



CROSS ASSESSMENT OF A DISCUSSION TOOL DESIGNED TO SUPPORT COLLABORATIVE KNOWLEDGE BUILDING

Iolanda Garcia (author and presenter)
. eLearn Center (Universitat Oberta de Catalunya - UOC), Spain

Begoña Gros (author and presenter)
. eLearn Center (Universitat Oberta de Catalunya - UOC), Spain

Summary

In this paper we present the design and assessment process of a discussion tool meant to support collaborative learning and knowledge building processes. The eKnowledge tool is based on social knowledge building theory and incorporates several functionalities specifically conceived to favour the development of such kind of processes in the context of an e-learning environment as the Universitat Oberta de Catalunya (UOC).

This tool is being developed on the base of CSCL products, but it also takes into account early advancements made on discussion tools in the social web scene. We describe main characteristics and affordances of eKnowledge and explain the approach we have followed for its assessment. Finally we explain how the obtained results have guided us on the final development of the tool and its integration on the UOC Virtual Campus, both at a technological and at a pedagogical level.

Rationale and theoretical foundation

The field of CSCL has grown up in the last years and has generated interesting results about the nature and essential issues in collaborative learning processes and environments. However, the implementation of collaborative systems and processes in specific settings remains not adequately tackled. A particular issue to pay attention concerns the design of tools that provide support to collaborative processes. In this sense, it is of main interest to study the development of scaffolding and scripting tools that improve the reflective structure of collaborative work in virtual learning environments. We are referring specifically to tools that facilitate and support interactive and collaborative processes as well as knowledge production. Another matter of relevance relates how those tools can facilitate the monitorisation and assessment of collaborative learning and social knowledge building processes.

Many classical applications used on collaborative environments like forums, or even some more novel tools associated to the social web, show clear deficiencies in facilitating management of contributions and structuring processes, packaging generated knowledge for its reuse, providing effective and quick following-up of interaction and discourse production, or evaluating contributions and built knowledge.

Asynchronous communication tools like forums have evolved in different directions according with the needs emerged in diverse contexts. That means sometimes they have done it as an answer to needs centred on information exchange or informal discussion, more than from an educational approach.

There are several products developed in the field of CSCL that reach to provide a structure for collaboration and act as mediators for reflective and knowledge building processes. This is the case for instance of Knowledge Forum (Scardamalia and Bereiter, 2002) and Fle - Future Learning Environment (Leinonen, Virtanen, Hakkarainen, Kligyte, 2002; Stahl, 2006). On the other hand, electronic forums are being developed out of the educational field to support open discussion in online environments based on information exchange and community building around topics of interest.

In this paper we present our current work on the development, assessment and implementation process of a discussion tool designed to favour the development of collaborative learning and social knowledge building processes, as well as the production of quality conceptual artefacts. This tool is being developed on the base of CSCL products as the ones previously mentioned but it also takes into account early advancements made on discussion tools in the social web scene (Salmon, 2005; Kanuka and Garrison, 2004).

Context of development and goals of the project

The goal of this paper is showing the adaptation of an asynchronous communication tool to meet the requirements previously referred, in the specific context of the Universitat Oberta de Catalunya virtual campus. In short, we present the development of an electronic forum prototype, the design of which incorporates a set of functionalities expressly conceived to favour the development of collaborative learning and social knowledge building processes, as well as the production of quality conceptual artefacts.

UOC is an open and distance university that manages all its teaching activity through a Virtual Campus, with more than 35000 students. The amount of communication exchanges generated in training virtual classrooms is very high. The technological system that currently supports those exchanges is based on a forum tool quite outdated, with insufficient affordances to properly manage interaction processes. Attending the specificity of the educational model we are referring to and the limitations of the communication channels that can be used, it is indispensable to work on the evolution of support systems that favour more effective management and facilitate the development of collaborative knowledge building processes, as a key aspect for the educational model we want to make progress to.

For the conceptualization of this forum prototype design we have founded on most representative products derived from recently developed research in the field of CSCL. In the last years the design of CSCL systems has made a step forward in the development of environments conceived to support social knowledge building processes. According with Bereiter and Scardamalia (2003), the role of those environments is providing a structure to collaboration and act as a mediators of reflective and knowledge building processes. Those authors, professors and researchers at the University of Toronto, are founders of this pedagogical model and also creators of Knowledge Forum program (Scardamalia and Bereiter, 2003), a system designed from this perspective and conceived expressly to support derived discursive processes. Another example of tool inspired on a similar model is the program Fle3 (Future Learning Environment). In this case, it is a tool based on progressive inquiry model boosted at the Centre for Research on Networked Learning and Knowledge Building of the University of Helsinki, Finland.

Analysis of those two mentioned environments, among others with a more generalist approach, as well as the evaluation of limitations detected on traditional asynchronous communication tools (like is the case of the forum available at the UOC Virtual Campus), has allowed us to identify most relevant functionalities to support intended processes. From this point of view, the goals that we expect to attain in the design of the prototype are the next: 1) Improving navigation and information management functionalities; 2) Incorporating functionalities that support collaborative knowledge building processes, as well as their follow-up and evaluation.

eKnowledge design

For the design of eKnowledge we have worked on two dimensions that are complementary and provide feedback to each other. The first dimension is concerned with forum usability, such as structure and navigation issues with a clear impact on information management. The second dimension is more methodological and process oriented, thus it is focussed on functionalities specifically designed to support collaborative knowledge building processes:

A) Functionalities related with structure and navigation in discussion spaces:

- Information organization and visualization options: they provide an immediate and organized summary of available information that is generated in discussion spaces. They allow setting a sample of contributions we want to visualize on the screen depending on different parameters: by pending reading, by content labels or categories, by better evaluated, by chronological order, by author, etc.
- Advanced search system: it allows information location through key words inside a specific or various forums, either developed in the same virtual classroom or any classroom in the Virtual Campus. The system allows, in addition, a restricted search to specific sets of contributions that share the same label of content.
- Permanent actualization via RSS: it can be configured at a general level (subscription mode) and also associated to a specific contribution in order to receive warnings of generated answers.
- Contents exportation: it can be restricted to independent open discussion topics or all topics dealt with in a forum, selecting only messages content or including also attached material.
- Transverse forum spaces: it allows setting up discussion spaces shared by several virtual classrooms and student groups, with the aim of facilitating interdisciplinary work.

B) Functionalities related with collaborative knowledge building support:

- Contributions: they incorporate several elements to the body of the message that favour reflection around the content: files attachment, visual and multimedia content on the body of the message, keywords, labels, references to other contribution contents or participation spaces, etc. Those elements improve characterization of interventions and at the same time facilitate deepening on its understanding, and enrich communication. These elements also facilitate the identification of content contributions without the need of reading them integrally. Contributions can be saved without being published, in order to continue with their elaboration later, so that it can be decided when they are made visible to other participants. Once published,

contributions are reeditable, that is to say, they can be modified while there are no further answers associated to them. A sign makes the recognisable when they have been updated.

- Contributions assessment: it provides an indicator of the degree of quality or interest of a contribution from the vote of participants in the discussion. The system provides information on the percentage of positive or negative evaluations assigned to each contribution.
- Subjects: it is possible to create as many subjects or specific discussion spaces as required inside the same forum area on the basis of group organizational criteria, thematic or content related matters, management of resources, etc.
- Contributions labelling/tagging: tags allow identification and categorization of the contribution content on the basis of the reasoning process realized for its elaboration and implicit cognitive activity (elaborating a theory, expressing an opinion, formulating a question or building an hypothesis of work, for instance). This way, the use of tags demands reflection on the content of own interventions and expressing the type of contribution made to the rest of participants. Furthermore, contributions' labelling provides the teacher with immediate information on the type of process that is taking place, making easier contribution management and identification of situations in which his participation might be required.
- References: they allow linking the content of different contributions and interconnect them. Using references, students can base their contributions in previous ones written by their partners, thus, building new content (or knowledge) from the reconstruction of a previous intervention and taking part in a conjoint process of progressive improvement of discourse content. References can also be made to external contents to the discussion space (contributions on other forums of the same classroom or external, documents, video files, websites, etc.). References allow establishing significant relations and provide a guide (both to teacher and students) to explore or navigate throughout the contributions network. Referenced information can be located through the system of advanced search from the screen of contributions' edition. This way, each contribution incorporates a direct link to associated references.

Those two sets of affordances are configurable on an initial form where it can be specified which of these functionalities are active and which are not, depending on the process we want to generate. Through this form it is also possible to establish profiles of intervention and management from which privileges of use can be predetermined.

eKnowledge assessment and results

The evaluation of the product consisted on a pilot test by groups of experts in the use of electronic forums in two different contexts:

- A) The forum space from the eMagister.com site (Intercom Group). A group of experts of general forums usage and development have participated on the tool assessment from the perspective of its usability, thus focussing on information management functionalities and navigation structure.

At this moment, technicians from eMagister.com are working on the development of a different prototype from the selection of several eKnowledge functionalities that fit in their

current model of forums. More specifically, main characteristics that are being developed in the new prototype are the following: tagging of posts/messages, multiple filters and organisation options by fields/topics, exportation of discussion threads, assessment in 5 levels by criteria of utility and library organizing files attached to posts.

The mentioned functionalities are being developed in a modular way in order to make as easy as possible their exportation and adaptation to different platforms, for instance the UOC Virtual Campus. Moreover, the developed prototype will be implemented and used on a regular basis on eMagister.com site by current users, which will provide us with valuable feedback about its usage in a context that cannot be strictly considered as a learning environment.

- B) The UOC Virtual Campus. A group of teachers with expertise on the application of collaborative learning methodologies and supporting tools has assessed more specifically learning scaffolding and discourse structuring functionalities.

The goal of the assessment protocol has been collecting information about the use experience of the eKnowledge tool from the perspective of its potential users, regarding the following criteria:

- Adequate to collaborative knowledge building theoretical approach (concepts, terminology, procedures, actions, results, etc.).
- Sufficiency, regarding elements, spaces and functionalities.
- Complexity/ease of use.
- Flexibility of use in the different communication situations that can take place in a virtual classroom or virtual space as well as in specific collaborative learning processes.

General questions guiding the assessment process are:

a) Does eKnowledge facilitate information management throughout generated discussion spaces? In which way?

b) Does eKnowledge support collaborative learning and knowledge building processes?

The assessment protocol proposes three routes that correspond to the big fields of action involved in forum participation, as well as in the follow-up of contributions and generated discourse. Following each route involves carrying out a set of actions and answering some questions to evaluate the personal experience in performing them. Finally, there is a section with more general questions. This assessment procedure is thought to identify critical points not necessarily taken into account in the protocol, but that can be relevant for the tool improvement. In this sense, the results obtained from the assessment process are meant to guide the final development and implementation of the eKnowledge tool in the UOC Virtual Campus. The implementation entails modification and adaptation of technological functionalities as well as developing pedagogical models and methodological guidelines to support eKnowledge uses.

The results obtained from the assessment process are meant to guide the final development and implementation of the eKnowledge tool in the UOC Virtual Campus. In general terms the results have shown that specific functionalities to support collaborative learning and knowledge building processes are very well appraised but that usability and navigation options require further analysis. It is of main relevance to build and intuitive tool that allows flexible and versatile usage in different educational settings.

The implementation entails modification and adaptation of technological functionalities as well as developing pedagogical models and methodological guidelines to support eKnowledge uses.

The development of this kind of technological affordances on learning environments can bring about many advantages. However, if they are not adequately used, their incidence can be limited to mere quantitative changes, with no real impact on the activities configuration, either on the process and the resulting product, in terms of learning and knowledge. Therefore, it is necessary to address pedagogical and social dimensions in addition to the technological one. This involves modifying the training system in order to offer activities that propose students' participation on collaborative social practice situations. The role of the teacher in these activities also changes and has to be very well design regarding the follow-up and encouragement of students work and the interactive processes involved. In short, it is necessary to progressively incorporate students in a more participatory learning culture, based on the commitment of belonging to a community (Wenger, 1998), and on collaborative knowledge building processes.

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