Interaction Analysis and Visualization in educational group blogging. Research questions, tools, evidence and future directions


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Abstract: The present position paper describes interaction analysis issues about collaborative learning by design group blogging that are going to be discussed during the corresponding workshop at CSCL 2009. Blogging is quite popular and group blogging has interesting potential for learning. In the workshop we are going to work on interaction analysis graphs, experimental research findings and future directions.

Introduction
The development and availability of social software applications sets new challenges and opportunities for the learning technology community. The term “social software” refers to computer network software applications supporting groups of actors in communication and interaction (Allen, 2004). The term social software is systematically used from 2002 in order to include applications such as forums, wikis, blogs, online multi-user games etc., which are not usually covered by the business oriented term of “groupware”.

The educational community’s interest for social software is mainly based on the idea that it is consistent with the modern learning theories. This is especially the case for constructionism (Papert, 1993) and social constructivism theory (Ernest, 1994; Kim, 2001) that emphasize the importance of learners’ active participation to social activities during learning, which is mediated by the design and construction of artefacts.

The learning in social environments is significantly affected by the quality of interaction among the participants (Fesakis et.al. 2004, Dimitracopoulou, 2008). Participants are interacting each other (e.g. exchange messages, posting comments etc) and with the software system content (e.g. rating the quality of a paper, marking videos they love, defining tags etc). Interaction produces a big volume of raw data that can be analyzed in order to e.g.

- gain a deeper understanding of the ongoing situation,
- select the timing and the kind of intervention
- identify interaction patterns and rules
- help the participants to fill the gap of the awareness because of the lack of non verbal communication channels
- facilitate the participants to self regulate their interaction in a group
- enable an more convenient intergroup activity comparison for intergroup competition
- exploit modern collective intelligence techniques for the mining of knowledge

In this paper we focus on the interaction analysis for group blogs for the improvement of learning and teaching. A general review and introduction to the educational uses of blogs is presented by Downes (2004). Downes proposes, among other things, the view that students participating in blogging have opportunities to a) reflect on their texts, b) engage in writing for significant time intervals, and c) trigger long dialogue with their readers leading to new writing cycles. In the followings first research questions are presented, then some group blogging data analysis and visualization techniques examples are described and finally possible future research and development directions are discussed.

Research Questions, Tools, and Evidence
Fessakis, Tatis and Dimitracopoulou (2008) present a case study of the educational exploitation of group blogging for the implementation of a “learning by design” activity. More specifically, a group of students used a blog as a communication and information management tool in the University course of ICT-enhanced Geometry learning activities. The analysis of the designed learning activities, the blog content and log files, as well as the
points of view of the students (via a questionnaire and a group interview) expressed upon completion of the activity gives significant findings supporting the researchers’ initial hypotheses about the potential of blogs’ educational applications. Blogs combined with a proper pedagogical approach such as ‘learning by design’ enable teachers to offer high quality learning experiences to their students.

In the specific case study the research questions include the qualities of the effective comments in group learning blogs, the learning outcome, and the content of the blog. The interaction analysis tools where quantitative (log files summarization) as well as qualitative (content analysis, participants views). Some of the summation and visualization tools are depicted in the next figures (Figure 1, 2 and 3).

Figure 1. Students’ contribution per post/comment category (Content Analysis summation)

Figure 2. Articles production synopsis
In the workshop the construction, meaning, and subjects understandings of the above tools are going to be presented and discussed.

In a currently ongoing follow up research we are examining the effects of several interaction analysis graphs in the participants self awareness, self regulation and intergroup competition and interaction. More specifically the research questions are:

- Are specific graphical representations of interaction data able to facilitate group blogging participants’ awareness? That is the knowledge of basic information like who is the most active collaborator, who is not posting any comments etc.
- Are the presence of graphs help participants to regulate their interaction pattern; Do participants change their contribution after reading the graphs?
- Are the graphs understandable? What is the information that participants decode from them?
- Does the availability of interaction analysis graphs of other groups affect the interaction pattern of the groups?

The current study (in contrast with the initial mentioned previously) concerns 22 groups of seven students each for which the graphs are available during the blogging period. Some of the graphs we use in this research are presented in the following figures (Figures 4-11). The graphs in figures 4-8 concern intragroup interaction analysis. They are presented by separate posts in the blog which students have to comment. This technique could be automated in the future after the intensive study of what works best. Figures 9-11 facilitate the intergroup comparison and could be also automated in the future. The graphs are quite simple and their interpretation is straightforward. This is a design decision since the graphs should be easily computable and understandable by a wide base of people. The main focus of this research is to investigate the effects of the availability of interaction analysis graphs as a kind of feasibility study.
Figure 4. Comments posting evolution by member.

Figure 5. Comments accepted evolution by member.

Figure 6. Articles posting evolution by member.

Figure 7. Comments and Articles posting synopsis by member.

Figure 8. Commenting social network for a group
Feature directions

The case studies data analysis is going to inform us on the effects of simple interaction analysis graphs on collaborative learning by design blogging awareness, self regulation and intergroup regulation. This could produce the specification of interaction analysis gadgets that could be embedded in relative blogs, learning management systems etc. In addition several other possible graphs could be tested e.g. graphs analyzing tags, marks, content etc.

Another interesting direction is that of the application of collective intelligence techniques (Segaran, 2007). Collective intelligence techniques can be applied in the level of a specific blog or in the level of a blog forest in order to produce representations and information that could not be possible in a face to face environment. For example using rating marks or favor lists of blog users it is possible to locate groups of students with similar preferences and make recommendations, facilitate the shape of homogenous or uneven working groups etc. In figure 12 there is an example of application of mds technique in order to find users of similar interests in Scratch community (Fessakis, Dimitracopoulou, 2009). Collective intelligence techniques can be a bridge from the commercial interaction analysis techniques applied to sites like amazon.com etc to the cscl community.
Discussion
Using social software for learning is expanding since the availability of systems like, wikis, forums, blogs, social networking etc is quite widespread and modern learning theories underline the significance of social interactions for the quality of learning. People interacting using social software produce a large volume of raw interaction data that could be processed in order to mine knowledge for learning conditions. In the proposed position paper we focus on collaborative learning by design using group blogging. More specifically we present research questions about interaction analysis in such situations, possible techniques, and the experimental study of the interaction analysis effects on students awareness, self regulation and intragroup interaction. Several simple graphs are presented and discussed as far are their interpretations and uses are concerned. Finally new research directions are considered for exploration.

References