Online group work patterns: how to promote a successful collaboration

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Abstract

Participation is a complex process, engaging the whole person, implying cognitive, emotional and relational aspects (Wenger, 1998). In online open and distant learning, group work is a commonly used strategy, given its collaborative nature and constructivist framework (Bates & Poole, 2003; Garrison & Anderson, 2003; Jonassen, 2005). In this context, collaborative learning processes are highly dependent on the shared written information and the interactions that are established among the participants. The types of interactions that occur within such groups are often decisive for its success.

The present research was developed in the context of a Curricular Unit that is part of the degree plans for the Master in E-learning Pedagogies and the Master in Educational and Multimedia Communication at the Universidade Aberta, where a new pedagogical model for online education has been implemented since 2007.

Two main research questions were asked: What are the interaction patterns that characterize successful groups? What types of constraints prevent some participants from fully engagement on the group work? To answer these questions, after the course was finished, two particular groups were identified (one characterized has very successful in their final product and one has less successful), after that, each of the group´s online discussion forums was coded and submitted to content analysis.

Data analysis involved iterative analysis and revision of the coding scheme (Strauss and Corbin, 1998). Two of the researchers derived the initial coding key from the online discussion forums used during the group project phase of the Curricular Unit. Some of the codes were quantified in order to foster a more meaningful comparison of the data by allowing patterns to be identified and further explored (McConnell, 2006).

This type of assessment was welcomed by the students and effectively implemented by all the groups but one. Nevertheless, the interpretation made by each group of what should be valued and how it should be operationalized varied significantly. Even though the groups seemed to follow similar stages throughout their project development, distinct interaction patterns emerged between more and less successful groups. This raised issues of equity and validity of the suggested method, as well as about the best strategies to foster productive online collaborative learning environments in general, and about the role of the instructor in particular.

Networked Learning

The notion that peer interaction stimulates knowledge production and produces cognitive gains (Dillenbourg, 1999; Perret-Clermont, Perret & Bell, 1991; McConnell, 2006) explains many pedagogical decisions. Virtual worlds and learning environments provide participants with the possibility to appropriate knowledge and develop competencies through exploration, research and experimentation, putting them in contexts, groups and

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situations that offer diverse learning settings. This is particularly important in the case of online group work given the Internet and web capabilities to "provide a virtual environment for learners to work together, share resources and collaborate" (McConnell, 2006, p.31). According to this author (2006) these types of virtual communities provide participants with the opportunity to take ownership over the content and direction of their learning; be responsible for managing their learning and cooperate; and to "focus on their own learning and development from a critical, reflective perspective, combined with an understanding of relevant academic ideas and concepts" (p.31).

This way, we argue for the endorsement of collaborative learning contexts that stride for the quality of learning through the understanding of the relationships between participants, tools/artifacts, and social groups. The instructor should act mainly as a facilitator to the learning process, directing his participation towards the orientation of the community/group work in a productive direction while supervising the peripheral participants (Wenger, 1998), to whom tools may be provided to self-regulate their interactions (Dillenbourg, 1999).

On any given situation, participants produce and create the contexts of their community of practice, supporting themselves on the cognitive, social, and physical aspects of the environment that they consider relevant. But we must have present that in order for the collaboration to take place there must be a motive and space for negotiation. According to Dillenbourg (1999) collaboration is characterized by participants who share a common goal, are at a similar level and can perform the same actions while working together. The interactions defined as collaborative have the possibility to influence the peers cognitive processes, to be negotiable and may produce misunderstandings, that are a significant part in the "collaborative learning dynamics model" (Dillenbourg, 1997, p.10). According to Wenger (1998) "the negotiation of meaning involves the interaction of two constituent processes, (…) participation and reification" (p.52). Such ongoing negotiation goes beyond language (both written and oral). Furthermore, the social relations between the participants and the achieved degree of commitment are preeminent factors in negotiation. Reification entails the participants' products as a result of their engagement in such collaborative processes.

Rovai (2004) considers that collaborative learning is successful when the group agrees on a product that translates the contribution of each member. This way, group work can contribute to the development of a collaborative and participative learning environment. Nevertheless, research (Swan et al., 2000; Barlow, 1992). has shown that this type of work may lead into more polarized decisions and heated discussions. In these situations, the instructor's role becomes extremely important, and requires him to supervise and regulate the group work. In ODL, usually older, students are characterized by their high motivation to learn, fueled by their realization that learning will help them to better perform in their professional settings. What is more, according to Rovai (2004) their life experiences constitute a very good resource for collaborative learning.

Group work patterns and knowledge convergence

According to Wenger (1998) "living is a constant process of negotiation of meaning" (p.53). The engagement in practice can be characterized by a series of patterns. However it is the successive reenactment of such patterns that produces an experience of meaning. McConnell (2006), in his description of online group collaboration, describes the process of group work as being defined by such attributes as "the students ability to have an in-depth discussion, raise points, contribute to discussions (…) and generally participate as fully and openly as possible." (p. 62). This author refers to three approaches to the analysis of group collaboration in online environments: the process of group work; social presence; and the outcomes and products of group work. Concerning the stages of group work, McConnell goes one step further and describes a series of patterns experienced by the participants.
Barron (2003), in a face-to-face setting, was able to distinguish that some patterns of interactions are more productive than others for establishing a working joint problem-space that allows the group to capitalize on the resources available to solve problems and to learn from one another. This author concludes that successful groups have a greater tendency to discuss its member's proposals and to link them with their prior conversations. On the other hand, less successful groups are more likely to reject or ignore its partner's contributions without weaving them with their prior conversations.

This attention given to the patterns of interaction is particularly important given its close relationship with the process of knowledge convergence. "Knowledge convergence is the process by which two or more people share mutual understanding through social interaction, and is believed to reflect the fundamentally social nature of the

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knowledge construction process" (Jeong & Chi, 2007, p.287). In this context, knowledge convergence can be reflected in the quality of learning and in the groups' collaboration and final products. Also, given the presented framework collaborative learning research suggests the need to give greater emphasis to interactional practices in order to render them more productive (Matusov, Bell & Rogoff, 2003).

The proposed research questions are part of a bigger research project where different types of collaborative practices in online Courses were investigated, based on the analysis of the online interactions on the discussion forums, the works produced by the students (both individually and in small groups), and answers to questionnaires applied in the different stages of the investigation. In this particular case we are interested in exploring questions related to group work in online ODL. Two main research questions were asked: What are the patterns that identify successful groups? What types of constraints prevent some participants from fully engaging on the group work?

In this paper we aim to discuss how more and less successful groups, in terms of their final product – a project related with the participants professional practice requiring the creation of a learning situation mediated by technological tools – have been influenced throughout their work process by the online collaborative interactions. This is supported by Barron (2003) when she says that the "quality of interaction had implications for learning" (p.307). Moreover, our own teaching experience taught us that all students do not equally benefit from collaborative work.

The context

Based on the recent developments on open and distance learning (ODL), the Universidade Aberta has assumed a student centered pedagogical model (Pereira, Mendes, Morgado, Amante & Bidarra, 2007) founded on flexibility – where asynchronous technology is preferred and students and instructors can participate on the Courses from wherever they are located – and supported on three types of interaction: student-content; student-instructor; and student-student. Moreover, on the principle of digital inclusion, giving access to a higher education institution to an adult population that had no previous competences on instructional and communication technologies (ICT).

During the last 2 years, the Distance Learning Laboratory (LEaD) on which these authors participate, has been developing work related to creation of learning environments supported by virtual classroom systems (VCS). According to Pereira et al. (2007), the assessment strategies and instruments used in online education are much different from those used in traditional classrooms, or traditional ODL. These authors refer the use of diagnostic, formative and summative assessments, and the most commonly used assessment instruments identified in their research were: tests, final exams, essays, projects, problem solving, case studies, and portfolios; which are all cited as common to the mentioned learning environments.

The task of developing online Courses, and more specifically designing Curricular Unit plans, is one of the Professor's tasks. In the implementation of this task we argue about the importance of adopting a curricular congruence where the significance and objectives of the assessment should attain a balanced coverage all the curricular objectives and competences, and the principle of integration assuming assessment as an integral part of the learning process. This study was conducted as part of a larger project exploring assessment processes and the significance that the participants attribute to assessment in general. In fact, nowadays, professionals are expected to work collaboratively in small groups, and tasks are designed to be interdependent, requiring the sharing of information and knowledge. In this perspective, the online Course where the participants were enrolled defined as one of its major goals the development of argumentative and debating competencies in collaborative settings, both on online discussion forums and during the development of small group projects.

This work was developed in the context of a Curricular Unit called *Using ICT for Learning and Teaching* that is part of the degree plan for the Master in Elearning Pedagogies and the Master in Educational and Multimedia Communication at the Universidade Aberta. Based on the University Pedagogical model (Pereira et al., 2007), the adopted methodology was structured around completely asynchronous and complementary work strategies. Firstly, it was based on the participants' independent study and reflections of the presented documents. It required participants to read critically, to identify the main thesis defended by the authors, and elaborate their own opinion. Secondly, it required that the participants work collaboratively with their peers, participating in online forums where they debate and (re)construct collectively their learning. Thirdly, participants were

expected to choose a theme, from within a set given by the Professors (blogs, problem-based learning, game-based learning), and work in small groups to find the best solutions for the problems and cases that they were confronted with (4 weeks to develop the group project, and 2 weeks to discuss it). And finally, to develop an individual final paper based on a literature review or on the report of a pedagogical experience. The role of the online teacher varied throughout the course, according to each phase objectives. During a first phase, when the participants are engaged in big group discussions, the teacher worked as a facilitator and a critical observer; during the group work stage the responsibility for the discussion leadership was entirely the responsibility of the participants, with the teacher being only a critical observer and interacting only when requested.

The participants

The participants were 36 master students from the referred programs. From this sample, 19 were female and 17 male. All of the participants were employed professionals, including 5-12th grade teachers, professional development trainers, University instructors and a psychologist. Participants came from a variety of locations, from both continental Portugal and from the Madeira and Azores islands, and there was also one participant from another European country. The ages ranged from 30 to 55. The participants met for the first time during the pre-program familiarization module that all, first-time students are required to participate in, with the objective of familiarizing themselves with online communication modes and technologies. During this module participants are expected to start the development of an online learning community and are already required to engage in small group work.

The participants were divided into 8 groups (with 4 to 5 participants each), and each group was asked to develop a project that would later be presented to the whole class and discussed by all on a forum. The project that they had to complete was based on the "creation of a learning situation mediated by technological tools". 10 of the participants had previous experience in CSCL at different levels.

Data collection and analysis

In this research we have tried to understand what differentiates the process of collaborative group work in the cases of groups that have been very successful in their final product from those that have been less successful. We were interested in investigating how the groups coordinated their actions, their decision making processes, how the group members interacted, and what was the role of any artifacts that the group researched or created. We were also interested in analyzing how collective cultural resources, both discursive and practical, were used by the participants, in the context of participating in a group project for their Masters program. For that, after the assessment and classification of the group final products, based on the previously negotiated criteria (exploration of the chosen theme; critical reflection about the use of ICT in learning environments; synthesis; originality of the final product presentation medium), two representative groups were identified: Dali (very successful in their final product) and Matisse (less successful).

After that, we went back and analyzed each group's processes of collaboration, with particular emphasis to the interaction between the participants during the four weeks of online group work, and the artifacts that were constructed, and reconstructed, by each group on the way to their final product. Both the online group forums interactions and the group's artifacts were coded and used as the base for a qualitative analysis.

The analysis was conducted using Strauss and Corbin (1998) "grounded theory" approach. For these authors the theoretical interpretation of the data emerges from the systematical analysis of the data, implying a very close relationship between them. It is important to clarify that this interpretation of the theory is sustained by a set of well defined categories (concepts or themes) that are systematically interrelated through statements of relationship originating a theoretical framework that explains the situation being studied.

In this study the researchers are also online instructors, with experience in the conception and implementations of courses, and when this investigation was started had already a set of questions to guide their analysis. This way, the initial reading of the participants' interventions was guided by these initial questions, later emerging the themes (adapted from the work of McConnell, 2006) that were then used as references. Afterward, the analysis was refined around those themes. Finally, two representative groups (Dali and Matisse) were more

carefully scrutinized to identify their similarities and differences when compared to the overall framework that had initially emerged.

Results

Group Dali was composed by 3 professional development trainers and one psychologist with ages ranging from 30 to 45, two of them with previous experience in CSCL. They were very successful with their final product and worked collaboratively very harmoniously. Group Matisse was composed by 3 teachers and one professional development trainer with ages ranging from 30 to 45, and one of them had previous experience in CSCL. They were not as successful with their final product and revealed some difficulties to collaborate effectively, resulting in anxiety and division amongst the group members.

From the analysis of the group interactions emerged 4 main patterns of work (McConnell, 2006) that we will now present (table 1). The patterns we identified in our groups suggest some differences from the ones he advanced. Moreover, some of the patterns (presented in *italic*) were only present in one of the groups.

Table 1: Patterns of group work

	Group Dali	Group Matisse
Negotiation	• *Clarification of focus* • Making the goals explicit • Establishing a structure • *Collaboration*	• Making the goals explicit • Establishing a structure • *Struggle*
Research	• Sharing information • *Creation of artifacts*	• Sharing information • *Changing minds and direction*
Conception	• *Collaboration* • *Defining section headings* • Drafts of sections • *Reflection over the produced sections*	• *Cooperation* • *Different perceptions of expertise and experiences* • Drafts of sections • *Anxiety*
Production	• Merging the produced sections • *Establishing the final presentation format* • Discussion • *Assurance concerning the assessment requirements* • *Revision* • Sharing the final product with the community	• Merging the produced sections • Discussion • Sharing the final product with the community

The concept of **Negotiation**, already referred by McConnell (2006, p. 154), "is characterized by considerable negotiation between the members of the group". Also in our case, this concept implies the effective involvement of all members with the goal of promoting an equitable collaborative learning environment. This concept includes the following differentiating aspects:

Clarifying the focus of the group project, as when in group Dali it is said "I leave here a proposal for our discussion. I'm waiting for reaction. What is exactly your idea? Can you give more practical examples for us to visualize something? We need to see, in order not to stray away from the proposal…" (Susana, group Dali).

Making the goals for the project explicit between the members of the group and with the instructor's help when necessary, as for example when Carla says "Meanwhile I'll ask the instructors to clarify this task… I'm a little confused about what is wanted".

Establishing the structure for the project, as when Pedro from group Dali says: "here goes a more pragmatic suggestion for the proposal I had theorized about, however, it needs a lot of critical reflection, and some pondering so we can collaboratively overcome this challenge. Learning scenarios. Objectives. Framing of the proposal based on learning theories"

Collaboration is also very evident during this phase, particularly in group Dali as we can see in the following excerpt "Do you want to share some starting point or are we all going to propose some topics for the discussion to take shape between us? So far, I believe we are all still trying to do everything, next it will be the stage to harmonize it all between us, and in the end we will have "something" that was done by "someone"" (Maria). In group Matisse this was also the moment when some of the participants started to struggle between themselves

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for protagonism as we can see in Filipe's post "You must be delirious! Read the threads carefully, and make sure who is answering whom, reflect about what is written and don't react so disproportionately to the simple question I made you? Oh Edite, if you are not kidding, save me. Ok?"

Another pattern of work that we have identified was the **Research** that all groups clearly engaged in, as a critical exploration of the available bibliography and tools (games for group Matisse and Blogs for group Dali) relevant for their projects. As Susana from group Dali says "I'm going to do some readings about blogs as learning tools and then will leave here a clearer picture". In this category we emphasize the sharing of information between the group members and the creation of artifacts, such as the blog created by group Dali where they shared comments and reflections, as an addition to the gathered information: "I'm going to put on the blog some of the papers that we found and I will also post there about what I think about the readings. This forum can be more for us to debate how the project is going to evolve" (Susana). Group Matisse does not share an artifact and presents during this period some indecision (changing minds and direction) about where to go with their project, with the members not being able to agree on a bearing and continuously proposing new ideas without stopping to discuss between them and without providing feedback to the ideas posted by their colleagues.

Both groups exhibit a pattern corresponding to the **Conception** stage of their work characterized by the development of a learning situation mediated by technological tools. This concept is characterized by the following aspects:
Similarly to what happened during the Negotiation, group Dali, once again engages on a high level of collaboration that is clearly less visible in group Matisse. The next excerpt illustrates the collaborative learning setting in group Dali:
> "By Susana – March 4th 2007, 23:11
> Proposta_de_Intervencao_Pedagogica.doc
> As promised I leave here something else in the development of our paper. Tomorrow I'll be back and intend to include some images and schemes for it not to be so heavy. Meanwhile I'll be waiting for new developments.
> > By Maria – March 5th 2007, 04:04
> > Proposta_de_Intervencao_Pedagogica.doc
> > Hi everyone I leave here an update."

Characteristic from this pattern is also the drafting of sections for the final product, as well as the definition of the section headings, as is evidenced in the next post "As I had written in this morning's forum, I have put together some things that I wrote with the last ones that Pedro had suggested and so it come to the document that now goes as an attachment. When I was finishing this process Maria wrote here some new proposals about a new parameter and a different objective from the initially suggested…" (Victor, group Dali). In line with this there is also the reflection over the produced sections that translate into polishing their own work through questioning and commenting each other's contributions as when Pedro (from group Dali) says "The main and specific objectives do not need to be about the blog construction. In fact, they may be any other objectives which fulfillment implies the use of the blog. What I mean is that it seems limited to me to have as learning goals the construction of a blog".

The last pattern that emerged was the **Production** of the final product, related to the elaboration of the final project to be presented and the format of its presentation. Included in this pattern we identified the following aspects: The merging of the produced sections as illustrated by Pedro (from group Dali) when he says "after reading what we have so far done, let's add, tweak, and correct as necessary, but in different colors so we can understand each others' contributions". By the definition of the format of the final product as is shown when Susana (from group Dali) posted "If we are talking about blogs in Education, I believe it makes a lot of sense to construct our work in a blog, don't you think so?" The discussion emerges here, especially in group Dali, as a moment of revision, to reformulate proposals and harmonize the final product and also promoting "assurance concerning the assessment requirements is sought" (Swan, Shen, Fredericksen, Pickett, Pelz & Maher, 2007, p.154), as we can see in this post "Alexandre, can you take a look at the activity sequence and see if it is in agreement with what you had imagined? If not we can cut, remove, add, etc. In particular activity 5 needs to be completed; if we change the goal and replace it by Ana's proposal it doesn't even need to appear in activity 5…" Finally, the sharing of the final product with the community appears as the last step in the project that was

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reached by every group. As required every project was then subject of a debate on a forum where all the class members participated. Here is how group Dali shared their work:

"Hi everyone, attached you can find a pdf version of the work developed by team Dali. To take a look at our project in a blog forma go to the webpage Blogs e Aprendizagem Colaborativa. Good Job, Team Dali"

Another aspect were these two group greatly diverged was in the sequencing and time used in each of the presented patterns of group work (see figure 1). In the case of the successful group (Dali), a clear sequence is observable in the way they structured their work. They started almost immediately working in the negotiation process, and as that was finalized, the progressed to the research and conception phases. They invested more intensively in research at the beginning of the conception, but felt the need to come back to it two more times during the conception process to further develop their understanding of particular areas. Finally, as the conception stage approached its end the participants redirected their effort towards the production phase, which lasted approximately one week, and were able to present their final product at the predetermined date.
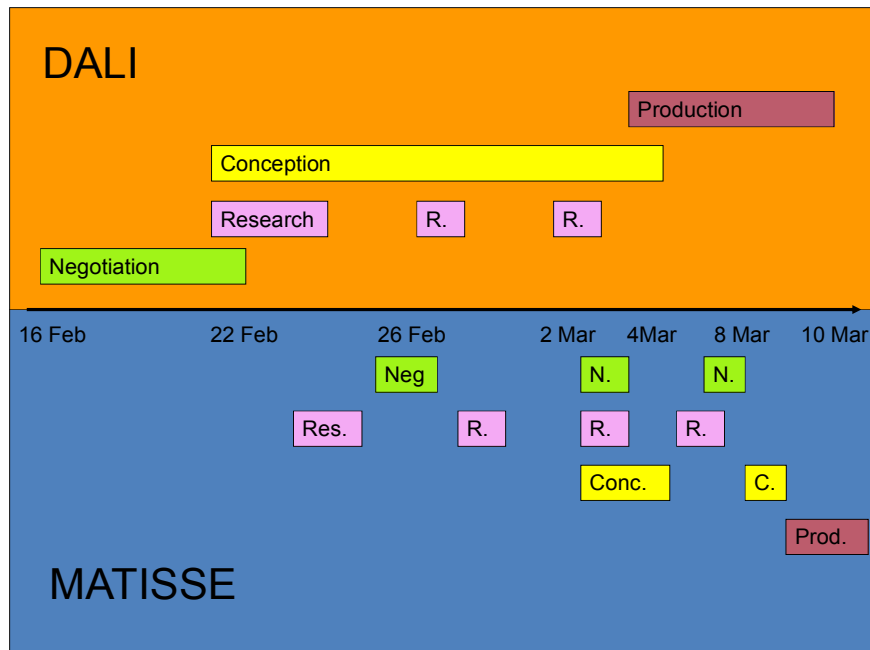

Figure 1: Temporal dispersion and duration of both groups' patterns

In the case of group Matisse, we are faced with a very different scenario. The first relevant aspect that deserves noticing is the fact that this group took almost one week to begin their interaction, and when they did, they did not start by negotiating the focus of their project, but instead started by sharing between themselves the results of their random research efforts. After this initial research they initiated the negotiation process, but were unable to come to a consensus. This made that both the negotiation and research phases were dragged along intermittently until March 8th and, consequently, hindering the conception phase development and delaying their whole project. Because of that, this group was only able to reach the production phase at a very late time, resulting in their late final product submission.

These two groups also diverged significantly in the way that they developed their collaborative learning communication processes supported by the available ITC technologies (see table 2). In the case of the successful group (Dali), their communication was centered on two online discussion forum threads, in which all the participants contributed with feedback and elaborations, for a total average of 42.5 replies per thread, that was also complemented by on chat session were the participants brainstormed some of the ideas that they had during the negotiation phase.

Table 2: Communication Characteristics

Groups	Dali	Matisse
Threads	2	22
Replies/thread	42.5	1.2
Chats	1	3

Groups Matisse illustration is very different. For this group, there were 22 initiated threads by the groups' members on the online discussion forum. However, these initiatives were not supported by the other group colleagues, being only able to attain the very low average of 1.2 replies per thread. Moreover, this group also resourced considerably more to the chat tool, despite the fact that they were not able to use it in a productive way.

Discussion

In this research we drove to study processes of collaborative assessment, used in the context of a Curricular Unit from an online Master Program. All the groups were able to complete their projects and share them with their peers; however, various degrees of success were present. Here we discuss the contrast between two groups representative of this situation. This research was completed through the analysis of the participants' postings in the group work forums and the assessment of their final group projects.

Group Matisse spent most of its time researching material for their project without ever clearly defining the problem that they wanted to work on. They spent a lot of time manifesting their differences without resolving them. In spite of the large research they shared, they did not comment on it when they presented it. Moreover, they did not provide feedback to each other. Decisions were made by some members but the others did not comment on them. No agreement was formally reached in the asynchronous forums. There was clearly a case of members with very strong views and that were not open to negotiate them. They felt the need to resource more often to the chat tool, being apparent that during those sessions they were forced to move on with their work and assume the responsibility to make decisions about it. Unfortunately, this did not translate into improved sharing in the forums. From the analysis of this group's interactions it is clear that the group members do not know each other and have not developed strategies to promote that knowledge. It remains to be clarified which reasons were responsible for this behavior. According to Giddens (1997) this knowledge is necessary to provide the participants the ontological security that enables trust and a collective identity.

Group Dali worked in a very distinctive way. From the beginning they were careful to ensure that they negotiated an approach to their working process that assured the collaborative participation of all members. The whole process of negotiation intended to clarify what was the focus of their project and their goals to achieve it. They were also careful with scheduling of their activities in order to make sure that all deadlines were kept. They started by building together the understanding of what is a blog, and they went one step further and actually created one. This might be considered one of the milestones (McConnell, 2006) that clearly helped to define groups' identity and energized them to complete their project. They were careful to relate their work to the studied learning theories, and when they shared the results of their individual readings they added to it their critical comments and benefited also from their colleagues input. There is an in depth work of reflection to which all the members contributed, not only about the project itself, but also about their own learning.

When we compare the two groups, even though they follow a very similar pattern of work, several differences are clear. In group Dali, from the beginning there is a clear intent to harmonize and value everyone's participation, at the same time that they thoroughly discuss what, and how, they are going to accomplish with their project. In group Matisse the negotiation of the problem is not clearly done in the beginning and as a consequence extends almost until the end. Moreover, in this group the research pattern is also much longer due to this lack of definition of their focus. They did not establish a work plan and as a consequence, only the pressure of the deadlines forced them to move on. This is much more the case of a cooperative work rather than a collaborative one.

Another clear difference is the way in which the groups share their individual readings. In group Matisse the members simply post the links or references to the readings that they have considered relevant. In group Dali, the members go one step further and make also available their critical reflections on the readings that they are sharing. This prompts their colleagues to give them feedback and so initiate a rich discussion about their

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research that is absent on the other group. These are characteristics of participants with a well developed sense of identity (Giddens, 1997). This is also in agreement with Barron (2003) when she says that "the most successful group had high rates of affirming, agreeing, and accepting remarks. These kinds of responses served to prolong the discussion of ideas and led to higher levels of reasoning" (p. 313).

The lack of feedback in group Matisse's interaction may be hinting the lack of trust in their shared motivations, that Donath (1999) called social identity and considered essential for their sense of community. Even more, as Giddens (1997) told us "attitudes of trust in relation to situations, persons or specific systems, and at a more general level, are directly related to the psychological *security* of the individuals and the groups" (pp. 19 italicized in the original). This seems clearly to have been one of the issues hindering the performance of group Matisse, originating from their lack of trust between themselves. Moreover, group Matisse's lack of creativity in terms of their final product, and in their choice of format, may be interpreted based on Giddens [(1997) view: "Creativity, which represents the ability to act or think originally with regard to pre-established modes of activity, is intimately connected to trust" (p.38).

An interesting characteristic from group Matisse's discussions is the large number of threads (22) but with a very small number of replies per thread (1.2). Conversely, on group Dali when the members post their participations they immediately invite their partners to comment on them resulting on a much smaller number of threads (2) but with a much bigger number of replies per thread (42.5). Group Dali spent the large majority of its time in the asynchronous forums (re)working on their proposal and sharing their ideas about it and its organization. In contrast, group Matisse feels a much stronger necessity to also recur to the chat tool to enable its project to advance. As McConnell (2006) already pointed out, also in our case, we have noticed that the group with more collaborative difficulties is the one who feels a stronger need to use the chat tool.

Group work revealed to be a powerful tool to develop collaborative work competencies. However, giving the students the opportunity to engage in online group work is clearly not sufficient to assure that they will work collaboratively, as was the case with group Matisse. What is more, aspects related to ontological security and trust (Giddens, 1997), as well as social identity, are cornerstone to understand how the groups coordinate their actions in order to develop their work and collaborate effectively.

Finally, relational aspects clearly came up very strongly as extremely important to fostering a positive work environment. This in turn leads to a healthier relationship between the group members, and consequentially to improved learning and knowledge construction. For this reason, during the development of group projects, it is particularly important for the online teacher to take on the role of a social relationships facilitator, especially in situations where it becomes necessary to deal with conflict and different opinions, such as in the case of group Matisse.

Implications

A first implication that we must point out, is that, whenever possible, special care should be given to the construction of the groups. This should be done taking into account not only cognitive aspects where a balance is commonly intended, but also, the participants interpersonal skills. It is necessary to consider how the relational contexts as well as social and cognitive aspects interfere in the development of collaborative processes. Research (Comeaux, 2005) suggests that action coordination towards a shared task as a clear effect in the participants' negotiated identities.

Moreover, as curriculum designers for online courses we must think about the consequences that this study has for our practice. What do we envision as consequences in order to foster an environment nurturing to the production of collaborative work? An obvious one is that we must rethink the role of tutor/instructor. What should his role be for each group? In particular, in the case of less successful groups, what strategies can he use to promote a more collaborative setting?

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