Comparison Study of Some Collaborative Tools Use in Virtual Teams

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Abstract: This article describes the connectivity and networking of virtual team members (based on the reference review and some structured interview organized with members of virtual project teams) and new perspectives in virtual teams' collaboration, to underline the actual trends and to identify their future development. Introduction of new communication tools with multiple options and functionalities that better support collaborative work and learning processes will also, facilitate the integration of new members, the communication and working processes and they will increase trust between members of virtual teams. The tools used for communication and real time research-work will increase competitiveness, too by optimizing the resources dedicated to different projects, teams and management systems. There are software tools that facilitate communication, collaboration and coordination of virtual teams. Choosing the right software has to consider the specific virtual teams' needs and requirements. The best frame is one in which the characteristics are well defined so that they cover all aspects of collaborative activities and overall project management.

1 VIRTUAL TEAMS DEFINITION, TYPOLOGY AND ADVANTAGES

Modern organizations build-up and encourage the development of virtual teams/networks for better attend their global objectives/interests in the global economy. The changes in managing people as employees have underlined, in the last years, the importance of virtual teams (created by the organization extension boundaries) for the global business management. In addition, the information and communication technologies development have support new types of work within an organization (much more efficient and effective) based on the emergence of virtual cooperation, collaboration and learning. The phenomena has initiated many research studies aimed to discover the new challenges, benefits and disadvantages of virtual teamwork. Virtual teams' definitions evolve from the primary description of the concept made by (Lipnack et. al., 1997): *virtual teams are most definitely teams, not electronic representations of the real thing. They are going digital, using the Internet and Intranets. Unlike conventional teams, a virtual team works across space, time, and organizational boundaries with links strengthened by webs of communication technologies*. Other following researchers conclude that a real working team can be transform into a virtual one if some criteria, characteristics are satisfied simultaneously (Ale Ebrahim et al., 2009): (1) they are geographically dispersed (Dafoulas & Macaulay, 2002), (Shin, 2005), (Nemiro, 2002), (Peters & Manz, 2007), (Lee-Kelley & Sankey, 2008); (2) they are driven by common purpose (Bal & Teo, 2001), (Shin, 2005), (Hertel et al., 2005), (Gassmann & Von Zedtwitz, 2003), (Rezgui, 2007); (3) they are enabled by communication technologies (Bal & Teo, 2001), (Nemiro, 2002), (Peters & Manz, 2007), (Lee-Kelley & Sankey, 2008); (4) they are involved in cross-boundary collaboration (Bal & Teo, 2001), (Gassmann & Von Zedtwitz, 2003), (Rezgui, 2007), (Precup et al., 2006).

Technologies, setting clear, coherent objectives and member competencies (expertise, convergent on the teams' objectives/tasks) are preconditions of the virtual teams' forming. Leadership and communication facilities are considered success items for an efficient and effective virtual team.

The main ideas of this article are related to: presentation of the functionalities requirements of the software tools to support virtual teams work (as precondition of the virtual team success); then a comparison study of some collaborative tools used

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by virtual teams will be made in order to show how communication and collaborative working technologies contribute to a trustful environment development between members of virtual teams. The following software solutions that can be used to support collaborative work during a process were analyzed: Anymeeting, Enovia 3D Live, Caltech's EVO, Lotus Sametime, Skype and WebEx. Finally, some conclusions of our research will be made.

2 TECHNOLOGICAL ASPECTS THAT SUPPORT VIRTUAL TEAMS

2.1 Functionalities Requirements of the Software Tools used to Support Virtual Work

Virtual teams are deeply dependent of computer and telecommunication technologies. These technologies define the operational environment of any virtual team and thus come together to determine the *infrastructure* for collaborative working and learning.

Communication between two or more persons can be done synchronously. In truth, this way of communication is based on the interactive exchange of data, information or knowledge. Communication can take various aspects, and depending on the context, the needs will be different.

Taking into account synchronously and asynchronous communication, we will provide an overview of technologies that facilitate communication: (a) synchronously as video communication, audio communication, instant messaging and whiteboard; (b) asynchronous as e-mail, forum and the exchange of information.

For an effective work in virtual teams and also, to increase trust between members of these teams, a range of technologies are used to facilitate communication and work based on data transfer.

The following functionalities are very important to support virtual teams' collaborative working environment development: t*he sound (audio), video streaming (video), transmission of text (instant messaging), display/revising whiteboard content (whiteboard), application presentation/common control over the application (sharing application), recording session.*

Table 1 assist the virtual team facilitator choose the appropriate technology based upon the purpose of the meeting and the functionalities that are needed (Ale Ebrahim et al., 2009), (Thissen et al., 2007).

Using real-time communication tools and research can increase companies' competitiveness by optimizing resources dedicated to different projects,

Table 1: Tools for Virtual Teams (synthesis from (Thissen et al., 2007); (Ale Ebrahim et al., 2009)).

Tool	Examples	Uses and Advantages	Immediacy
Instant Messaging and Chat	Yahoo Messenger, MSN Messenger, AOL Instant Messenger, Skype	Instant interaction, Less intrusive than a phone call, View who is available, Low cost, Low setup effort	Synchronous or asynchronous
Groupware / Shared Services	Lotus Notes, Microsoft Exchange, Novell GroupWise	Calendars, Contact Lists, Arrange meetings, Cost and setup effort vary	Asynchronous
Remote Access and Control	NetMeeting, WebEx, Remote Desktop, pcAnywhere	User controls a PC without being onsite, Cost varies, Setup varies	Synchronous
Web Conferencing	EVO, WebEx, Anymeeting, GoToMeeting, Enovia 3DLive	Live audio, Dynamic video, Whiteboard, Application sharing, Moderate cost and setup effort	Synchronous
File Transfer	File Transfer Protocol (FTP), Collaborative Websites, Intranets	Share files of any type, Cost varies, Moderate setup effort	Asynchronous
Email	Numerous vendors and Free applications	Send messages or files, Cost and setup effort vary	Asynchronous
Telephone	"Plain Old Telephone Service" (POTS), Voice Over Internet Protocol (VOIP)	Direct calls, Conference calls, Cost varies, Low setup effort	Synchronous Asynchronous for voice mail

Table 2: Comparison between information technology support solutions.

Functionality	AnyMeeting	Enovia 3D Live	EVO	Lotus Sametime	Skype conference	WebEx
Text transmitted	X	X	X	X	X	X
Sound transmitted	X	X	X	X	X	X
Video transmitted	X	X	X	X	X	X
Show the content of whiteboards	X	X	X	X	X	X
Share control of the application		X				X
Transmitting data by files	X	X	X	X	X	X
Combining calendars						
Show/edit calendar						X
Show/edit list of media content		X				X
Conducting a opinion survey				X		
Show participation	X	X	X	X	X	X
Status record	X	X	X	X		
Record the whole session	X	X	X	X	X	X

teams and systems management. Current virtual teams use complex software tools to better satisfy their specific needs for working together. In the following, a short overview of some collaboration tolls will be made.

2.2 Comparison Study of Some Collaborative Tools used by Virtual Teams

The actual virtual teams are using complex software tools to collaborate and to develop new complex tasks. During a project process that is developed by a virtual team, there are used a lot of software tools that are capable of project management and real-time communication between project teams or members. For the purpose of this paper, there have been analyze the some software used for collaborative work by analyzing the correspondent vendors information, by testing them in local conditions or during some project meeting of ours. The method of structured interview with different users (partners of our national and international projects) allows the synthesis shown in Table 2.

AnyMeeting is known as Freebinar. This is a free collaborative platform. Has the same qualities and features as a platform for which you pay, is an online platform, so that the download is only required for the presenter which allows you to share your screen (for the host).

Enovia 3D Live is a powerful product of Dassault for collaboration between virtual project teams. Easy to use, ENOVIA 3DLive provides a virtual workspace for reviewing product data and guiding contributors across heterogeneous information sources to the exact projects, people, and information necessary for efficient product development. Users are involved in a visually rich, real-time environment where on-line virtual teams and communities are brought together quickly. Virtual teams can search, navigate, chat, perform co-reviews and collaborate on all aspects of the product, and all with just an Internet connection.

EVO (Enabling Virtual Organizations) is a tool designed for education and research by a community of physicists. Is the successor of the Virtual Room Videoconferencing and videoconference is a tool produced by the folks at Caltech. This platform offers the possibility to create and join in meetings/meetings. There are no limits on the number of people who can participate. Is based on Java and runs on three operating systems used by the scientific community: Windows, Linux and MacOS.

Lotus Sametime is designed as a tool to announce the presence and instant transmission of messages (in a work team). Participants who begin an instant messaging meeting because they saw that the others are available at any given time, they can *improve* the exchange of information by adding an audio link to a streaming video, a white sheet and functionality for sharing application. In addition, they can pre-arrange meetings that are secured with a password.

Skype software allows meetings worldwide. Millions of individuals use Skype for audio and video calls frees, to send instant messages and files or for group meetings with other Skype users. Every day, people everywhere use low cost Skype calls to landline or mobile. Shortcomings: it is possible only between two people and cannot use shared applications or tools. Skype do not allow sharing application.

WebEx makes sharing webcam video easy and intuitive (simple menus and manuals). If somebody from a team has a webcam enabled, just click the

camera icon next to your name in the WebEx interface to start (or stop) sharing. Web conferencing allows members of a conference do almost anything they can do during face-to-face meetings. WebEx is able to: hold a press conference; make a sales presentation; conduct remote training; collaborate on design.

Table 2 shows a brief analysis of the presented software for collaborative work, communication that are most used in virtual teams. This comparison was made using information from the vendors and users, but from our experiences gain in different projects when such software was available for use. A comparison between: AnyMeeting, Enovia 3Dlive, EVO, Lotus Sametime, Skype conference and WebEx has been done by considering criteria related to their efficiency and effectiveness to support virtual teams work (share applications, data, information and knowledge; project management and collaborative learning) and communication functionalities. To be successful, virtual teams need a strategic framework in which to operate.

3 CONCLUSIONS

Based on the software analysis that support the virtual collaborative environment development, it has been demonstrated that the appearance of special tools, allows users to exchange information quickly and it leads to a decreased time required for developing and launching a product. It is highlighted that in the approach of virtual teams we must significantly consider the differences between software, which facilitates the access to information technologies, data storage and networking between participating teams at products development.

The software used for project management and for collaborative work should provide instant access to information and collaboration to support virtual teams members: to improve time management and knowledge management activities; to improve collaboration, co-operation and integration.

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