Assessing online collaborative groups within institutional contexts: a pluridimensional approach

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Abstract

The use of online work groups partially or totally self-managed is becoming a widespread educational practice even within formal education contexts such as universities, especially in job-oriented post-graduate courses (master courses, specialization courses, internships). In such contexts it is important to have assessment criteria which can be easily applied and later integrated adequately with the individual assessments.

What indicators are therefore taken into consideration when assessing an online collaborative group? In an earlier study we had drawn up an "effective collaboration" quantitative model centered on the quality of communication and socio-ethical relationships management. Here we propose to integrate such a model with another two quality dimensions (i.e., the dimension "quality of critical negotiation" (QCN) and the "Quality of end product" (QEP).

Je-LKS | Journal of e-Learning and Knowledge Society
Vol. 6, n. 2, May 2010 (pp. 95 - 104)
ISSN: 1826-6223 | eISSN: 1971-8829

1 What dimensions to consider

Several methods for the analysis of collaborative processes have been developed in the past, but they were mainly theoretical with scarce implications for practice.

When considering the different approaches, there are first the purely quantitative methods based on the data derived from the log files of learning management systems. The most common calculations are the number of connections by the individual participants, the number of messages sent, the number of attachments, and other numbers of this kind. There are also content analyses of interactions (for an overview see Rourke *et al.,* 2001; De Wever *et al*. ,2006) based on coding systems that classify the conversation texts according to predefined categories depending on the different aspects of the interactions (cognitive, metacognitive, social etc.), and which are analysed by using statistics with the aim of describing the nature of the communicative process (e.g. the prevalent type of interaction, the importance of the different moves in the dialogue, etc.). Such analyses can, usually, highlight only the most macroscopic aspects (Häkkinen *et al.,* 2003).

Finally we shall mention the qualitative methods, based, in most cases, on the etnomethodological perspective of conversation analysis (ten Have, 1999). These methods produce detailed and deep case studies and are able to highlight the deepest and most important aspects of the collaborative processes. However, they provide data which are not easily comparable and cannot be generalized. Moreover, and they require a lot of work and time.

Such models, which are surely interesting from a speculative point of view, are of very little effective use. As a matter of fact, what dimension should be considered for a real evaluation of the extent to which a certain behaviour is far from an expected performance, is not clear. It does not seem reasonable to presume that certain dimension should be interpreted according to simple linear relations ("the more present the dimension is – the more positive is the trend"). Furthermore, they require long procedures.

An institution with educational objectives (universities, adult training centres, etc.) need to have comparable data which can, if necessary, be integrated with the individual assessment. In such contexts, we believe, three main dimensions should be considered:

- the quality of communication from an ethical perspective (QCE), i.e. the ability to manage group relationships respecting communication norms and rules.
- the quality of collaborative interactions in terms of critical understanding and social negotiation of meaning (QCN) (comparing/discussing different points of view, dialectical discussions).

- The quality of the end product and the awareness of the process carried out (QEP).

On a purely theoretical level all the three dimensions are supposed to be respected at the same time. It is, however, logical to think that a collaborative group would be characterized by its own specific strategies, oriented more towards one or another dimension, depending on the difficulties it encounters.

2 The Quality of Communication Ethics (QCE)

In earlier papers (Calvani *et al.,* 2007; Calvani *et al*., 2009) we presented a quantitative model of collaborative effectiveness, which we believe gives an answer to the issue of quickly assessing collaboration effectiveness. This model uses a Moodle add-on, the Web Forum Plus[1], a web forum developed purposely to allow also the use of Thinking Types (i.e, labels that participants can add to their own messages to declare their communicative intentions).

This model, as opposed to the common quantitative techniques, enhances the quantitative elaboration taking into account dimensions which are not usually considered. Within this model, a group should keep itself within adequate thresholds as regards:

- extent of participation,
- equal participation,
- rhythm (consistent exchanges throughout time),
- depth (development of discussion threads),
- reciprocal reading,
- extent of roles,
- proposing attitude,
- reactivity to proposals,
- conclusiveness.

The model may be based on average values as a reference (when the universe made up of all the groups is large) or on values which are defined beforehand as acceptable by the participants in the groups.

The result of data processing can be immediately represented by a radiant graph like the one in the figure below, which highlights the differences between the average in all the groups and the performance of the single group considered for the analysis (Calvani *et al.,* 2009). In this particular case, we can see how Group A1G2 has significantly higher values than the average as regards conclusiveness, proposing attitude, interaction and depth, but lower ones as regards the extent and the equity of participation.

[1] www.corsolte.net/forumplus

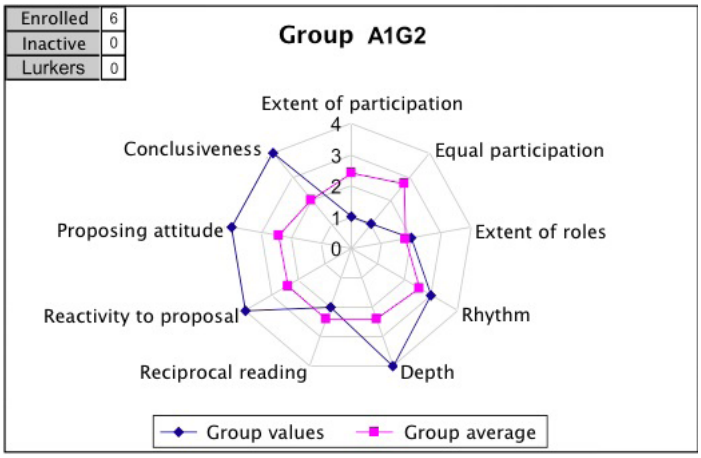

Fig. 1 - An example of collaborative effectiveness

3 The Quality of Critical Negotiation (QCN)

A group could, however, behave adequately as regards abiding by the formal criteria which characterize good communication ethics (that is, it participates adequately and within reasonable time, respects others, reads posts, answers questions etc.), but nevertheless have a weak critical attitude, and be basically acquiescent. Participants could simply conform to what others (maybe the co-ordinator) say, thus limiting their efforts to introduce different points of view or other possibilities. Such aspects are certainly an important part of the collaborative process and in fact, both Computer Supported Collaborative Learning (CSCL, Stahl *et al.*, 2006) and constructivist theories focus on negotiation, interpersonal discussion and critical thinking (Dillenbourg, 1999; Garrison *et al.,* 2001; Andriessen, 2006). We also consider the distinction between collaboration and cooperation (Himmelman, 1993; Roschelle & Teasley, 1995; Dillenbourg *et al.,* 1996; Misanchuk & Anderson, 2000; Strijbos & Martens, 2001; Calvani, 2005) whereby collaboration implies a greater degree of liberty and more room for negotiation during the process (as regards roles and objectives/aims), while cooperation is more similar to "teamwork", where each member plays his own part, with predefined roles and less interaction.

Looking closely, most online collaborative group experiences have a common tendency (which in some ways is quite comprehensible) to simplify the task. They seem to apply the logic of 'cognitive parsimony', where the acceptance of the first work proposal is immediately outlined within a rigid pattern where revisions and further enhancing is practically impossible. In other words, there is a tendency to scale down a negotiable collaborative approach to a

cooperative-practical approach.

After preliminary research, a specific system to encode web forum messages, structured in three categories (see table 1), has been outlined to assess this dimension (critical sense/negotiation). The first two categories, which have been defined "negotiation attitude" and "non-negotiation attitude", are linked to the two important types of discussion as regards the overall quality of the collaborative process. The third category, defined simply 'other', describes all the interactions which do not fall under the first two and which mostly fall within the broad classes of socio-emotional communication and organizational-management communication.

The chosen encoding unit are posts sent in web forums, that is, the whole text message included in the common space of discussion[2].

TABLE 1

The categories of the interaction encoding system

Category 1: negotiation attitude
Interactions focusing primarily on the group: • proposals or problems related to the project are brought forward, and the group is invited to reflect and discuss; • proposals/contributions by others are discussed critically; • evaluations, clarifications, explanations, justifications regarding already introduced proposals/contributions are requested/encouraged or given; • already introduced proposals/contributions are developed through changes, integrations, reprocessing and references to external resources; • relationships and connections between proposals/contributions are created/clarified through references, comparisons and conclusions are drawn by summaries.
Category 2: non-negotiation attitude
Interactions primarily focused on the individual: • suggestions or contents are presented without taking the form of a negotiable proposal, that is, they do not contain requests/proposals which can be discussed; • a simple acceptance/consent or a refusal/disagreement is expressed, with no supporting arguments; • suggestions/instructions on individuals' activities and tasks are requested, encouraged and given; • the author's activity is illustrated by a summary of his work and a declaration of what he wants or is going to do.

[2] Encoding was carried out by two researchers, who after a training period, carried out an independent classification. The result of the inter-rater reliability agreement calculated according to Cohen's kappa (K) was satisfactory (K = 0.64).

Category 3: other
Interactions that do not fall under the first two categories: • expressing difficulty; • presentations, greetings and polite exchanges; • emotional exchanges; • purely organisational/management discussions; • exchanges which cannot be assessed.

4 Quality of Product and Awareness of the Process

The two dimensions we have dealt with so far (communicative ethics, critical-negotiable ability) are not entirely sufficient for a satisfactory assessment within a formal context. A group could have "behaved well" on the ethical level in terms of respecting netiquette and have discussed/negotiated at length, but in the end produced a low-quality product. The assessment required within an academic context cannot entirely overlook the end result. In our case, in order to assess this dimension (which should, in each case, be considered on the basis of the specific objectives given to the group) we based ourselves on three indicators (see table 2) strictly linked to the definition of the product's characteristics as expressed in the task[3].

TABLE 2
Tabella 2: Assessment indicators

Indicator 1: content quality
• extent, richness, quotations, sources.
Indicator 2: structure
• contents' organisation, clear expression, readability, hypertexts (presence of an index, internal links, footnote links).
Indicator 3: critical awareness, that is, clear awareness of the limits of the work
• awareness of points left pending, of possible developments and further elaboration, • clear information about different roles and individual contributions to the product.

5 Sample and data processing

The activities of our courses, where participants are mainly teachers, normally take place over a period of 5-6 months and are subdivided in two parts: an individual phase of familiarization focused on technologies adopted in the course, online norms of behavior (netiquette/socioquette) and initial learning of field contents, followed by the formation of work groups and selection of

[3] A mark from 0 to 2 (0 = inadequate, 1 = partially adequate, 3 = adequate) was given to each indicator by two independent assessors (whose level of agreement was 70%), and the average of these marks constitutes the assessment of the single projects done by the groups.

group coordinators, and the project work. The institution supplies substantial technical and instructive support at the beginning and after it tends to gradually give the groups more autonomy (fading), remaining, however, present in every phase. The transition from the individual phase to the group formation phase takes place also during a face-to face meeting where practical agreements are made.

This year we introduced some novelties. Eleven groups with 4-7 members in each one were formed online and were not monitored by the tutor in the project work. Practically, participants with different skills and expertise, who never actually met, joined together around some themes and they had to manage a reasonably complex situation: choose a coordinator, create a common ground, manage interactions efficiently and reach the objective of finishing the project.

Out of the 11 groups, 2 split up after a few days, particularly because nobody wanted to be coordinator. So the first critical factor that emerges regards participants' possible feeling of inadequacy when faced with a series of requests and instructions which at times might seem too complex to respect.

All the other groups finished the task, took part in the activities, and after prepared a collaborative document (with the exception of one who, however, intentionally decided to rewrite it more thoroughly within a longer period of time). On a formal level they fulfilled their duties. But what type of profile does emerge for the group when it is considered through the three different dimensions?

Here we will only present (tab. 3[4]) the summary data. As can be seen each dimension turns out in a score of synthesis. The communication ethics dimension gives the variables of each group, which are significantly lower than the average of all the groups. The critical-negotiation dimension gives the percentage of messages, which were coded as "negotiable" by the interactions analysis, on the total posted on every group's web forum.

The end product dimension gives the average of the scores attributed by the evaluators:1.5 is considered an acceptable score and 2 is considered good.

[4] It was not possible to exactly define the process characterization of two groups (no. 3 and no. 8), which therefore will not be considered. Group 4 chose an autonomous method using mostly a synchronous tool such as a chat to interact.

TABLE 3
Summarized data of the considered dimensions

Group	Quality of communicative ethics "Critical" variables (i.e., variables under the average)	Quality of critical-negotiation	Quality of end product	Qualitative notes
1	• Rhythm • Depth • Reactivity to proposals	30%	1,5	No attitude towards negotiation, with little continuity and argumentative depth. Acceptable end product
2	• Equal participation • Rhythm	64%	2	Very good negotiation quality and good end product. Some problems on the level of communication ethics
3	• Proposing attitude • Depth	not available	not available	-
4	not available	not available	1,5	-
5	• Extent of participation • Proposing attitude • Extent of roles • Reciprocal reading	50%	2	Good negotiation level and good end result but within a limited number of messages, with great problems on the communication ethics level
6	• Equal participation • Rhythm • Conclusiveness	30%	2	Limited level of negotiation. Several problems on the communication ethics level, but with a good end product
7	• Equal participation • Rhythm	55%	1,5	Good quality of negotiation. Some problems on the communication ethics level. Acceptable end product
8	• Extent of participation • Extent of roles • Proposing attitude • Reactivity to proposals	not available	1,5	Negotiation not assessable. Several problems on the communication ethics level. Acceptable end product
9	• Equal participation • Reciprocal reading	31%	1,5	Limited negotiation. Some problems on the communication ethics level. Acceptable end product

Conclusions

The problem of the effectiveness of collaborative groups can be dealt with from different points of view. Each criteria provides a perspective on the issue and it is not plausible to think of the existence of mechanical correspondences

and correlations between the different dimensions. Between the quantitative and the qualitative dimensions in particular, there are multiple and different patterns.

We have proposed a model based on a triangular pattern: quality of communication ethics, quality of critical negotiation, quality of end product.

The first dimension uses quantitative indicators, which we have already experimented and presented in previous works. For the second and third assessment we have proposed a grid based on quality indicators, which however are easily transferable to other contexts.

On the whole, it must be observed that every online group, faced with a complex task, will understandably turn to particular strategies which will reduce the cognitive content favouring "cooperative" rather than "collaborative" solutions. To some extent, a tendency towards cooperation could be necessary as long as it does not prejudice the good level of the critical and dialectical attitudes, which are aspects that should always be saved in an educational context.

For this reason, planning should be oriented to guarantee some adequately reserved and limited space and time all along, supported by more specific technologies suitable for encouraging different points of view, discussions and taking common decisions quickly.

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