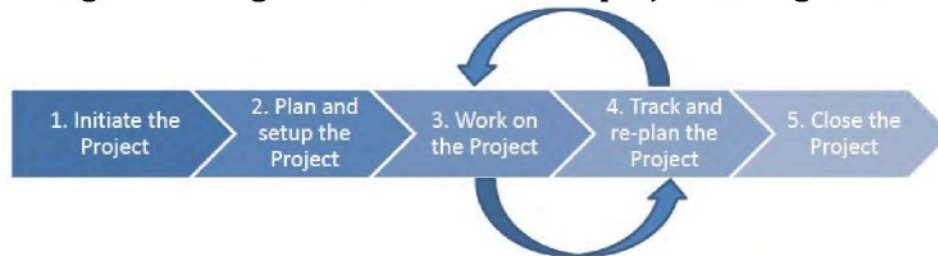
As stated in [1], "Rapid evolution of communication technologies is making distributed projects increasingly viable. The project participants could be widely dispersed yet coordinated by sophisticated tools." Romano, Chen and Nunamaker in [2] propose a five-level hierarchical framework for collaboration and in [3] they propose collaborative project management architecture based on the following observations: "The PM paradigm has changed due to increasing number of distributed project collaborators from different locations, organizations and cultures. ... A high degree of informal and ad hoc communication is important for distributed project success. ... A collaborative PM tool focuses on explicit representation of project information and timely sharing of the information. ... A collaborative PM tool should facilitate members in conducting group processes such as: generating ideas, organizing ideas, and selecting alternatives. If results are stored in a permanent repository they can be used for future project analysis." The authors also draw attention to the importance of transformation of tacit to explicit knowledge, well described by the SECI cycle introduced in Nonaka and Takeuchi in [4] and broadly used in today's knowledge management.

BrightWork's Collaborative Project Management: A How-To Guide [5] provides "An easy to follow and simple to use Project Management Guide for Project Managers who are not yet formally trained in Project Management and who may not yet have the time or budget for training." Their approach to collaborative project management comprises the five stages (see Fig. 1).

CASA Guide to Managing Collaborative Processes can serve as a case study describing the application of theoretical concepts in the practice of a specific organization. As the

authors say, the goal of their Guide is *"facilitating multi-stakeholder Project Teams as well as for those who participate in the process. Not intended to be exhaustive of all skills required, it provides a description of the tools and steps fundamental to collaborative decision making and integrates more structure and discipline into the process."* [6, p. 9]

Fig. 1 Five stages of the collaborative project management

1. Initiate the Project → 2. Plan and setup the Project → 3. Work on the Project → 4. Track and re-plan the Project → 5. Close the Project

Source: [5, p. 5]

Google search for "collaborative tools in project management", performed on April 5, 2013, returns approximately 8 180 000 links. However, if you browse several top pages, you see that the prevailing majority of links is to companies offering online integrated project management systems, which are usually based on subscription fee depending on the number of users, features, etc. These SW packages let you collaborate with project resources, manage project users, analyze risks, assign tasks, coordinate schedules and make your project a success from anywhere in the world. These project management apps can save you time, but, especially at the very beginning, they can also be quite time-consuming and not intuitive. Furthermore, for current use at the university they too expensive. Some of the applications offer free trial (usually for 1 month), only a few of them offer free access, but with severely limited toolset (e.g. Zoho Projects [14]).

Collaborative project management and project portfolio management is offered by MS Project 2010 server version. This application was installed at the University of West Bohemia with support of the FRVŠ project 1573/2012 "Vybavení počítačových učeben pro výuku projektového managementu" (Equipment of computer laboratory for project management courses). In winter semester 2012/13 the desktop MS Project Professional 2010 [11] was implemented in the Project Management course of the bachelors study programme. The course was attended by 178 students. The MS Project Server 2010 will be introduced in 2013/14. This SW package provides many of the collaborative features, but its use is limited only to the local university installation, potentially for collaboration with project partners using the same software. The currently offered MS Project 2013 suite [12], [13] offers extensive toolset for online collaborative project management, but similarly to earlier version, its use is limited by price and partners using the same application.

In the following parts of this contribution we will focus on less demanding, often free- or shareware applications that can facilitate the preparation of the project proposal, monitoring the project progress, prepare project reports, evaluate the project results and archive the project documentation.

2.1 Project proposal development

Project proposals are today often finalized and submitted in web applications like e.g. BENEFIT7 [9], used for the EU Structural Funds in the Czech Republic. However, these applications are not very suitable for project proposal development, especially in its initial phases. Generation of project ideas can be supported by brainstorming, mind maps and other tools described in section 4.

The project proposal development phase is often quite hectic – the deadlines, even if at the very beginning of the process seem distant, are approaching too fast and the time pressure in the last days is quite exhausting, especially for project coordinator.

Typical projects at universities involve several partners from different organizations, often from several countries. It is impractical to suppose that all of them will use the same complex online project management software package and therefore we are limited by the use of commonly available tools, mostly from freeware or shareware category. In the phase of project proposal development we must formulate project goals and objectives, form project team, define work packages, assign responsibilities of project partners, allocate resources, develop project budget and project schedule. Most working documents in this phase need not be strictly formally structured; usual formats are text files and spreadsheets, most often MS Word and MS Excel from the MS Office suite. These types of documents can be shared in easily available synchronous applications ZohoWriter [15] or GoogleDocs [16] or asynchronous data repositories as Dropbox [21] or KnowledgeTree [22].

Additional appendices, as Gantt chart, organizational diagrams, mind maps, etc. are usually prepared by project coordinator in locally available applications, in our case MS Project 2000 [11], SmartDraw [20] and MindManager [18] or X-Mind [19], finally usually converted to pdf files and appended to the project proposal.

Indispensable tool in this phase is Skype [24] – both for one-to-one and for the team communication. With Skype, it is quite easy to share the ideas and directly implement them into the project files. MP3 Skype Recorder [25] allows recording the communication so that it can be referred to later on and shared with those project team members who were not able to participate in the discussion. Even with all sophisticated tools, we must not forget to organize the kick-off meeting as soon as possible – the face-to-face meeting cannot be replaced by even the best technology.

2.2 Project management and monitoring

After the project approval the work packages leaders must lead their local teams and report their progress to the project manager, who then must periodically submit progress reports, including financial reports. As the structure of these reports differs for different types of projects, grant agencies, etc., we again usually resort to informal working documents created in some type of shared environment and the project coordinator then must collect all the necessary information and submit it in the required

form (usually through some web application) to the project sponsor. The tools used are similar to those described for the project proposal development. Again, we must not forget personal meetings and workshops.

3. Project management office

Collaboration in projects can be assisted by project management office that in larger organizations (including our university and faculty) provides support to project managers. We can distinguish the two following types of the management office (PMO) according to the extent of its activities:

- PMO providing basic services to project managers – information, selected administrative tasks, possibly including accounting;
- Integrated PMO involving project managers who manage all projects in the organization.

Among the basic PMO´s activities are:

- developing and implementing process framework and the methodology of project and project portfolio management,
- developing and delivering project management trainings,
- improving cooperation between project and functional managers,
- supporting project preparation, management and administration,
- collecting and sharing best practices, creating and maintaining the knowledge database related to project management

The typical PMO services, activities and tools are well described in [8] (see Fig. 2) and can be used as the model for any PMO. According to [7] we can distinguish five basic phases of the PMO development:

1. Project office – usually 1 project manager responsible for successful performance of one or more projects;
2. Basic PMO – providing standard methodology and tools reusable for multiple projects;
3. Standard PMO – creating and implementing infrastructure of the organization´s project management, providing services to individual projects and project managers;
4. Advanced PMO – using integrated and complex approach to project management within an organization, project portfolio management;
5. Centre of excellence – separate unit having responsibility for organization project and project portfolio management, continuous improvement of the methodology, process framework and cooperation between organization´s units.

The type and phase of the PMO development implies the use of collaborative tools and techniques. Beginning from the 3-rd phase of the PMO development the use of

collaborative tools seems to be indispensable due to necessary efficient cooperation and coordination.

The PMO operates at the UWB Faculty of Economics in mode 3 with the goal to proceed to higher levels of operation.

Fig. 2 ITU Project Management Office Services
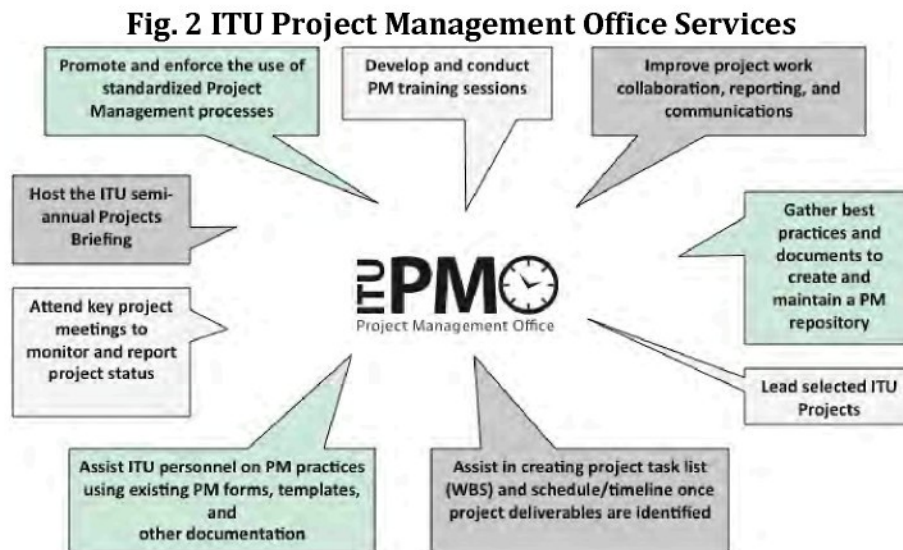
4. Where to find the tools (links, references)

We participated in the development of one of partial outcomes of the Leonardo da Vinci project InnoSkills – The Informal and Cooperative Learning Guide [26], which together with the InnoSkills Innovation Rooms describes several categories of collaborative tools for innovation management; however, they can be quite as well used for project management.

The Guide provides explanations on how to efficiently use the tools and benefit from them. All the tools were tested by InnoSkills partners in practical situations. Their experience, lessons learned, benefits and challenges, tips & tricks are described in the Guide together with links to websites from which the users can download the SW and further information about the product use.

We explored tools for the following categories:

- *Brainstorming* Brainstorming is a creativity technique designed to generate a large number of ideas. It can help to develop project ideas at the very beginning of the project proposal development.
- *Mind Mapping* A mind map is a diagram used to represent words, ideas, tasks, or other items linked to and arranged around a central key word or idea. Mind maps are used to generate, visualize, structure, and classify ideas, and as an aid in study, organization, problem solving, decision making, and writing.

SW: MindManager [18], freeware alternative: X-Mind [19]
- **Collaborative Text Processors** A collaborative document processor is a form of collaborative software application that allows several people to edit a file using different computers.
  SW: Zoho [15], Google [16]
- **Whiteboards** This kind of software allows a defined number of persons to work together online from different locations on a document, discuss a website, draft any schemes etc.
- **Online Polling** An online polling is a survey in which participants communicate responses via the Internet, typically by completing a questionnaire in a Webpage. Online polls may allow anyone to participate, or they may be restricted to sample drawn from a larger panel.

Conclusion

At present, in the university environment, we cannot rely on complex online project management collaboration software packages and we must resort to generally accessible applications, mostly from the free- and shareware categories. However even those less sophisticated tools allows us to build a toolset that can significantly facilitate collaborative work in all project phases. This paper describes various elements of such a toolset currently used at the University of West Bohemia.

We would like to conclude by the quotation of U.S. Army general and minister of defence Colin Powell: "There are no secrets to success: don't waste time looking for them. Success is the result of perfection, hard work, learning from failure, loyalty to those for whom you work, and persistence"

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