

Evaluating the Social Dimension in Online Learning Communities

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Abstract. The social dimension is nowadays recognized as one of the main factors influencing the learning process [1, 2]. In this paper we consider the social dimension developed by a group of students during an online course. To do this, we analyze their interactions during three different collaborative learning activities, i.e. a Jigsaw, a Role Play and a Discussion. By looking at the data showing the level and nature of the social dimension developed within each activity, it is possible to compare the activities themselves, and to reflect on their capacity to foster the social dimension in light of facilitating the overall learning process.

Keywords: CSCL, social dimension, collaborative techniques, Jigsaw, Discussion, Role Play.

1 Setting the Scene

Within the broad field of technology enhanced education, there is a growing trend to incorporate socio-constructivist approaches to learning, which stress the cruciality of the social dimension to the cognitive process and to the development of new knowledge.

In particular, Computer Supported Collaborative Learning (CSCL) is a recent research area that focuses on debate-based learning and peer negotiation and is grounded in socio-constructivist theories [3, 4, 5, 6]. According to CSCL basic assumptions, discussion and collaboration among peers are the basic elements of the learning experience [7] and for this reason the development of the virtual learning community (composed of students, teachers, tutors, designers, etc.) is a key point for enhancing a significant learning experience. In these contexts, learners usually interact through Computer Mediated Communication systems (CMC), which allow both synchronous and asynchronous communication. Learners are usually engaged in tasks (discussing a topic, solving a problem, studying a case, etc.) with concrete outputs to produce, which usually act as catalysts of interaction and collaboration. Activities in those contexts can be based on “collaborative techniques” (e.g. Discussion, Role Play, Jigsaw, Peer Review, Case Study, etc.), which, by specifying rules, tasks and procedures to be followed by students, are able to enhance interactions and hence may possibly foster the collaborative process [8].

It is in contexts like these, that the social dimension is regarded as one of the most critical aspects of the learning process [9, 10, 11, 12, 13, 14, 15, 16]. Originally defined in 1976 as the "degree of salience of the other person in a mediated communication and the consequent salience of their interpersonal interactions" [17, p. 65], the concept of "social presence" was further defined later on by many authors [18, 19, 20, 21] and still today there is no complete agreement of the concept. Gunawardena [12] tried to distinguish between definitions of social presence referring to a property of the medium in mediated communication, and those referring to the perceptions, behaviors or attitudes of the participants in a mediated interaction.

The concept has also been further investigated within educational contexts. In particular, "social presence" has been defined by Garrison et al. [10, p. 94] within the wider concept of the "Communities of Inquiry", as "the ability of participants in a community (...) to project themselves socially and emotionally, as 'real' people (i.e. their full personality), through the medium of communication being used". On this same line, in this paper we will use the term "social dimension" to refer to the ability of participants to express and/or show affection and cohesiveness.

The paper describes an online course, i.e. the "TD-SSIS Liguria course", designed and run in 2007 by the Istituto Tecnologie Didattiche – CNR within the context of the Italian teacher training system. The various collaborative techniques used on this course (i.e. the Jigsaw, the Role Play and the Discussion) are described and analysed, so as to provide a picture of the social dimension, as developed by students, in such a way that it is possible to reflect on the various techniques themselves, and compare their ability to foster the social dimension within the learning community.

2 Research Context

In 2007 SSIS Liguria commissioned to the Istituto Tecnologie Didattiche – CNR a course on "Educational Technology". The main aim of the course was that of making students familiarize with the main issues related to the introduction of ICT in educational settings.

On that occasion a blended approach was chosen, where topics were introduced during face-to-face lectures, and then discussed and further studied during online collaborative activities.

The TD-SSIS Liguria 2007 community was composed of 159 students of all disciplines and 6 tutors. The large size of the learning community required the creation of smaller "classes" working in parallel (20/25 persons each), so as to allow collaboration. In particular in this study, our attention will be focused on one of the classes, namely a class composed of 21 students coordinated by a tutor.

The main objectives of the course were:

- to be aware of the main concepts related to online education;
- to know the main characteristics of the most common e-learning models;
- to use collaboration as a learning strategy by interacting within a community;
- to know the structure of web quests and be aware of their educational potential;
- to know the structure of blogs and be aware of their educational potential.

In order to achieve the above mentioned objectives, the course was organized in 4 lectures (namely: Module 1, Module 3, Module 5 and Module 7 of the course) and 3 online modules (Module 2, Module 4 and Module 6), as shown in the following Figure.

	week 1	week 2	week 3	week 4	week 5	week 6	week 7	week 8	week 9
face-to-face lectures	1st lecture Module 1			2nd lecture Module 3			3rd lecture Module 5		4th lecture Module 7
online activities									
Module 2 - Socialization and e-learning models									
Module 4 - Web quests									
Module 6 - Using blogs in educational settings									

Fig. 1. TD-SSIS Liguria 2007: plan of activities

Online modules were based on one (or more) activities, each one in turn being based on a specific collaborative technique. Techniques were chosen by the course designers a priori, on the basis of the learning objectives and the contextual constraints (time schedule, organizational issues, etc.)

In the following the 3 online modules are briefly described.

Module 2 (the first module carried out online, see Figure 1), was first of all devoted to “Socialization” among the members of the community and familiarization with the communication system. During the second part of Module 2, a *Jigsaw* was proposed to students. This activity was devoted to the study of the main existing e-learning models, but this was done by following the procedures and structure typical of a *Jigsaw*¹. In particular, during the first phase of the *Jigsaw* “expert groups” were created, each one being devoted to the study of a specific e-learning model. Some readings were assigned and each group was required to produce a shared document, describing the assigned e-learning model. During the second stage of the *Jigsaw*, students were rearranged in new groups, each one being composed of people coming from the different “expert groups” of the previous stage. The so created “jigsaw groups” were in charge of solving a problem, by putting forward the competences acquired in the previous phase.

During Module 4 – “Using Webquests in class” students remained aggregated as in the last stage of the *Jigsaw* (Module 2). This time the technique chosen for the activity was a *Role Play*. Learners were asked to pretend to be a group of teachers, whose school director had asked them to analyse and evaluate a certain number of webquests. Since the *Role Play* imposed the analysis of the webquests to be carried out from very particular perspectives, i.e. by playing specific roles, at the beginning of the activity each student/teacher chose a role from a list of characters, including the “director”, the “rapporteur”, the “techno-sceptical”, the “bureaucrat”, the “defeatist”, etc. During the activity, the webquests were discussed and a common evaluation was

¹ For more information on the *Jigsaw*, see <http://www.jigsaw.org/>

negotiated by the students/teachers, who argued their position according to their role. At the end of the activity, the students/teachers produced a shared document containing the analysis, which took into account the different viewpoints played.

Finally, during Module 6 – “Using blogs in educational settings”, students (who maintained the same groups as the previous module) focused on the use of blogs in educational contexts. The collaborative technique chosen for this activity was the *Discussion*. In line with the design principles behind such a technique, the activity was not particularly structured; nonetheless, two phases were envisaged so as to give pace to the work; besides, an artefact was required from students as output of the whole Discussion. In particular, during the first phase of the activity students were required to individually read some materials, navigate a certain number of educational blogs and try to implement a draft of a personal blog. During this phase the communication system could be used exclusively for asking questions and for expressing personal doubts, ideas or comments if any. On the contrary, the second phase of the activity was much more collaborative, because students were in charge of discussing with the final aim of conceiving a common design of an educational blog.

The computer system used to carry out the online activities was Moodle², an OpenSource computer conferencing system that can be easily configured in forums and topics.

3 Research Method

In order to measure the social dimension developed by students during each module, an evaluation model was used, which had been previously developed and extensively used to assess similar online experiences [22, 23]. The model considers four dimensions as those characterizing a learning process in CSCL contexts, namely the *participative*, the *cognitive*, the *social* and the *teaching* dimensions. In the model, each dimension is characterized by a set of relevant indicators that can be used to monitor and evaluate it, and by methods that allow one to gauge such indicators, starting from tracked data. There is a wide variety of data that can be collected and analyzed to implement these methods - these range from quantitative data about the interactions among students, to more complex data obtainable from the elaboration of the above and from content analysis of interactions [23]. Since the focus of this study is the social dimension, in this paper, instead of describing each single dimension, we address the social component only, as previously defined. According to the model, in order to investigate the social dimension, it is necessary to identify clues that testify to affection and cohesiveness, as illustrated in Table 1.

To investigate this dimension entails manually carrying out content analysis of all the messages exchanged by the students. This involves a certain workload, encompassing reading each message and systematically identifying the frequency of given keywords or patterns or even expressions that are believed to reveal a feature of the communication act, and finally classifying each of them as belonging to a certain indicator category. The unit of analysis chosen was the “unit of meaning” i.e. each message was split in parts defined on the basis of “consistent themes or ideas” [24].

² <http://www.moodle.org>

In content analysis, the coding procedure and the assignment of the units of analysis to the pertinent indicator, is usually carried out by a couple of coders (in our study researchers, who had acted as designers and tutors on the course) who, after a period of training (in our study about 40 hours) and the setting up of a strict coding procedure, work separately to code the whole corpus. Furthermore, in order to estimate the level of agreement between the coders, it is quite common to calculate their inter-rater reliability [25].

Table 1. Main indicators of the social dimension (examples are inspired by Rourke et al [11])

SOCIAL DIMENSION	category	code	indicators	examples
	<i>Affection</i>	S1.1	expressions of emotions that may be revealed either by verbal dissertation or through graphical/orthographical solutions, e.g. repetitions, use of punctuation, use of capital letters, emoticons	"I just can't stand it when.....!!!!" "ANYBODY OUT THERE?" ;-))
		S1.2	expressions of intimacy that may be revealed by the use of sarcasm, humour, irony, etc.	"Hi guys, don't worry about it! Here you have an expert... ;-) ah!"
		S1.3	"self-disclosure" acts that may be revealed by presentations of personal anecdotes or by admission of self-vulnerability	"When I read this, I was a little confused...." "What really frustrates me is....."
	<i>Cohesive-ness</i>	S2.1	occurrences of vocatives or more in general references to other people in the group	"John, what do you think?"
		S2.2	expressions reinforcing group cohesion that can be revealed by either expressions of group self efficacy, or use of inclusive pronouns or adjectives	"Hey guys, I think we have hit the target! Well done, we really are a good team!."
		S2.3	greetings, phatics, salutations	"Hi all!" "That's it for now!" "Enjoy your week-end!"

In this study, the corpus of the coded messages was of 677 (total number of messages exchanges during the Jigsaw + the Role Play + the Discussion). The sample used to calculate the inter-rater reliability was composed of 70 messages, which were coded by both the coders. The sample was chosen by selecting 10% of the messages in each module of TD-SSIS Liguria 2007 course, which was considered representative of the whole corpus of messages. The selected messages were distributed in time (namely, at the beginning, in the middle and at the end of each module). The inter-rater reliability was calculated using Holsti coefficient and considering the agreement on each unit of meaning. This was 0.90 (percent agreement 0.84), which is usually considered a good result. Disagreements were solved through discussion.

4 Results

The following Table contains the results obtained from the analysis of the messages exchanged among the 21 students during the 3 online modules described above. In particular, the results refer to the number of units found in the messages related to the social dimension.

Table 2. Results of the analysis related to the social dimension

		M2-Jigsaw	M4-Role Play	M6-Discussion
<i>Affection (S1)</i>	S1.1	6	15	53
	S1.2	17	25	32
	S1.3	41	23	22
<i>Total:</i>		64	63	107
<i>Cohesiveness (S2)</i>	S2.1	54	69	54
	S2.2	41	15	43
	S2.3	133	121	229
<i>Total:</i>		228	205	326

The Table compares the data of the 3 modules and makes a distinction between data for the indicator Affection (S1) and data for the indicator Cohesiveness (S2).

Looking at the total number of units referring to the social dimension, we should note that there are not so many differences among the three techniques; above all the Jigsaw and the Role Play have very similar values, whereas the values of Discussion are a little higher.

As one may note, Affection always has lower values than Cohesiveness; in particular indicator S2.3 (greetings, phatics, salutations), which has to do with the habit of students to use a correct netiquette, has the highest value; moreover, indicator S2.1 (occurrences of vocatives or more in general references to other people in the group) is quite high, as if to indicate that students did frequently refer to one another, which is usually considered a positive attitude in collaborative learning environments. As far as S1 is concerned, it seems that the group was not so keen on expressing emotions (S1.1) or intimacy (S1.2).

By looking at the indicators technique per technique, one may note that – as we have already mentioned - the Discussion is the technique that apparently fostered the social dimension most.

In particular: the ability to express emotions (S1.1) is very low in the Jigsaw, and then increases during the Role Play and is at the highest level in the Discussion. The same trend can be observed for S1.2 (expressions of intimacy). These trends may find a reason not only in the ability of a technique to enhance these indicators more in respect to other techniques, but may also have been affected by the order of the modules and by the consequent ability of students to perform the social dimension, which – as it is easy to understand – may increase as time goes by. Moreover, the fact that the Jigsaw did not encourage the expression of emotions and intimacy so much, may be partially due to the fact that this technique imposes a rearrangement of groups (expert groups and then jigsaw groups) and this may inhibit the creation of a friendly climate.

A different (and opposite) trend can be noted for S1.3 (self-disclosure acts), which is higher in the Jigsaw and lower in the other two techniques. This is because the Jigsaw was the first activity of the course and it was here that students expressed their uncertainties about the course, and about the modalities of communication.

As far as Cohesiveness is concerned (S2), values for S2.1 are quite similar, even if the Role Play seems to have encouraged the attitude to refer to others' messages more. At the same time, group cohesion (S2.2) was lower during the Role Play than in

the other group techniques. These two data concerning the Role Play may lead to consider this technique good for helping students in taking into account the others' point of view more, but on the other hand – since the assigned roles solicited students to assume opposite positions – this of course did not foster group cohesion.

Finally, S2.3 values (greetings, phatics, salutations) are very similar in Jigsaw and Role Play and are higher in the Discussion, which – being the last activity of the course – was naturally the occasion for expressions of that kind.

In addition to the analogies and differences just presented, it is also interesting to compare our results with the learning achievements obtained by students within the three activities (quantified in terms of marks received for each online activity).

Table 3. Mean marks obtained by students in the three activities³

<i>Discussion</i>	27/30
<i>Role Play</i>	27/30
<i>Jigsaw</i>	24/30

The mean marks reported in Table 3 indicate that the Discussion and the Role Play obtained better achievements in comparison with the Jigsaw. This seems to suggest the idea that a good social dimension may positively influence the students' learning achievements (see our Discussion), but – on the other hand – one should not take it for granted that a lower social dimension (as in our Role Play) will necessarily lead to poor achievements.

5 Conclusions

In this paper we have investigated three collaborative techniques, and have compared their ability to foster the social dimension within the same group of students during a course.

Naturally the study, like the majority of the sample studies in the educational field, is explorative in nature and thus statistically “weak”, in that the sample is so limited and at the same time it is impossible to control the numerous variables involved. As a consequence, the results are to be handled carefully; still some design principles and indications can be drawn from our analysis.

First of all, it is worthwhile noting that our data do not definitely raise one of the techniques to a higher rank in respect to the others.

Instead, what seems to emerge from our study, is that the choice among techniques at design level needs to be made with caution, by taking into account not only the learning objectives, context and contents to be addressed, but also the peculiarities of each technique and its ability to support more or less particular aspects of the learning process.

For example, if the focus is on the social dimension and the aim is to enhance this component of the learning process, one should pay attention to the order of the activities proposed within the course, starting with easy techniques, such as for example the

³ Marks in Italy are usually given in thirties, with 18 as the lower acceptable mark.

Discussion, which allow students to “naturally” know each other and does not impose roles or frequent rearrangements of groups. Only when the learning community has already started up, may one use techniques more demanding from the social point of view.

Moreover, at design level one should consider and bear in mind that there are techniques which in principle are intended to foster a “positive” social dimension, whereas others (such as for example the Role Play) are intentionally thought to create opposition among people, so during the process one should take under control that they do not foster a “negative” social dimension as well.

Finally, our study also confirms that it is not always possible to observe a direct relation between the social dimension and the learning achievements obtained by students (high social dimension = good achievements; or, on the opposite, low social dimension = bad achievements); moreover, given the high number of variables at play (e.g. the individual characteristics of the students involved in the process), it is even more difficult to link directly students' good or bad achievements to such dimension only. Despite (and because of) this, further research in this field would be recommended, with the aim of better understanding the nature of the relation between the social dimension and the achievements of a learning community.

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