

Article

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Student perceptions of collaborative work in telematic simulation

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Abstract

Student work groups in higher education are not always operational; teachers should use methods for the early detection of dysfunctions to help remedy deficiencies that hamper group effectiveness. We have found that polling at different moments in an activity is instrumental in spurring groups to correct their shortcomings. This paper presents the perceptions of a cohort of engineering students, whose group work was improved as a result of polling during a telematic simulation with student teams from other countries. Qualitative analysis of the students' personal reflections shows that several factors were related to active participation and group effectiveness. These included greater familiarity among members, awareness of group performance, efficient inter- and intra-group communication, suitable task distribution and work organization.

Keywords: *active participation; assessment; awareness; collaborative work; communication skills; debriefing; dysfunctions; familiarity; group work; group effectiveness; language learning; polling; task distribution; team; telematic simulation*

Collaborative work may be a way to broach the concern for socializing processes in education and training. The more dynamic educational approaches imply instruction in small groups, learning mixed skills, and personal and social development, where each member of a group is

responsible both for the learning of the other members of the group and for his/her own learning (Johnson & Johnson, 1989). These assumptions suggest three ideas:

1. The method of instruction involves group work, which modifies the relationship

between instructor and student and among the students themselves.

2. Training is not one-dimensional, but facilitates the development of many-faceted skills.
3. The internal organization of a group plays an essential role.

Collaborative work entails that students work in teams, carry out joint tasks and participate fully in the process of learning.

Methodologies and techniques that use collaborative work, such as simulation and gaming, case studies, laboratory practice, workshops, seminars and discussion groups, among others, favor the active participation of students. Teaching strategy is supported by an approach in which learning arises from discovery that students make while working together on common tasks, which produces positive affective and cognitive outcomes. For some authors, such as Kayes, Kayes and Kolb (2005), among others, collaborative work leads to deeper, more significant learning because it is experiential. For others, participation in small groups also gives the members of the group a feeling of belonging and integration (Griffiths & Partington, 1992; Webb, 1992; Cohen, 1994; Michaelsen, Knight & Fink, 2002; Law, 2008; among others).

Collaborative vs. cooperative

Collaborative and *cooperative* are occasionally considered as synonymous, since both foster active participation on the part of the student, the use of group skills, the execution of group tasks and learning based on discovery. Jacob (1997), however, points out that collaborative work is less structured than cooperative work with respect to roles assigned to the team members. Tasks are more open-ended and complex with no one specific answer, and the instructor is not the authority in the class, but rather a facilitator for group action. In the widest sense, collaborative

work does not necessarily seek a product or grade; the objective may be to share information or share learning. Dillenbourg (1999) and Gros (2000) also point out that cooperative learning requires the distribution of tasks among the members of the group. Distributing the tasks means that students each study a different aspect in depth and then pool the results for everyone; in other words, they work together to reach a collective goal (Johnson, Johnson & Holubec, 1999, p.14) and, in this way, profit from individual and group learning, as in a true learning community.

Collaborative and cooperative learning approaches or paradigms have several differentiating characteristics. According to Zañartu (2003), each paradigm represents an extreme of the teaching-learning process, which goes from the highly structured by the instructor (cooperative) at one end, to giving the responsibility for learning principally to the student (collaborative) at the other. The basic premise of both paradigms is found in constructivism, although Zañartu reminds us that collaborative learning is more in line with a socio-cultural approach and cooperative learning, more in line with the constructivist thinking influenced by Piaget.

Knowledge is discovered by the students and transformed into concepts with which it can be related, then reconstructed and expanded through new learning experiences. Fundamental learning is knowledge of the basic concepts represented by socially accepted norms such as grammar, spelling, mathematical procedures and historical facts, among others. This kind of learning is better achieved in early stages by using cooperative learning structures, controlled by and centered principally on the instructor. Collaborative learning, centered on the student, where instructor and student share authority and control in learning, is designed to take over when cooperative learning ends (Bruffee, 1995). Even

in a group learning situation we see a transition between the two systems from cooperative to collaborative. For full discussions on cooperative language learning, see Jacobs et al. (2002) and McCafferty et al. (2006).

The challenge for instructors

Although group work has many learning advantages, group tasks require extra monitoring. The challenge for instructors is to help students overcome the drawbacks that group dynamics may entail, so that all individuals who form the group progress in knowledge and skill acquisition. A large part of the success of the methodology is found in certain decisions, such as the following, which are taken before the start of the process:

- On the one hand, certain group dysfunctions throughout the process are associated with variables such as the size of the group, the criteria for forming the groups, the length of the task to be completed, who decides on the task, the product sought by the group and the evaluation of individual and collective progress (Oxford Brookes, 2002).
- On the other hand, variables related directly to the individual such as shyness, insecure command of the language, ingrained cultural restraints and opportunistic or parasitic behavior can also be the cause of alterations in the functioning of the group (Vandrick, in Dancer & Kamvounias, 2005, p.446). As a consequence, the study of the variables mentioned can help to lessen the interference of these factors in the acquisition and practice of skills and abilities.

After the activity

Learning activities should always include assessment, which can raise awareness of the learning process. It is advisable to allow time after the activity to reflect upon what has taken place, to determine what went right or what went wrong. Lederman (1992, p.147) considers that the process of reflection after the endeavor enhances outcomes by using the information

generated during the activity to facilitate learning for those who have been through the experience. Thiagarajan (1992, p.161) adds that the period of reflection called debriefing helps participants derive meaningful insights. Petranek (2000, p.108) holds that students learn even more from simulations when written debriefing is included. For a more recent discussion of the importance of debriefing, see Crookall (2010).

In previous research, we verified, by way of quantitative analysis, a means to detect, assess and rectify group dysfunctions at different moments throughout the process (Watts et al., 2009). We now seek to examine the students' perceptions of their group work put forward in the written debriefing of the activity. The purpose here is to present the aspects that students highlight when evaluating the work done by their team.

Collaborative work in a telematic simulation for learning English

The effectiveness of telematic or computer-assisted simulation in the learning of English for specific purposes in a technical environment has been demonstrated in studies by García-Carbonell (1998) and Rising (1999; 2009). Using group work as a tool to apply the methodology provides opportunities for students to acquire other skills which they will find useful in their careers. According to Sheppard, Dominick & Aronson (2004), to succeed professionally, engineering students should be versed in the new international teamwork and collaboration paradigm, which includes virtual environments, different languages and different cultures. In the case under study in this article, participating in a large-scale simulation, such as ICONS (International Communication and Negotiation Simulations), is an immersion experience that adds a new dimension to

university teaching. Project ICONS, designed at the University of Maryland as a program for experiential learning, uses the internet as a tool for training in multiple disciplines through simulation and gaming methodology. It also uses simulations to develop communication skills, such as conflict resolution, decision-taking, negotiation, intercultural communication and crisis management. The tasks undertaken in the simulations cover social, language and strategic competence needs that arise in real-life situations. This constitutes an intellectual challenge that increases the motivation to learn.

The ICONS computer-assisted network simulation, or telematic simulation, has an asynchronous action format, lasting several weeks, but during which time synchronous interaction also takes place. The participating teams take on the roles of high-level diplomats, representing various countries negotiating a proposed international scenario, following an agenda planned and prepared ahead of time. The teams come from different countries, but operate on the same computer platform, allowing real- and deferred-time interaction with all of the participants.

Each class is a team that adopts the identity of a country role in the simulation scenario. At the same time, each class is divided into smaller work groups, to which certain topics and tasks are assigned. The formation of the groups and the choice of the team leaders are the responsibility of the instructor, who uses the results of an initial English placement test to distribute students to groups as evenly as possible. The designation of assistants to the leader, spokesperson, secretary, language controller, as well as the organization of the work to be done and the distribution of additional tasks are decisions that the students make.

In simulation and gaming methodology, the instructor acts as a facilitator, more like a guide than a “fountain of learning” (For extensive

discussions about simulation and gaming methodology in language learning, see Crookall & Oxford, 1990; García-Carbonell & Watts, 2009 and García-Carbonell et al., 2001). The instructor’s mission is to accompany the teams, intervene as little as possible, observe constantly and be available to help the different groups or the team as a whole, as the need arises. After finalizing the first two phases of the simulation, i.e. preparation and action, work centers on the debriefing and assessment phase, in which the participants have the opportunity to analyze and think about the experience individually and as a group.

Assessment

In addition to studies of the effectiveness of telematic or computer-assisted simulation in the learning of English for specific purposes in a technical environment, the authors have carried out various studies in the same context to adapt diagnostic and summative assessment to the objectives, content and methodology of the academic subject being used in this study. The quality of the diagnostic test used to form the work groups was studied by Watts and García-Carbonell (1996). Criteria to correct written texts were also studied and validated (Watts, 1997; Watts & García-Carbonell, 1998 and 1999). The criteria for assessing portfolios were also analyzed (García-Carbonell, Watts & Rising, 1998). The criteria for the oral component of summative course assessment were revised and set (García-Carbonell, Gotor, Montero, Rising & Watts, 2001). The whole assessment system for the course was studied on two occasions (Watts, García-Carbonell & Martínez, 2006; Watts, García-Carbonell, Rising & Martínez, 2007).

An active-learning methodology like telematic simulation can use group work to cover a wide range of linguistic skills (oral and written comprehension and expression) and communication skills (strategy definition,

decision-making, or conflict resolution, among others). The assessment solutions that the authors have applied and adjusted over the years include several measurement instruments (timed compositions, individually written portfolios and oral presentations of the portfolios) which require the student to practice skills that provide more global cognitive learning, in which assessment is in itself part of learning.

In spite of the improvements that the authors made in earlier runs of the simulation, problems were occasionally detected in group work too late to be rectified within the time frame of the simulation. Therefore, procedures in the course now include the suggestion found in Brooks and Ammons' (2003) and in Andreu-Andrés, García-Casas and Rising (2009) to use peer and self-assessment to stimulate and evaluate the participation of the students. Students are asked to fill out a brief questionnaire in English at three different points of time during the simulation, at two-week intervals. The questionnaire is anonymous and contains questions on the quantity and quality of individual contributions to the group, an estimate of the effectiveness of the group and proposals for improvement. In the last survey a question is included about perceived learning. To assess group effectiveness, the students are asked if they think their group's effectiveness is insufficient, fair, good, very good or excellent. To assess individual contribution to the work of the team, the students are asked to indicate how many members of the team are collaborating actively and to identify the members by name. The authors have verified the usefulness of this type of polling (Watts et al., 2009).

Materials and method

The cohort taking part in our study consisted of telecommunication engineering students who study English as a foreign language by way of the telematic simulation, ICONS. The qualitative analysis was based on the study of the

comments on group work by 26 students, taken from their portfolios. The portfolios were written in English and prepared individually. The students were requested to reflect on, among other things, their participation in the simulation and evaluate their group's performance.

For the analysis, those sections of the portfolios which dealt with the evaluation of group work were used, forming a small corpus with a total of 8,448 words and 1,472 different words. On examining the raw data of the texts, the comments that pointed to the detection of problems or degrees of participation were extracted in literal segments. In the beginning, the texts were codified according to the macro variables surveyed (effectiveness and active contribution), although special attention was paid to the specific obstacles encountered in group work, the emergence of personal resources to offset the obstacles, and the effect caused by the polling on three occasions.

The design of the qualitative analysis in this study is sustained by Glaser and Strauss's (1967) method of constant comparison called Grounded Theory, which postulates the systematic generation of theories and social concepts. The design follows the process guidelines derived from these authors, as specified by Charmaz (2006, p.11). Qualitative analysis commences with a preliminary, open codification of data, followed by the development of initial categories, including properties and dimensions of the categories as part of the code. The categories and their properties are then integrated and limited in central, selected conceptual categories, followed by theoretical sampling and saturation and finally by writing up the theory with the results found. The texts used were studied with the help of the software application for qualitative data analysis, ATLAS.TI. THE KNOWLEDGE WORKBENCH (Version 5.2).

Results

Analysis of the coded data retrieved from the students' comments generated four categories related to (1) effectiveness and active contribution, (2) organization, (3) free riders and (4) discoveries. The segments reported here have been revised for grammatical precision to facilitate reading and are identified by the letter P and number of the student author of the comment.

Effectiveness and active contribution

Students related their group's effectiveness to two achievements: obtaining enough votes from other teams for the approval of their proposals as well as an active and effective contribution to the process of negotiation that their group carried out with the other teams participating in the simulation. As expressed by one of the testimonies collected,

During the first teleconference we couldn't negotiate effectively but we corrected that error in the second teleconference ... we sent more messages, enough to reach agreements and get backing and votes. In the end, we learnt how to define and divide the work more efficiently. Overall, our effectiveness, bearing in mind the results of the group, was really good (P10).

The concept of efficiency is associated with effectiveness.

... efficient from the start, we did all the work well that we had to do and that shows in our results ... one of the most active delegations, one of our proposals was approved by general vote ... in addition we had time to become friends and have fun together, which I consider important ... (P13).

To be effective, the students underline the need for good communication among the members of the group, for which they used "the Internet and all the possibilities it offers" (P3). Along with the platform that supports the telematic simulation, some students found a common e-mail account useful; others "space shared on the

network" (P8) (such as WIKI or Google-docs) which allows working collectively on the same document or spreadsheet. The following testimony echoes this idea:

Google-docs, for example, is a very useful instrument for sharing documents with other members of the group who can not only read them, but make changes if it's necessary (P3).

Another comment from the same group expresses the usefulness of Google-docs in the following way:

They can also be used to explain our opinions on messages and proposals that we have read. We think it's better than e-mail (P6).

Information and communication technologies (ICT) also help overcome certain obstacles in group meetings such as conflicts about time and place:

It was fun working in groups, but it was hard to organize extra meetings outside of class time because the seven of us had different timetables and many of us lived a long way away. (P22).

For students who had never used ICT in a subject to coordinate group work, it was imperative to learn to use the tools, an added value in their learning while, at the same time, ICT increased the speed and effectiveness of their collective work:

The use of shared webspace made the work faster and led to improvement in effectiveness, helping us get an excellent assessment (P15).

There is no doubt, however, that the students found the Internet, according to the analysis of results, to be most useful in searching for information on different simulation topics which were unknown or complicated for them:

On-line dictionaries and grammar books for certain linguistic needs" (P4) were also highly useful.

It was common for the students to associate getting to know the other members of the group with increased effectiveness. Awareness brought

about through the intermediate polls proved effective, as the following comments show.

After the results of the first survey, we realized we were the least effective group. The instructor suggested we should meet after class to get to know each other better. After having supper together, we began to cooperate more and the effectiveness of the group improved significantly (P28).

It all came about because of a change in group members' attitudes. We only had a few extra meetings at night and the group came together perfectly (P26).

In general, effectiveness was seen to be linked to efficiency and active contribution, the use of ICT and greater understanding among the members of the group.

Organization

The importance of organization for the success of group work was highlighted by many students. On occasion, they thought it was the major objective, as this commentary shows:

One of the principle objectives of this subject was to learn how to organize a group into a working machine ...We organized the work two different ways. The formal way recommended by the professor and a functional way, useful in searching for information and drafting proposals. The subject allowed students to realize the importance of organization in group work (P16).

Also indicated was the fact that the activities carried out in Phase I of the simulation (briefing stage) helped them to work on a team, to join forces in the defense of their ideas and even to learn new terms and expressions. Quite a few students, however, pointed out that they would have liked to know more about resources for group organization before the experience.

The majority of the students mentioned very concrete aspects of organization associated with:

- The distribution of work into tasks;
- The specialization of each member or various members in specific topics or aspects for the purpose of drafting documents;
- The preparation of texts to use as responses in the teleconferences; and
- The coordination of groups by means of open communication channels (ICT).

Free riders

One rather delicate aspect which only a few students commented on was the subject of free-riders who join the group but work very little and whose contribution to the group is minimal. In this regard, a certain frustration is detected.

My evaluation of group work covers the whole range. I had some good and some bad experiences. I found some students who took initiative and worked with constructive criticism. Others only did what they felt like and only took into account their own individual work. Group spirit was really divided. The members and I (chief editor) should have talked about the problems, but in the end we did things the hardest way and without much confidence. Personally, I don't think the people we thought were a problem realized what we thought of them. I accept full responsibility for not telling them. Sometimes it seemed like people criticized for sport, without offering proposals for improvement. We also had some problems with unannounced absences (P19).

The same student concludes in a philosophical vein, without the self-incrimination of the previous paragraph.

As in all groups, my group had very hard-working students, some who tried to help without helping and some who never volunteered for any work. I suppose that's the way it goes. When I look back and think about our group work and our results, I think we achieved a lot and that we should be happy with our participation in the simulation. We were members of the most active country team and I think everyone knew us. We considered all the proposals and messages and tried to respond as

well as we could to each question. I learnt a lot (P19).

The usefulness of polling in identifying parasites and correcting the situation is demonstrated by the testimony of a person who realized that his group did not think highly of him. Interestingly, this person belonged to the group with the best results in group self-assessment.

We worked well, but not always, especially me. I say this because on one of the surveys ... there was a commentary on the proposals for improvement that said 'change the roles (secretary)' and I was the secretary But instead of feeling discouraged, I appreciated the remark because it made me react and wake up (P16).

Discoveries

Perhaps the most striking finding of the qualitative analysis was what the experience in teamwork revealed to the students about themselves as people. For example,

I went through several stages during the course of the subject. At first I was afraid; I thought I wouldn't be able to cope with the complexity of the subject because of my level of English and oral skills. Then, I began to feel more comfortable, speaking English and working with a group. This is the other important lesson I learned (P18).

Many students underline what the simulation experience taught them about group work and teamwork.

I think the main thing we learnt during this experience is how to work in a group and act as a team (P5). This subject has improved and strengthened my capacity to work in a team (P16).

The fact that they were not able to freely select their team does not seem to have been a worry since there was only one reference to the professor's assigning members to a group.

In the beginning I had a bad feeling when they told us the main part of the class would be a group exercise. It was even worse because we

weren't going to be able to decide on who we worked with ... (P12).

Most of the students expressed their satisfaction with their respective groups.

We got to know each other and became friends, which made it even easier to work as a team (P12).

First of all, I want to highlight the friendship among the members of the group; in my opinion this feeling is necessary to carry out good work and feel good during the course (P23).

In fact, numerous students declared their pride in belonging to their group.

I am proud to be a member of this group. We all worked well; we did our task and tried to do it well. I feel grateful to my whole group. We worked in a really good atmosphere and I think that is reflected in the work we did (P16).

This feeling does not change even when the objective was not reached.

Our proposal did not get six votes but, in any case, I feel proud of our group work. We were an active team and we gave our point of view (P22).

Other types of abilities, different from group work, were also acquired.

And of course we learnt a little about politics and negotiations. Since we are all engineering students, this could be a new skill in the future (P5).

But not only linguistic topics; I think we touched aspects which are not taught in any other subject I have attended, that is, 'transversal skills' like group work, negotiation, how to make meetings fruitful, how to organize group work, etc. (P16).

Last, the intercultural and content exchange provided by the telematic simulation promoted a change in intellectual and personal maturity, which is reflected in a higher degree of student motivation. The general feeling of the group was of having awakened to working as a community and learning about other cultures (there were eight different nationalities in the class), showing

greater sensitivity, not only to English, but to other languages as well.

The best thing about taking this subject was meeting new people and working with them, opening my eyes to the rest of the world and increasing my desire to learn even more English, and who knows, even other languages (P18).

Summary

From the critical analysis of their own work – and their group work – students learn different ways of solving problems. Likewise, they understand better what they know about the content, their language capability in English and their thinking processes, besides acquiring experience in self-assessment.

Our analysis of the final commentaries by the students on their group work points out aspects which, according to the qualitative analysis, fall into four categories: *Effectiveness and active contribution, organization, free riders* and *discoveries*.

Group effectiveness

For the students, group effectiveness means, in the same measure, that the group reaches its objective and that it contributes actively to the process of negotiation in which all of the teams in the telematic simulation are immersed. The usefulness of the internet in gathering information on complex and unknown topics and in solving questions about the *lingua franca* (English) is underlined. Everyone used e-mail to communicate and a high percentage of the groups used tools in shared webspace like Google-docs to prepare the documents needed in their negotiations with other teams. Reaching immediate goals and, therefore, results with regard to the rest of the participating teams, means group effectiveness. In short, the greater the goal achievement and active participation, the greater was the group's perception of effectiveness.

Organization

The category called organization includes aspects singled out by the students as necessary for collaborative work. They refer basically to the difference between team and group work, to the role each member plays, to the distribution and execution of tasks and to the intra-group channels of communication. The lack of knowledge about organizational techniques prior to the experience was listed as a shortcoming. In the future, including more explicit information about group organization in the pre-simulation phase is recommended as well as practice with games that model familiar situations in which students can observe strategies and behavior and learn to recognize them quickly and clearly in others.

Free riders

The category entitled free riders mainly includes the observations about free-riders and shirkers, which corroborate the results of the quantitative study with regard to degree of participation. In the future, the solution may be to require the teams to reach a consensus beforehand on the way to work together. The idea is to agree on the “rules of the game”, which are to be interiorized and followed by all the members of the group. These basic rules and their application would be revised periodically, using the afore-mentioned self-assessment and peer assessment surveys to evaluate individual fulfilment.

Discoveries

Discoveries, the fourth and final category, brings together the students' commentaries regarding what group work revealed to them. It is interesting to observe that on evaluating the work of their own groups, students perceived the value of working in collaboration with others, a competence rarely practiced during their engineering studies. Collaborative work proved to be pleasant and productive. An increase in intellectual maturity, open-mindedness and “knowledge of the world”, where intercultural

awareness is assimilated and interiorized was observed. Finally, it is worth noting that the appearance and positive appraisal of affective values can be interpreted as an improvement in participation and, consequently, in effectiveness.

Conclusion

In conclusion, we can say that, in collaborative work, deeper knowledge of the group on the part of the members – of themselves and of their performance –, efficient inter- and intra-group communication or suitable task distribution and work organization constitute outstanding characteristics of active participation and group effectiveness. The mechanisms that aid in the early detection of the groups in which these features are missing or simply not working are vital to the success of collaborative work and warrant further study of variables that will expose dysfunctional groups, in order to find solutions that will optimize the results of team work.

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