Analysis of 1000 Days of Collaborative Activities in Two Multinational Educational Projects

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Abstract: - Effective and efficient communication and collaboration is a prerequisite for the success of a project. This paper presents the numerical data which relieve the amount of the collaborative activity developed through collaborative platforms in the frame of two European educational projects during around one thousand days of these projects life-time. The paper extends the research presented in [7] by including the data of the last four months of the two projects considered. The aim of this paper is to show how much a collaborative platform can be used during a three years educational project life-time and what types of project activities requests a more intense use, in terms of quantity, of these platforms. For this evaluation, it is proposed a method which has as basis the processing of the statistical data from the log files generated by the web server which hosts the collaborative platforms.

Key-Words: - Multinational educational projects, collaborative platforms, activities reports, groupware

1 Introduction

The advanced technology and Internet has influenced the way in which we perform our daily tasks, the way we live, do business, shop, learn, communicate and how we spend our spare time [9].

With the advantage of new technologies, individuals have formed teams to work cooperatively, facilitating the emergence of new learning methods. This way to learn makes easier to create, adopt and distribute contents. Independently of time-limit or geographical limits, this way allows students and teachers to exchange opinions and information by ICT (Information and Communication Technologies) [10, 30].

The concept of teams and teamwork is the most important key to success and objective achievement in the contemporary organizations [32] and also in the educational and research multinational projects.

The multinational project teams are very complex, especially because the team members have different cultural background and not only. Communication aspects like informing, problem solving and monitoring progress are found to have a significant impact on effectiveness of virtual teams even within one culture [26].

In face-to-face teams, the relationship is easily build because usually team members know each other or/and they have a shared context (e.g. same company, same city/country, similar values, similar expectations, common projects, etc.) which facilitates communication.

Although the multinational projects include a series of face-to-face meetings, the communication between partners is mainly done using communication technologies. Thus the partners' members are more a virtual team than a traditional one. In virtual teams, the leader (in this case, the project coordinator) has to find or create a shared context that enables team members to see that they are similar in some important aspects to others in their team, to build familiarity among team members. Psychologists have demonstrated that people need a common context in order to build new relationship [11]. The relationship building effort is also bigger because the distance decreases the team members' involvement.

Studies [22] proves that "the relationship between distance and interaction frequency was well described by an inverse power function with a slope of approximately -1, consistent with the expectation that social impact is proportional to the inverse square of the distance separating two persons".

Thus, the project coordinator of the project virtual team has to make efforts to create a structure that fosters teamwork and helps the team regulate itself. The technology used for remote collaboration may help the project coordinator to further than these limits.

Messaging applications, such as e-mail and instant messaging are the most pervasive team-based communication tools, the "most common and best-understood computer-mediated technology for distance collaboration" [13]. They provide features for

synchronous and asynchronous interaction, thus facilitating information sharing and decision making.

Traditionally, the collaboration between the members of multinational projects is done by e-mail and sometimes by instant messaging. With *an increasing use* of e-mail in the last decades, the numbers of messages that a person receives daily has increased a lot, too. Thus, it has become difficult to manage the messages flow. Within the project partnership, exchanging data represents a very important aspect. The collaborative work between the members' team involves the work on the same material, in many cases. Managing file versioning by e-mail is sometimes a real challenge [23].

Instant messaging applications support synchronous communication, and have the advantage of offering the possibility to see if another team member is online or not ("presence awareness"). Both e-mail and instant messaging technologies help in geographically dispersed team work, especially in social/relational interaction support, but for a real effective team work, a collaborative platform is needed.

2 Collaborative platforms

The collaborative technologies is the fundament of a large range of tools, systems and IT platforms that sustain collaboration in the modern global economy, contributing decisively on the consolidation of different types of virtual collaborative communities [24].

There are three primary ways in which humans interact [31]: (a) Conversational: An exchange of information where the primary purpose of the interaction is discovery or relationship building. There is no central entity around which the interaction revolves but is a free exchange of information with no defined constraints. (b) Transactional: Involves the exchange of transactions which alter the relationship. Interactions are most effectively handled by systems that record, manage and complete the transaction. (c) Collaborative: Completely alters the effectiveness of the interaction between collaborators. Examples include the development of an idea, creation of a design, and achievement of a shared goal. Real collaboration technologies deliver the functionality for many participants to augment a common goal.

Collaboration is a process defined by the recursive interaction of knowledge and mutual learning between people who are working together toward a common goal. Collaboration does not necessarily require leadership and can even bring better results through decentralization and egalitarianism [31].

Collaborative platforms (also named groupware), represents a technology designed to facilitate (communicate, cooperate, coordinate, solve problems, compete, or negotiate) the work of groups [5]. The goal of any groupware is to integrate textual, visual, and auditory communication into a coherent software environment, integrating local-versus-remote and private-versus public information with usability metaphors based upon real world customs [12].

Within international educational projects the collaborative platforms must support activities, which frame in the same - time / different - time and different place category of the computer support for collaborative work Johansen matrix [28].

During the last years, there have been developed many complex cooperative platforms.

The collaborative platform provide features for document and file sharing, shared desktop access, simultaneous editing and other electronic forms of communication that allow data to be shared, edited and copied during the web meeting, personal notes, calendar.

In order to work in a cooperative way, it is necessary to share experiences and knowledge and to have a very clear common objective in which feedback is essential for success [20].

In the following sections, there are presented two collaborative platforms which have been used for communication and for collaborative work in the frame of two Comenius 2.1 multinational educational projects.

The two collaborative platforms are: BSCW - Basic Support for Collaborative Work (afterwards renamed Be Smart Cooperate Worldwide) and phpGroupWare.

2.1 BSCW platform

BSCW (http://www.bscw.de/english/product.html) is a collaborative platform that manages workspaces for different groups. The users may be members of several workspaces (e.g. one workspace corresponding to each project a user is involved with). A shared workspace can contain different kinds of information such as documents, pictures, and URL links to other Web pages or FTP sites, threaded discussions, member contact information and more [8]. BSCW is commercial software with a flexible licensing system which depends on the number of users and on the time of use.

Distributed as a server-based package or as a service, the BSCW system is accessible to the end users through a web browser on an Internet-connected computer. BSCW ensures a minimal effort to manage complex workflows and provides a flexible role concept so the managers can define access rights for individual group members. The users can upload data to the workspace and set rights to control the visibility of this information or the operations which can be performed by others. The most useful features for trans-national cooperation that BSCW provides are: document versioning (manage different document versions), transferring (a variety of

document transfer mechanisms) and locking (the others access rights can be temporarily denied), discussion forums (threaded forums), annotations and ratings, event notifications (customized email notifications and daily reports), customized access rights (by user and data), search facilities, archive functions, sending documents (directly from the workspace), online surveys (the survey results can be presented in visual form with related graphs), contact lists (the contact list can be shared), mobile access (PDAs and SmartPhones), integrated HTML editor (directly in the BSCW document management facility), appointment and reminder service (personal time management tool), interfaces (interfaces to link BSCW to external systems such as conferencing platforms, conversion services interfaces), individual user interfaces (interface tailoring according to needs) [3].

2.2 phpGroupWare platform

phpGroupWare is a "fully featured, web based messaging, collaboration and enterprise management platform" (http://www.phpgroupware.org/). It is provided with a range of modules (more than 50 applications) that can be selected and installed according to needs. Some of the most powerful features that can be used for multinational team collaboration are: contacts management, email, shared web-based calendar, to-do lists, address book, web content and document management and sharing, project management, issues tracking.

The phpGroupWare is a free to use platform which is a real alternative to commercial collaborative software, but more than that it is open source software - which means that it can be modified to accommodate specific needs. phpGroupWare allows users to build and deploy their own web based applications quickly and easily and supports multiple database backend, permissions and access controls, user interface generation and multiple languages. phpGroupWare currently supports over 20 languages and its flexibility and scalability make it suitable both for small groups and large groups.

The modular structure of phpGroupWare makes it possible to setup a flexible working environment and adapt the system on special demands. phpGroupWare includes a setup tool to install or remove applications. To get started coding new applications, there are several developer tools available [29].

3 Results and discussions

It is interesting to observe how much a collaborative platform is used during a multinational project life-time, in accordance with the project activities. In the following there will be presented two cases. Both multinational projects analyzed are European Educational projects in the Comenius 2.1 Program. The first one, *A Future Way for In-Service Teacher Training across Europe - FISTE Project* (http://fiste.ssai.valahia.ro/), started in 2004 and ended in 2007. The second one, *Virtual Community Collaborating Space for Science Education - VccSSe* Project (http://vccsse.ssai.valahia.ro/), started in 2006 and ended in September 2009.

In both projects, since the beginning, the coordinating institution has set up different ways of communication among the partnership. Because the face-to-face meetings (trans-national meetings) are limited in number and expensive, the collaborative technologies have become the most important way of communication and collaboration. Besides traditional e-mails (for each project was created a mailing list), collaborative platforms were installed on dedicated servers, offering the possibility of sharing ideas and working in real time inside the partnerships [19].

For FISTE projects it was selected the BSCW platform and for VccSSe project the phpGroupWare system.

In order to understand how the collaborative platforms usage rate varies over time, there will be presented below the main activities deployed in time in the frame of the discussed projects.

3.1. The FISTE and VccSSe projects

The FISTE project aimed at "finding new ways of how to teach in-service teachers in in-service teacher training and how the teachers themselves can learn and upgrade their knowledge and teaching methods by using ICT" [1]. The project partnerships include seven partners from five countries: three from Romania (including the coordinator) and one from each of the following countries: Finland, Iceland, Spain and Latvia.

The project's specific objectives were: 1) To develop methods for integrating face to face and web-based learning for everyday work of in-service teachers; 2) To apply the methods for teaching in various learning environments in the work of joined partners; 3) To improve teacher education possibilities to use new types of technology for in-service teacher education; 4) To improve in-service teachers' use and understanding of ICT to support their own work in meaningful ways; 5) To develop European cooperation and awareness; 6) To improve the research base of knowledge of how to integrate and best combine face to face learning and web-based learning in European in-service teacher education; 7) To disseminate the results of the European in-service teacher education project on local, national and European level [21].

The main activities of FISTE project are related to a national on-line course (*Integrating ICT in Traditional Training*) and then to a European on-line course development (*ECSUT: Educational Challenges & Solutions in Using ICT*). The first course was organized by each partner with local trainees. As for the European course, teachers from different European countries have participated.

The on-line course ECSUT – "Educational Challenges & Solutions in Using ICT" was a course designed for teachers, in order to provide basic skills and knowledge related to the use of Internet based Collaborative Platforms, pedagogical theories for using ICT in teaching and learning and how ICT based technologies can be implemented in teaching.

The course materials and all related activities were provided through the BSCW collaborative platform which was acquired to support the most part of the project activities. The license for BSCW was for 3 years (project time) and 300 users.

The VccSSe project objective was to adapt, develop, test, implement and disseminate training modules, teaching methodologies and pedagogical strategies based on the use of Virtual Instrumentation for science subjects teaching [2, 14, and 25]. The VccSSe project, coordinated by a Romanian institution, brings together trainers from nine institutions from five countries: two from Romania, three from Spain, two from Poland, one from Finland, and one from Greece.

The overall aim of the VccSSe project has the following specific objectives: (1) Offering the in-service teachers a particular technology (based on Virtual Instruments) that will enhance learning in specific laboratories; (2) Applying the developed teaching methodologies and pedagogical strategies to the teaching process and share them in an easy-accessed learning environment (the Virtual Cooperative Space); (3) Improving the research base of knowledge and the implementation to other training areas; (4) Developing European cooperation and awareness; (5) Disseminating all the results at the local, national and European level. [11]

The main activities of the projects consisted of one or two editions (the number differs from partner to partner) of a blended course (Virtual Instrumentation in Science Education) and the elaboration of a DVD edition of the project results. The training modules were organized by each partner at different moments of time, in one or two editions according to national framework.

The selected environment for supporting the project team work was the phpGroupWare platform. The platform was chosen to be used due to its feature richness and flexibility and not least because it is free of charge.

Besides the activities presented above, both projects include many other important activities. In this paper we presented only the two mentioned ones due to the fact that the biggest effort of the partnerships work was focused on developing the training and designing the DVD edition (VccSSe) or creating dissemination volumes (FISTE, VccSSe).

3.2. Numerical data

The collaborative activity on the BSCW, the platform used in the frame of FISTE project, is analyzed for the period of time between January 2005 and September 2007 [4] and the activity on the phpGroupWare, the platform used in the frame of VccSSe project, is analyzed between January 2007 and September 2009.

At the beginning of the FISTE project, some partners had already some experience in using BSCW, so that was the reason for selecting this particular platform, not only for communication and collaboration between partners, but also for courses development and the communication with the trainees.

While the FISTE project used only one platform, the VccSSe project used two environments for he project work: the first one for the collaboration between partners - phpGroupWare - and another one, a dedicated eLearning platform for providing the course and working with trainees (Moodle platform).

In order to evaluate the use rates for the collaborative platforms, in the analyzed periods of time, there have been considered three criteria:

- Number of visits on the platform;
- Number of files open on the platform;
- Total information traffic in Mega Bytes.

The data used for evaluating the use rates are produced with the help of *Webalizer* software [3].

The number of visits represents a series of requests from the same uniquely identified client with a set timeout. This means that as long as the same client keeps making requests within a given timeout period, they will all be considered part of the same visit. If the client makes a request to the server, and the length of time since the last request is greater than the specified timeout period, a new visit is started and counted, and the sequence repeats. A visit is expected to contain multiple hits (requests for a file - image, HTML file, JavaScript or cascading style sheet etc. - to a Web server) and page views.

Figure 1 clearly shows an intense activity during the FISTE courses. The national on-line courses started at different moment from June 2005 until October 2006. The visits' peaks on the graphic show the partners' efforts at different moments of time. During the last months of the project (June to September), the platform was more intensely used by the project team for uploading all the project products needed for the project

external evaluation and than for the final evaluation. The biggest accession, starting November 2006 until March 2007, is registered during the European on-line course when all the partners participated to the organizing of the course.

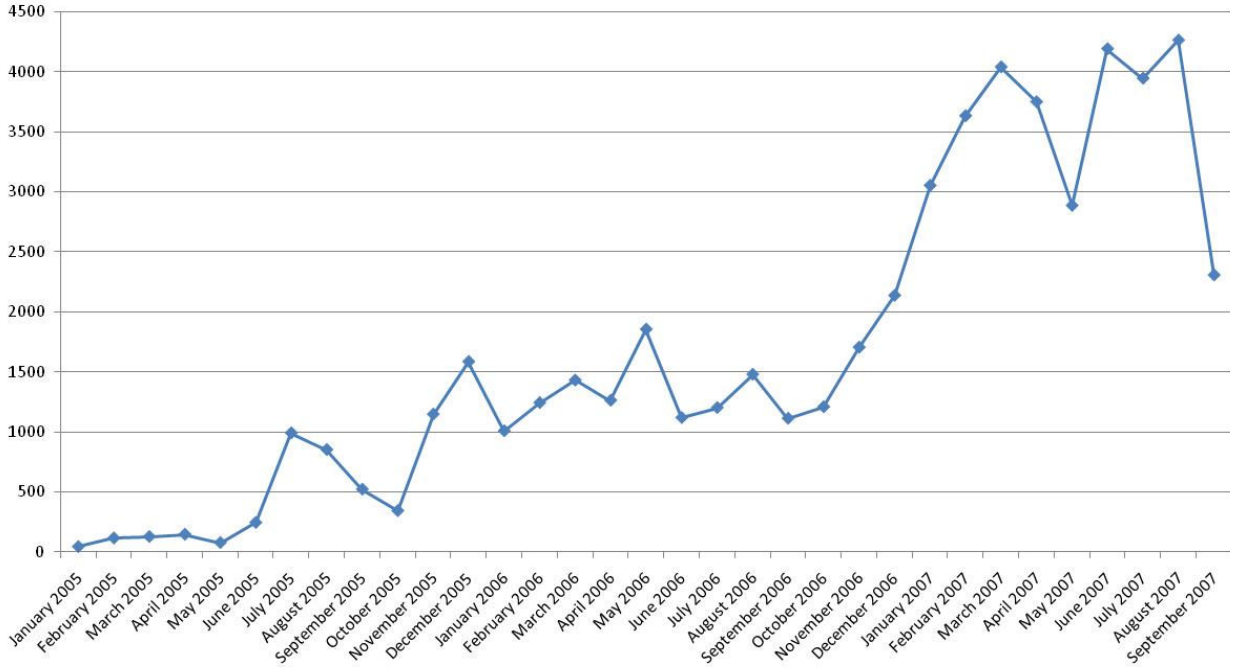

Fig. 1 Total visits monthly on BSCW

Figure 2 illustrates the total visits on phpGroupWare. The number of visits doesn't differ too much from one month to another, excepting the last three months, because the partnership effort was almost constant during the project.

The increased activity during the last months is owed to the extra effort to gather all the partners' outcomes and to make decisions in order to create the DVD edition of the project.

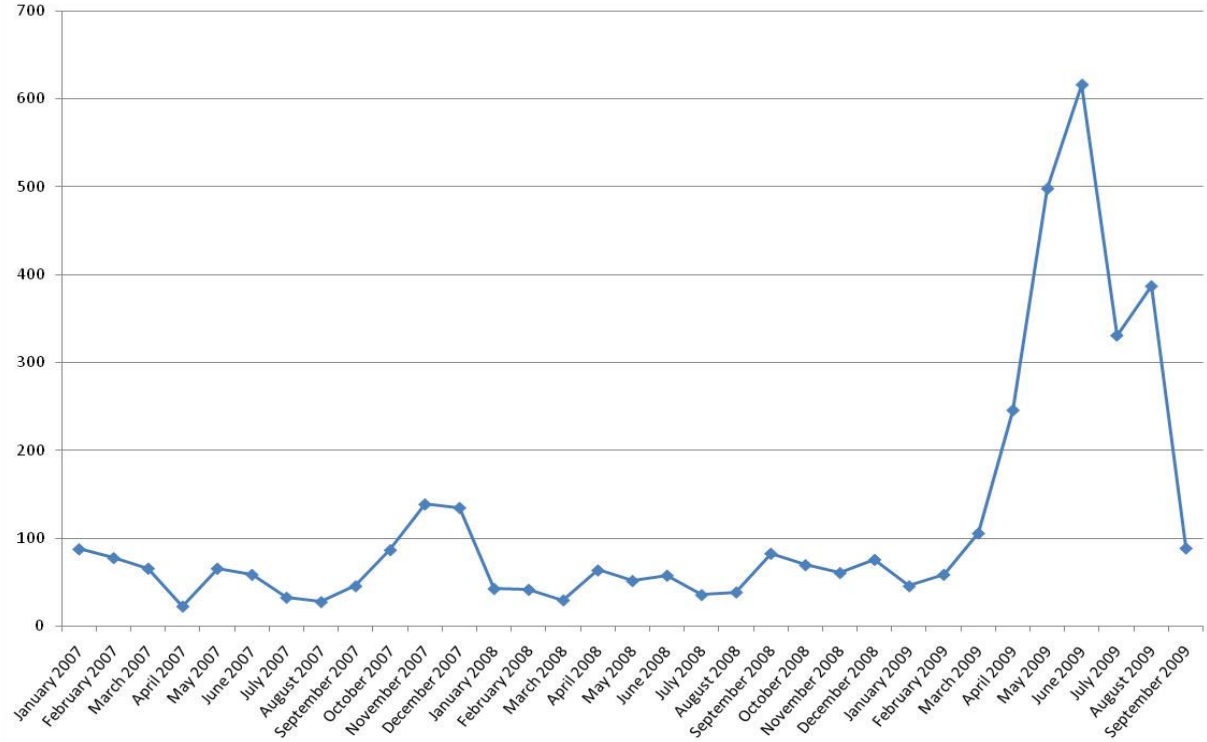

Fig. 2 Total visits monthly on phpGroupWare

Files represent the total number of hits (requests) that actually resulted in something being sent back to the user. This includes all of the individual items that make it up a page (such as graphics and audio clips).

Figure 3 shows the total files monthly opened on the BSCW platform. The highest number of files opened on the platform was registered in December 2005, when the Romanian on-line course version was in progress.

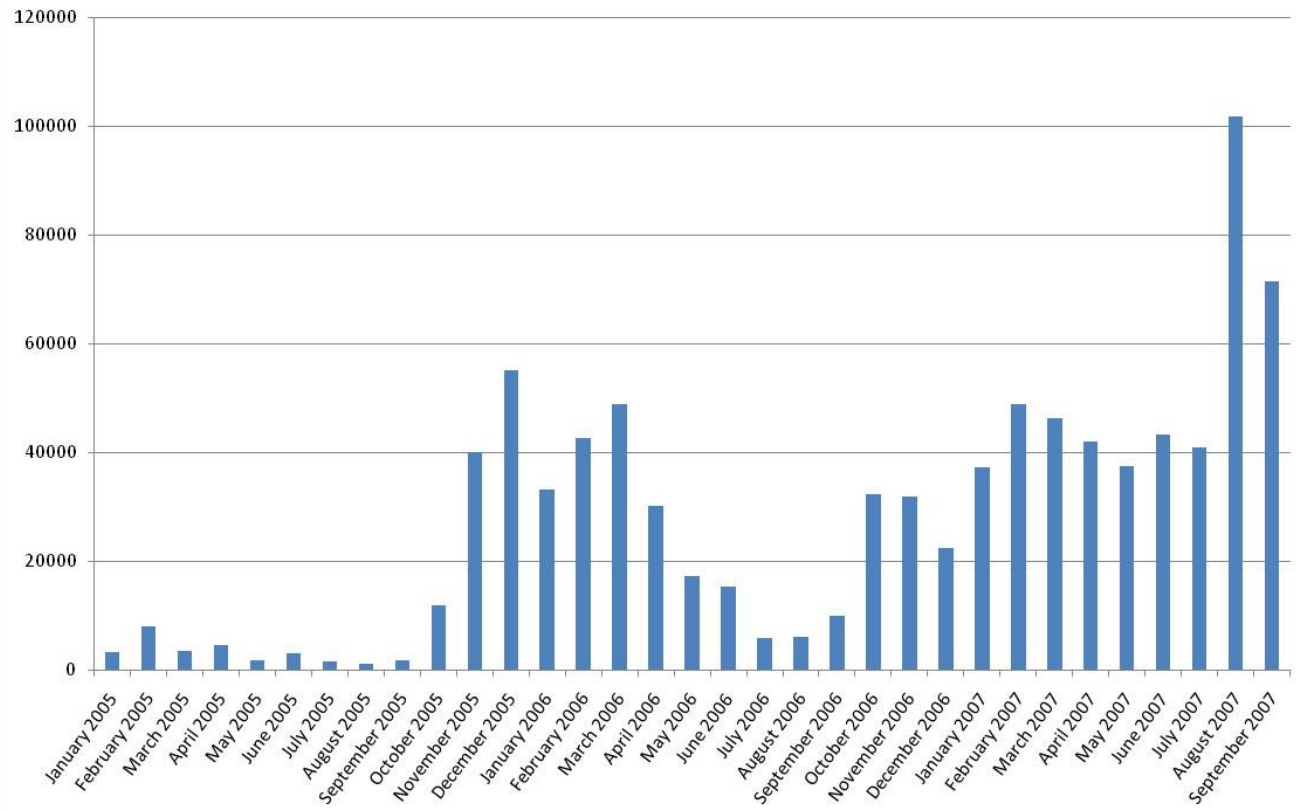

Fig. 3 Total files monthly opened on BSCW

In figure 3 it is visible another busy period, from November 2006 until March 2007. The highest numbers are correlated with the activities when the trainees were involved in the Technological Unit of the courses. This Technological Unit contained ten sub-units: (1) Video Editing; (2) Screen Recording; (3) Narrating Slides; (4) Blog, msn – What Are They Doing There?; (5) Spyware, Adware and Viruses. How Can I Protect My Computer?; (6) Files, Files, Files. How to Organize Your Data?; (7) Image Processing for Digital Camera Users; (8) Creating Appealing Print Publications; (9) On-line Conferencing; (10) Videoconferencing. The participants were invited to select and participate in the activities of two of these ten subunits [27].

The activities of this unit (many files to download, video-conferencing sessions, discussions etc.) imposed an intensive use of the platform which is clearly visible into the graphics.

Another high number of opened files was registered in March 2006 when the participants uploaded their final products on the platform. Due to the big number of participants, the traffic in Mbytes, represented in figure 5, increased very much in this month.

Figures 4 and 6 show the total number of files monthly opened and the total traffic on phpGroupWare. The peak recorded in January 2007 is owed to the partnership enthusiasm and the objective need to discover the platform. While on FISTE, some partners had experience on using BSCW in a previous project, on VccSSe the phpGroupWare was new for all the partnership members. The decision to select this platform was done based on financial matters, the phpGroupWare software being a free of charge application.

Figure 6 shows the periods of time when the partners worked together to fulfill different project activities.

An important project activity which involved a great team effort was the organization of the dissemination activity represented by the meeting with European Sciences teachers, using sharing and videoconference tools, held in March 2009. A number of 100 participants were presented to this meeting where each project partner had an intervention for showing relevant virtual experiments for the Sciences area [17, 18].

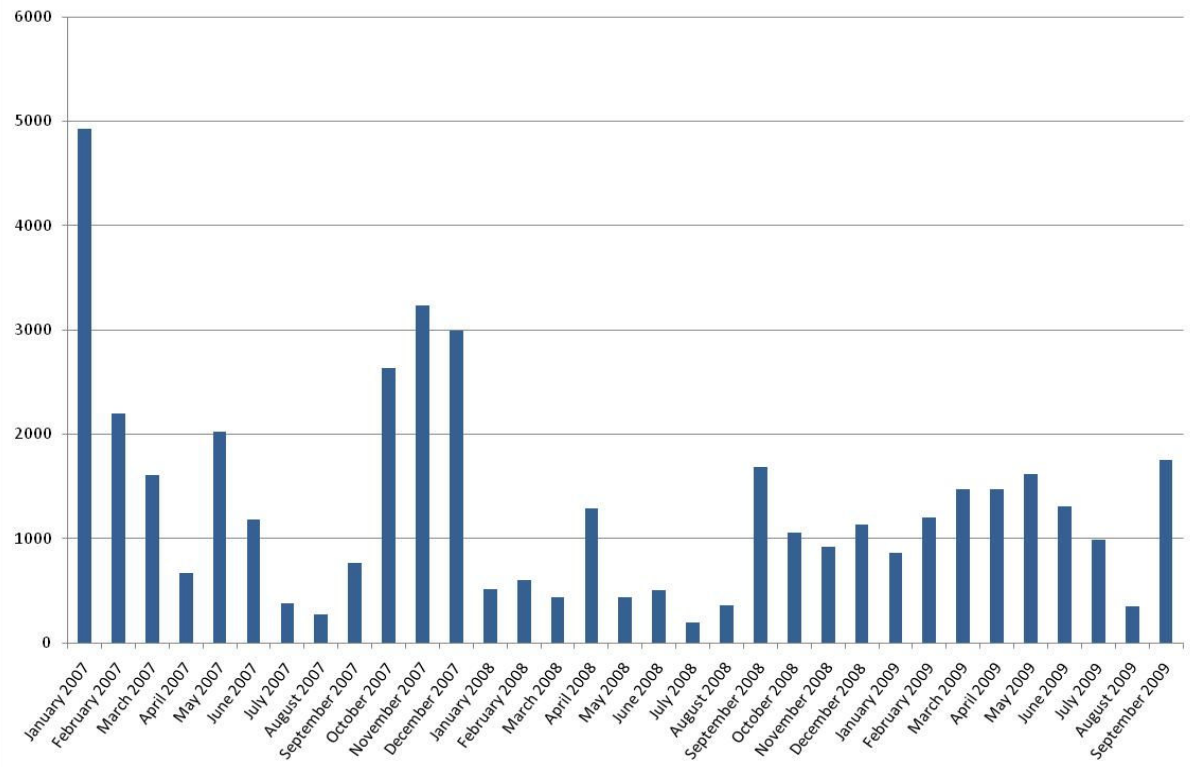

Fig. 4 Total files monthly opened on phpGroupWare

Analyzing all the figures, it can be observed that on BSCW there are two big periods of time with a sustainable activity correlated with the two FISTE courses deployment. During these courses the number of users increased a lot, the platform being accessed not only by the partnership members but also by the trainees.

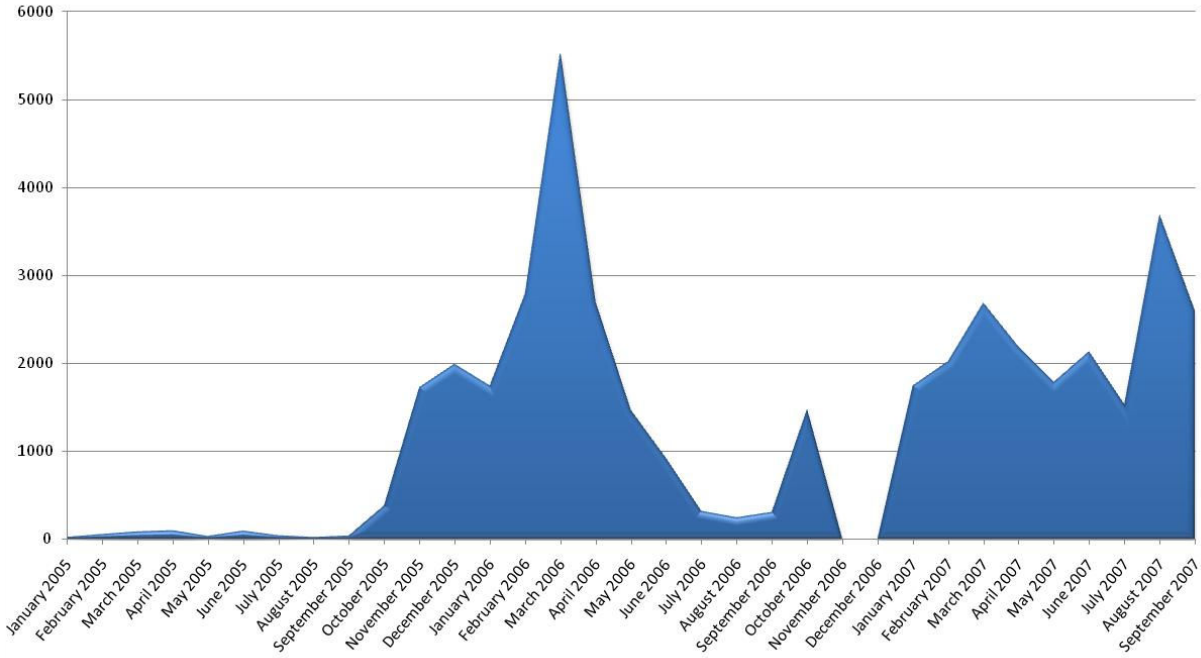

Fig. 5 Total traffic on BSCW in MegaBytes

On phpGroupware the busy periods of time are more often because there are correlated not only with the courses but also with the other project activities (the development of: VccSSe e-Space, training materials, database for Virtual Experiments, Virtual Experiments Exhibition, Guidelines for best practices, dissemination

videoconference, DVD project edition etc.). The partnership members are the only phpGroupWare platform users and the platform supports only the project team work, the courses activities being developed on the Moodle platform [6].

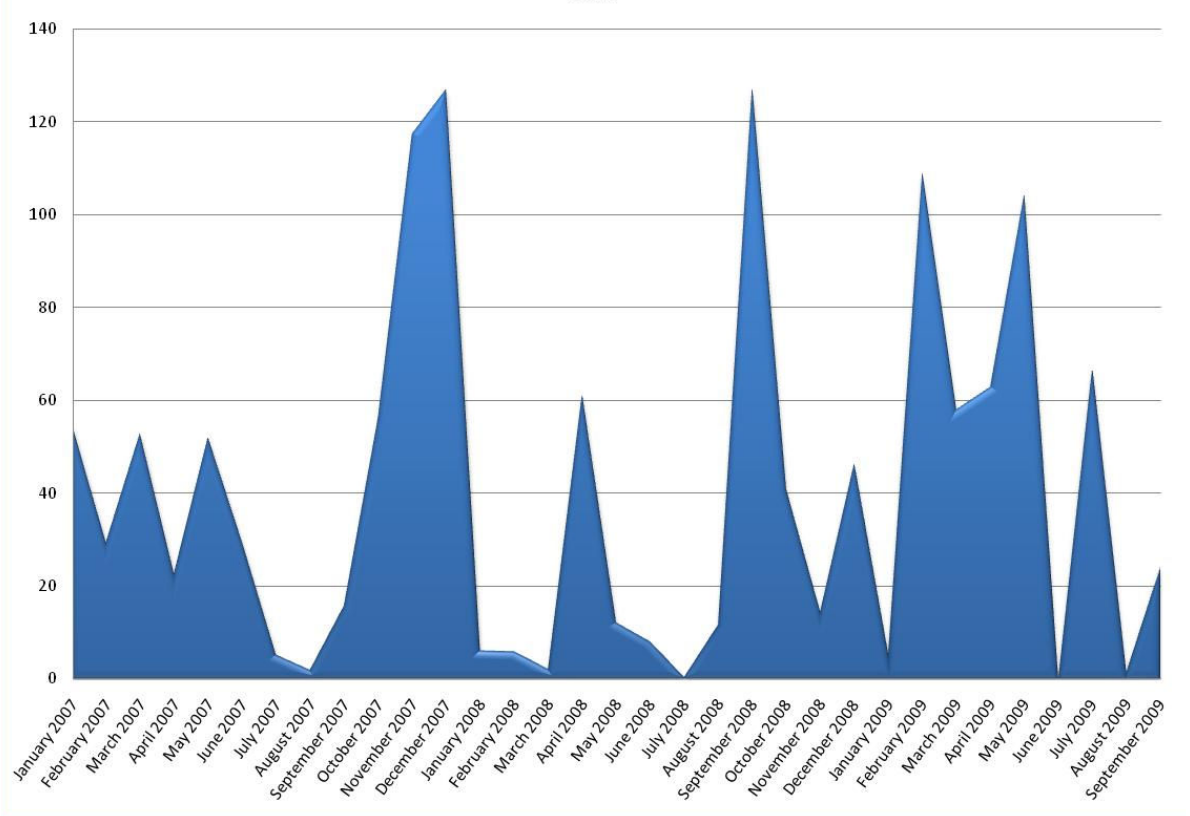

Fig. 6 Total traffic on phpGroupWare in MegaBytes

Table 1 highlights the activity rates differences between the two used platforms. The BSCW activity rates are considerably higher than the phpGroupWare activity rates.

Table 1. Total activity numbers for the whole period (33 months)

Description	BSCW	phpGroupWare
Number of visits	54977	3880
Number of files opened	899830	43055
Total traffic in Giga Bytes	41.37	1.30

The difference is more obvious if we analyze the average numbers per day, presented in Table 2.

Table 2. Average activity numbers per day

Description	BSCW	phpGroupWare
Number of visits	54.55	3.6
Number of files opened	905	48.78
Total traffic in Mega Bytes	38.85	1.44

The FISTE analyzed period has 1003 days. The average numbers per day are: 46 visits, 729 files opened, 37 MB traffic amount.

On the VccSSe project, for 1004 days, the average numbers per day are: 3 visits, 48 files opened, 1.44 MB traffic amount.

On BSCW, the average number of visits is fifteen times greater that on VccSSe. The files opened per day are eighteen times greater and the traffic amount is 26 times greater than on VccSSe.

The great difference on traffic amount is mainly because the users' numbers differ much: on BSCW there were at any moment 300 users (project team and trainees), but the total number of users overcome in a great range this number - probably around 500 users, but on phpGroupWare only 42 users (project team) worked on the platform.

4 Conclusion

The collaborative platforms have exponentially gained ground in the last years [15, 16].

The activity amount on collaborative platforms is not easy to quantify. The platform visits number, the number of the total files opened and the total traffic amount are

statistical data that can broadly indicate how much the platform was used.

The two examples of collaborative platform usage within European educational projects presented in this paper show that the activity, in terms of quantity, may vary, in a great extent, from project to project and from platform to platform. This variation, which can be easily observed in the data presented in this paper, depends mainly on the number of users. The project tasks influence also the time that the team members are spending on the collaborative platform. There are tasks that must be fulfilled by a particular partner and tasks that involve the collaborative work of two or more partners. The first category may not require any collaboration with the other partners and the use of the collaborative platform may be none, but the second type of tasks imply communication, shared work, file versioning and so on which may lead to an intensive use of the selected collaborative platform.

Another reason for this variation, which it is worth to be mentioned, is if the users know or not how to use the collaborative platform or at least if they have ever used another similar technology before.

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