

Methodological Aspects in designing Web-based Collaborative Systems

José A. Aravena Reyes
Department of Production Engineering
Federal University of Juiz de Fora
36026-330 – Martelos, Juiz de Fora - MG
(55-32) 3229-3407 Brasil
aravena@pro.ufff.br

Mauricio L. Aguilar Molina
Department of Production Engineering
Federal University of Juiz de Fora
36026-330 – Martelos, Juiz de Fora - MG
(55-32) 3229-3407 Brasil
aguilar@pro.ufff.br

Abstract

This work presents methodological aspects related with the development of web-based collaboration systems in Design and Education. Collaboration is highlighted as the fundamental aspect in the development of this kind of systems; it consists in a constructive and social process that is modeled in terms of protocols, which capture key acts of conversations involved in team working.

1. Introduction

The advent of new information technologies in the first half of the 1990's conformed a new scenery. The growing access to public networks and mainly the beginning of the Web brought a profusion of new concepts related with networking. These concepts began to win space due to the easiness of interchange of growing volumes of information.

The most common vision of the Web is that of a great information platform, where collaboration can be done overcoming traditional time and space limits by means of browsers. However, there are still significant barriers for the effective collaboration among people through the web. In spite of the readiness of information through the net, browsers are still individual windows for accessing information, maintaining users separated among them and offering little support for collaborative team working over the information shared through the net.

2. What is collaboration

Collaboration is a term without an exact technical definition because of the ambiguities in its practical use. In the day by day it is common the obscure use of terms such as networking, cooperation, coordination and collaboration. Collaboration involves the active participation of team working members; they work together playing specific roles, articulating its actions and sharing information in behalf of a common objective.

The development of computer networks technology opened a wider range of possibilities for collaboration; that is the case of Internet and corporative networks (Intranets). This way, users that are physically distant (either in different areas of a same building or in different areas of a city or a country) can interchange and share documents, files, points of view or ideas, facilitating this way collaboration. However, it is frequently observed greater emphasis in technological aspects, neglecting the essential of collaboration: people. Many times, network tools become a goal themselves, limiting this way the possibilities of collaboration.

For the authors of this paper, the most important in network-based collaboration continues to be collaboration. That is to say, the essential is the interaction among cognitive tools and collaboration activities, actors and the context in which collaboration takes place. Under this point of view, collaboration is understood as a constructive and social process, based on affective relationships that are manifested within the linguistic domain.

Most of the difficulties observed in so called "collaborative" systems is consequence of a series of aspects, such as inadequate communication, which in turn can either be consequence of ill-defined collaboration processes or even not defined processes; on the other hand, inadequate management of collaboration processes and the lack of a model that recognizes team members as valid members of an organized group many times cause failures.

The fundamental premise of these authors in order to overcome the above difficulties is modeling the collaboration process through the prescription of protocols for collaborative activities. The collaboration structure is based on the idea of teams developing activities in the form of conversations. Therefore, the support for collaboration through network-based systems is developed starting from the capture of key acts of the conversations involved in team working [1].

3. Collaborative systems: conceptual aspects

With the advent of computer networks, the design community adopted the term “Collaborative Design” aiming to include a diversity of applications for supporting team design. These applications were classified in distributed databases, client-server applications or just remote call procedures. Many of these applications failed in exploring social or group characteristics over the network because they were based on typical software approaches [1].

Different articles in collaborative design have emphasized the need of including advances in computer network technology in collaboration activities practice (video-conferences, remote data bases access, data patterns, etc.) [2]. These authors think that, although technological aspects are in fact important, supporting team working will be more effective with the development of approaches in order to appropriately formalize the dynamics of work groups.

It’s evident the need of a theoretical structure for approaching collaborative working activities in Education and Design with computer network support. The development of this kind of computer support needs the definition of formalisms to be translated in groupware applications.

In the model of collaborative project adopted by these authors, collective dynamics is formalized by means of integrated structures of conversation protocols, whose records serve as reference for the actions of team members. Three kinds of conversation models are considered: IBIS, conversation model oriented to action and conversation model oriented to negotiation [3, 4, 5].

These categories allow synthesizing most of the team recurrences and they are implemented by means of prescriptive protocols, which regulate the course of conversations through explicit rules about actions previously defined.

One of the key elements that has been considered during the process of design and development of collaborative environments is the use of techniques centered in the Chilean cognitive school, where “all to do it is to know and all to know it is to do”, inducing the proposal of collaboration models oriented to represent the recurrent actions within the domain of language [6].

Among those proposals, the Speech Acts Theory of Austin & Searle [7, 8] offers an excellent methodological reference for the social engineering in focus. The resulting protocols are thus prescriptive and they regulate the actions of team members in the domain of language.

4. Collaborative web systems

Collaboration systems are characterized by the intensive use of computer networks and require essential attributes such as safety, performance and including aesthetic [9]. The project of this kind of systems requires

an approach that goes beyond the simple development of html code for web pages. According with Pressman [10], systems and applications oriented to the web have as a common characteristic to offer content and functionality for a great amount of users.

Web Engineering is the process used for creating high quality applications, sharing with the traditional Software Engineering a series of concepts and fundamental principles, with emphasis in the same activities and management techniques. Nevertheless, there are differences in the way these activities are developed, but the philosophy that dictates a disciplined approach for the development of computer systems continues to be the same for web applications.

Web Engineering integrates a series of related areas, including software engineering, human-computer interaction, information engineering, project management, and graphic design. The development model adopted by these authors is prototyping and successive versions and it is based on the model proposed by Pressman in [10]. The model include several key activities, among which:

- Formulation: general objectives are defined, including a high level characterization of the activities to be supported by the application.
- Planning: defines an activity chronogram
- Analysis: defines the interaction model and identifies contents to be published. It also defines visual aspects of the project
- Engineering: project and production of contents, graphics and any other elements.
- Template Definition (forms and views): once defined the interaction model and contents, navigation and the interface for html pages production are defined
- Tests: implemented codes are evaluated, seeking the detection of eventual mistakes in applets, scripts and forms; operation tests are also carried out in different browsers
- Final User Evaluation

5. A practical experience

The collaboration schemes implemented by these authors are accomplished through “conversations” among teamwork members. Such conversations have several objectives: information transferring, accomplishment of tasks related with the problem to be solved, exploring aspects of the problem or negotiating a problem solution.

Conversations for information transferring are informal and they don’t need registration or any control formalism because they are based on the fact that many times a solution can be reached through informal contacts.

Tasks are bilateral conversations designated for a project team member; they have its own dynamics (from the beginning until its conclusion) and can assume several forms: reports, annotations, analyses, etc. Tasks are essential in developing collaboration activities because they allow the problem resolution progress, supporting alternatives choice or just supplying relevant information for understanding a problem.

The recording of collaboration activities gives place to a complex hypertext structure that represents the collaboration history. This structure can be explored using the standard navigation mechanisms of a browser. Negotiation is based in confronting the visions of team members around the problem and it aims to achieve a problem solution.

Each user action (conversation) creates an element in the hypertext structure in terms of a predefined format (report, annotation, analysis, etc.) and constitutes a document that can be seen as a web page.

Once conceptually modeled, these conversation structures can easily be implemented by means of groupware development environments, such as Lotus Notes [11], the platform adopted by these authors.

Usability has assumed great importance in the current era of web systems [12]. Fast time-to-market cycles require the observance of several aspects, with strong impact in performance. The effective design of user interfaces implies more than following rules. It requires a user-centered attitude. A typical development team requires profiles such as visual design, programming, redaction, ergonomic and usability consulting.

6. Conclusions

In designing and developing collaborative systems, a holistic approach is required. In this sense, collaboration is still the most important element to be considered. Collaboration can be defined in diverse ways; however, with an adequate epistemological premise and a model resulting from interactions of linguistic acts, it is possible to prescribe highly efficient and integrating protocols.

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8. References

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