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Task, Team and Time to structure online collaboration in learning environments

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Abstract

The debate on whether and how to structure collaboration in online learning environments is quite active. In this paper the authors identify Task, Team and Time as the main components of an online collaborative activity, through which the overall structure of the activity can be determined to scaffold learners' interactions. Based on five examples of real-life online learning activities featuring different degrees of structure as to Task, Team and Time, the authors reflect on the extent to which the way these three dimensions are structured may affect the overall learning process. Method of the study is interaction analysis of the students messages, exchanged in asynchronous mode during the activity. The analysis was carried out according to a quantitative and qualitative model that distinguishes among the participative, social, cognitive and teaching dimensions. The results of the study seem to support the hypothesis that the three Ts well represent the structure of CSCL activities and that, in many cases, it is the lack of structure in one or more of them that is associated to a higher frequency of some indicators, as if the missing guidance causes an enhanced effort on the side of the learners to compensate the deficit.

Keywords: Computer Supported Collaborative Learning (CSCL); Discussion; Peer Review; Case Studies; Role Play; Jigsaw; Structured activities; Task, Team; Time.

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1. INTRODUCTION

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In the field of *Computer Supported Collaborative Learning* (CSCL) (The Cognition and Technology Group at Vanderbilt, 1991; Scardamalia and Bereiter, 1994; Dillenbourg, 1999; Paloff and Pratt, 1999; Hernández-Leo et al, 2006; Fischer, Kollar, Mandl, & Haake, 2007), inspired by socio-constructivist learning principles, the debate around how to scaffold online discussion and collaboration among students is quite lively.

Starting from the assumption that learning is an active rather than passive process where language plays a key role and new competence is built collaboratively on the basis of previous knowledge, in CSCL contexts the learning environment is learner-centred and heavily based on group activities; during these activities students are usually asked to discuss specific topics or solve together some kind of problem. While doing so, learners exchange opinions and negotiate new meanings in order to build new, shared knowledge.

The types of activities that can be proposed to students in these contexts are much diversified, and may range from simple, unstructured discussions on specific topics, to highly structured tasks, with a common artefact to be collaboratively produced by students as an output of their activity. An example of a moderately structured type of activity is the Discussion (Hara, Bonk, & Angeli, 2000; Wu and Hiltz, 2004), an activity where, usually, no specific rules are imposed on students, who free to interact and exchange ideas, opinions, points of view, etc. On the other hand, highly structured activities are those where the social structure of the groups and the way they are asked to interact inside the group and with other groups are more strictly guided, in terms of schedule, outputs, grouping, etc. The Jigsaw (Aronson, Blaney, Stephin, Sikes, & Snapp, 1978; Blocher, 2005) is an example of highly structured activity.

As already mentioned, whether instructional designers and tutors of online collaborative learning activities should, or should not, provide their students with clear and detailed instructions about how to go about during CSCL processes, has been a debated subject for some time now (Hewitt, 2005; Bell, 2004, Liu and Tsai, 2008; Demetriadis, Dimitriadis, & Fisher, 2009; Dillenbourg and Jermann, 2007). Dillenbourg (2002) gave an interesting contribution to it by suggesting that scripting, i.e. imposing a structure on students activities by providing a set of rules to be followed, risks to contradict the very spirit of the underpinning learning theory of socio-constructivism. On the other hand, practitioners know that the degree of self-regulation displayed by learners in CSCL varies a lot and that, roughly speaking; the fewer learners are able to control their own learning, the more they need somebody else to do it for them. At the same time, an effective way to foster self-regulation is to gradually decrease scaffolding and let the learners develop their own structuring techniques.

The present paper aims to investigate whether this “rule of thumb” really applies and better understand it by looking in depth at five types of structuring techniques frequently used in CSCL: the Jigsaw, the Peer Review, the Role Play, the Discussion and the Case Study.

To do so, the structure of these techniques is not regarded as a mono-dimensional entity, but is described in terms of three dimensions: Time, Tasks and Teams. By analyzing the collaborative

processes activated by students during five activities respectively structured with the above techniques within real courses, the authors explore the main pros and cons of imposing constraints on Time, Tasks and Teams in online collaborative learning activities.

FIVE STRUCTURING TECHNIQUES FOR COLLABORATION

As already mentioned, different types of activities can be used in CSCL contexts to scaffold interactions and collaboration among students. These can be described in terms of Task, Team, and Time, the three main elements determining the structure of an online collaborative activity (Pozzi and Persico, 2011a -in print).

As discussed in the following, in principle, the same activity may be highly structured in terms of Time, because the tutor indicates deadlines for each subtask, but quite unstructured in terms of Teams, if learners are free to choose the groups they want to work with, and of course the other way round. The Task too may be defined very thoroughly, or there may be various degrees of freedom to its interpretation, execution and accomplishment. The three dimensions together describe the structure of an activity in a rather complete manner. For this reason, in the following, the five structuring techniques object of this study are described in terms of these three dimensions.

2.1 The Discussion

The Discussion is, among the five structuring techniques described hereafter, the most flexible of all, as it does not impose almost any constraint on Task, Team and Time. In fact, there are different possible ways a Discussion can be organized: for example, open-ended Discussions tend to be very little constraining, with participants being free to choose what to focus on and how to conclude the interaction process. Another, rather frequent, type of Discussion comprises two phases: during the first phase the Task consists of individual study of some learning materials, while the second phase consists of a collaborative activity, where students are asked to carry out a joint Task, based on what they learnt during the first phase. Typical Tasks for this second phase entail harvesting information, organizing content or solving a problem (Kanuka and Anderson, 1999).

In many cases, the production of an artifact as output of the Discussion acts as a catalyst of understanding and triggers message exchanges.

As far as Teams are concerned, during a Discussion they can be handled in a many ways: they can be of different sizes, even of size that vary in time, and they can be formed by the learners themselves.

As to Time, provided that the Discussion usually needs to be ignited and cannot go on forever, there is no need to stick to the schedule too rigidly, unless there is an external constraint imposing the end of the activity by a given deadline.

2.2 The Case Study

The Case Study is another type of activity frequently used in CSCL contexts, generally based on a "problem-based approach" (Winter and McGhie-Richmond, 2005). Typically during a Case Study the Task entails that students are provided with materials describing a real-life problematic situation and asked to study it, make hypotheses about how it could be handled, and/or analyze how it has been solved by experts, reflecting on strengths and weaknesses of the adopted approach, as well as on possible improvements or alternatives.

One of the assets of this technique is its being rooted in authentic problems and/or situations, providing a strong point of contact between theory and practice. The term "authentic", here, means genuine and relevant to the learners, as opposed to the artificial, contrived types of problems that are so common in traditional schooling, and refers to the well known cognitive apprenticeship model (Brown, Collins, & Duguid, 1989; Ghefaili, 2003). This approach fosters students' engagement in the task, which helps them to make direct reference to personal narratives, descriptions or facts and possibly to share knowledge.

The degree of structure of the Task assigned during a Case Study may vary considerably, depending on the nature of the case to be studied, on the learning materials (which can be provided, or be sought by students themselves, as part of the activity), on the kind of output required. Basically, the Task requires studying the learning materials and then discussing with others to put forward a solution to a given problem or comment on a given approach.

Of course the nature of the Task influences the Time dimension: if for example the Task entails individual study and then group discussion about the problem solution, this will imply at least two phases of work and a consequent time schedule.

The Case Study, as such, does not require any specific social structure, and can be used in combination with other types of activities (e.g. the Role Play or the Jigsaw), so to give more structure to the Team dimension.

2.3 The Role Play

The Role Play is being increasingly appreciated because it allows learners to take a stance from which they can observe real situations and therefore fosters critical reflection, both in face-to-face and in virtual learning (Lombard and Biglan, 2009; De Wever, Shellens, Valke, & Van Keer, 2008).

Like the Case Study, the Role Play takes inspiration from the "situated learning" and often takes place within a simulated environment, where the learner is engaged in pursuing a goal in order to master a set of skills, like in "Goal-Based Scenario" (Schank, 1997).

As such, the Role Play plunges participants in a realistic scenario, where they are asked to play a particular role (assigned by the teacher or chosen by the learners themselves), so that they assume a particular point of view and maintain the argument during the discussion with peers.

In this activity, usually, the Team composition acts as the leading dimension. Such a dimension can be more or less structured, according to whether it is the designer who assigns groups and roles to students, or it is the students who make these choices. Task and Time in a Role Play are not particularly constrained and can vary a lot depending on the designer' choices. In particular, the Task nature influences the schedule, naturally leading to decisions on the number and sequence of activity phases.

2.4 The Peer Review

The Peer Review is based on the reciprocal teaching approach (Rosenshine and Meister, 1994). Here the Task can be organized around three phases: in the first phase individual students or Teams produce an artifact, in the second another student or Team reviews it and provides formative feedback on it, in the third phase the authors of the artifact revise it according to the feedback received. Thus the Task in this case entails having three different outputs, each at each stage of the activity.

In this activity the Team structure is rather important: the "entity" in charge of carrying out the activity may be either an individual student, or a couple or even a larger group, but - whatever the choice is - they have to stay the same from the beginning to the end of the activity.

Lastly, since the Task is usually carried out in a reciprocal way, "entities" must work with the same deadlines in order to swap the products of their work and this usually imposes quite a high level of structure in terms of Time.

2.5 The Jigsaw

The Jigsaw was first proposed for face-to-face contexts by Aronson et al. (1978) and is nowadays very popular also in online learning (Blocher, 2005). It lends itself very well to tackling large, multifaceted problems, which can be decomposed in order to master their complexity more easily. The Jigsaw approach consists in segmenting the content into a number (4-6) of complementary aspects and assigning each aspect to a group of learners (the "expert groups"), who should analyze and study it so to become all experts in that aspect. Aim of this phase of work is to discuss the main points of the assigned part of content and understand it as thoroughly as possible in order to become able to act as experts during the following phase. At the end of this first phase, new groups are formed, called "jigsaw groups", containing at least one representative for each of the original expert groups. In the jigsaw groups, each learner is asked to contribute his/her expertise to the group work, aiming to build up a complete vision of the problem and, usually, produce a joint output, for example a presentation, requiring competence on the whole problem or content domain.

The Jigsaw is a very specific technique, entailing a particular orchestration as far as the dimension of Team(s) is concerned, because the experts groups should become homogenous in competences, while in the subsequent phase the jigsaw groups are heterogeneous. The two phases of the process

(determining the articulation of the Time component) entail that each participant plays different roles in the different situations: at the level of the expert group everyone is equally responsible, while at a jigsaw level, each person is responsible for a specific segment thus requiring a high degree of individual accountability. At this stage, it is essential that learners share their knowledge with their peers and this makes them understand how the individual contribution is unique and vital for the group to succeed. According to Kerr and Bruun (1983), this increases individual involvement, helping those who usually feel isolated and participate marginally. When the Jigsaw is adopted in online learning, this feature is particularly evident because learners generally have a stronger sense of their pivotal position in the communication dynamics (Lovaglia and Houser, 1996).

RESEARCH CONTEXT

The study has been carried in the context of a course on "Educational Technology", designed and run by the authors for several years and addressed to trainee teachers of the SSIS Liguria, the regional teacher training institution. Aim of the course (herein called TD-SSIS course) was making students familiarize with the most important issues related to the introduction of ICT in schools (Delfino and Persico, 2007).

Although each year the course had its own specificities, in terms of learning objectives, contents, activities, schedule, etc., all of its editions had an online component based on a CSCL approach, where trainees were required to carry out collaborative activities under the guidance of tutors. During each edition of the course different kinds of online collaborative activities were proposed to students. Their structures also varied, but the most frequently adopted were: Discussion, Case Study, Role Play, Peer Review and Jigsaw.

For the sake of this study, two particular editions of the course have been selected (called respectively TD-SSIS 2007 and TD-SSIS 2005), where the five types of activities have been proposed. As already mentioned, the two courses had the same general aims, but they were structured differently. More specifically, the Jigsaw, the Role Play and the Discussion were proposed within TD-SSIS 2007, while the Case Study and the Peer Review were proposed to TD-SSIS 2005 students.

In the following a brief description of the five activities is provided, as these have been proposed to students during the above mentioned courses.

The Discussion under study lasted 3 weeks and was carried by a class of 21 students, who were subdivided for this activity in groups of 7 persons each; the topic at hand was the use of blogs in educational contexts. In line with the design principles behind this kind of activity, the Discussion was not particularly structured; nonetheless, two phases were envisaged so to give a pace to the work; besides, an artifact was required to students as output of the whole Discussion. During the first phase of the activity students were required to individually read some materials and navigate a certain number of educational blogs. During this phase a forum could be used for asking questions and 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 within their groups for conceiving a common design for an educational blog.

Topic of the Case Study, which lasted 2 weeks and addressed 16 students subdivided in groups, was "Collaborative learning communities at school". The designers of this activity, who had previously chosen a case they considered significant to be studied, asked students to read and analyse a set of materials (documents, video, slides, websites, etc.) concerning and describing a real experience at school. During the first phase of the activity the aim was to produce and deliver a document at individual level describing five strong points and weaknesses of the real experience, while during the second stage, students should discuss within their groups and reach an agreement concerning the five strong points and weaknesses**.**

The Role Play proposed during TD-SSIS 2007 lasted 3 weeks and involved 21 students; it was aimed at tackling the topic "Webquest". Students were asked to pretend to be a group of teachers in charge of a common analysis and a shared evaluation of a certain number of wequests. The analysis of the webquests was to be carried out from a very particular perspective, i.e. by playing a specific role. At the beginning of the activity, students, divided in groups, had to choose a role among a list of characters, including the "director", the "rapporteur", the "techno-sceptical teacher", the "bureaucrat", the "defeatist teacher", etc. During the second phase of the activity students discussed the visited webquests and negotiated with their group peers a common evaluation, argument their positions according to their roles.

The Peer Review lasted 2 weeks and was carried out by a class of 19; the object of this learning activity was the use of online resources for teaching and learning. The activity was structured in two phases: during the first phase students of the same subject matter individually analysed online resources and were asked to give impressions about the websites they had visited. During the second phase, each student was assigned a peer and was required to read his/her analysis in order to provide comments and/or suggestions. This way each student received feedbacks on the work done in the previous phase. During the Peer Review activity groups were not subdivided into sub-groups, so that interactions occurred among all the 19 learners at a time. Nonetheless, this was not particularly annoying, due to the fact that during the first phase each student simply delivered her/his document, while in the second phase communication occurred mainly in couples.

Lastly, the topic at hand during the Jigsaw was most common "e-learning models"; the activity lasted 3 weeks and involved again 21 students. During the first phase 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, containing a list of five main characteristics of the assigned model. During the second stage, 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.

The following Table (Table I) syntheses the main characteristics of Task, Teams and Time for each activity. The degree of structuredness of each dimension has been classified as it follows: A= highly structured, B=medium structured, C= low structured.

Table I –Task, Team and Time structuredness of the proposed activities

DISCUSSION			
Time	***B***	2 phases (3 weeks)	
		Phase 1 (1 deadline)	Phase 2 (1 deadline)
Task	***C***	Individual task: readings Number of outputs: 0	Collaborative task: shared design of an educational blog Number of outputs: 1
Teams	***C***	3 groups (7 persons each) No communication required	Same groups of Phase 1 Communication internal to groups Many-to-many communication
CASE STUDY			
Time	***B***	2 phases (2 weeks)	
		Phase 1 (1 deadline)	Phase 2 (1 deadline)
Task	***B***	Individual task: readings Individual task: elaboration of a position document Number of outputs: 1	Collaborative task: elaboration of a shared position document Number of outputs: 1
Teams	***C***	2 groups (8 persons each) Communication internal to groups Many-to-many communication	Same groups of Phase 1 Communication internal to groups Many-to-many communication
ROLE PLAY			
Time	***B***	2 phases (3 weeks)	
		Phase 1 (1 deadline)	Phase 2 (1 deadline)
Task	***C***	Individual task: role assumption Number of outputs: 0	Collaborative task: shared analysis of webquests Number of outputs: 1
Teams	***B***	3 groups (7 persons each) Communication internal to groups Many-to-many communication	Same groups of Phase 1 Communication internal to groups Many-to-many communication with roles
PEER REVIEW			
Time	***B***	2 phases (2 weeks)	
		Phase 1 (1 deadline)	Phase 2 (1 deadline)
Task	***B***	Individual task: analysis of resources Individual task: elaboration of a position document Number of outputs: 1	Individual task: review of one of the peers' documents Number of outputs: 1

Teams	***B***	1 group (19 person each) No communication required	Same group of Phase 1 peer-to-peer communication
JIGSAW			
Time	***B***	2 phases (3 weeks)	
		Phase 1 (1 deadline)	Phase 2 (1 deadline)
Task	***A***	Individual task: study of materials Collaborative task: shared identification of the main characteristics of the assigned model Number of outputs: 1	Collaborative task: definition of a shared problem solution Number of outputs: 1
Teams	***B***	3 expert groups (7 persons each) Communication internal to groups Many-to-many communication	3 jigsaw groups (7 persons each) Communication internal to groups Many-to-many communication

As one may note, the Time dimension of all the five activities has been classified B, as all the activities were organized into 2 phases, so for each activity students had to meet 2 deadlines.

The Task dimension has been classified low structured (C) when an individual task was followed by a collaborative one but only the latter task envisaged the production of an output (Discussion and Role Play), medium structured (B) when the initial individual task implied also the production of an individual output, and was followed by the production of another output in the second phase, either individual or collaborative (Case Study and Peer Review), and highly structured (A) when both the tasks and outputs were collaborative (Jigsaw).

As to the Team structuredness, this has been classified C when the aggregation in groups remained the same in all the phases and the communication was internal to the group and many-to-many (Discussion and Case Study); B was assigned when some kind of rule was provided concerning group aggregation, roles to be played or modes of communication; this was the case respectively for the Jigsaw, the Role Play and the Peer Review.

In order to investigate the learning process resulting from the above mentioned activities, the interactions occurred within 5 groups of students (each performing one of the above mentioned activities) were analyzed and evaluated. The groups were selected because they all shared the same tutor. Main results of such evaluation are illustrated in the Results section.

3. RESEARCH METHOD

Starting from previous studies in the field (Henri, 1992, Rourke, Anderson, Garrison & Archer, 2001; Lally, 2002; Lipponen, Rahikainen, Lallimo, & Hakkarainen, 2003; Martinez, Dimitriadis, Rubia, Gomez, & De la Fuente, 2003; Daradoumis, Martinez-Monés, & Xhafa, 2004; Schrire, 2006, Strijbos, Martens, Prins, & Jochems, 2006; Weinberger and Fischer, 2006; Garrison and Anderson, 2003; Pozzi, Manca, Persico, & Sarti, 2007), the authors had previously proposed a model to evaluate CSCL processes (Persico, Pozzi, & Sarti, 2009). The model has been adopted during this experience to

analyze and evaluate interactions among the students performing the activities object of the study and for this reason it will be briefly synthesized in the following.

It encompasses four main dimensions, namely: the participative, social, cognitive and teaching dimensions. In order to bridge the gap between the theoretical framework and its practical applications, suitable indicators had been identified for each dimension, consisting of quantitative or qualitative variables that allow the analysis of each dimension according to specific objectives. These indicators express the actual manifestations of the four dimensions in a learning community. In particular, indicators of the participative dimension include the number of "active actions" by members of the learning community (in terms of sent messages, uploaded documents, etc.), the number of "reactive actions" (e.g. reading messages, downloading documents, etc.), as well as the level of "continuity" in participation across time. Indicators of the social dimension include clues of "affection" (which is typically revealed by expressions of emotion or intimacy, humour or irony, presentations of personal anecdotes) and "group cohesion" (such as vocatives, expressions revealing group-self efficacy, use of inclusive pronouns to refer to the group, phatics, salutations). As far as the cognitive dimension is concerned, the model makes a distinction between clues of "individual" and "group knowledge building", by assuming that a collaborative activity in CSCL contexts typically requires a stage entailing a personal ri-elaboration of contents and the expression of individual points of view, and another stage devoted to discussion and negotiation to collaboratively construct shared meanings and common interpretations of reality. Moreover, according to the model, the cognitive dimension also encompasses "meta-reflection", to recognize the importance of students' reflections on, and evaluations of, the learning process itself. Lastly, indicators of the teaching dimension include taking care of "organizational aspects", "discourse facilitation" and "direct instruction".

This approach has been used to analyze and evaluate all the messages exchanged during the five activities by the students of the selected groups. Data concerning the participative dimension were automatically obtained from server and system logs, while data concerning the social, the cognitive and the teaching dimensions were obtained through content analysis of exchanged messages in order to detect whether and to what extent the three dimensions could be traced[*]. The corpus of the analyzed messages was composed of a total of 794 messages.

4. MAIN RESULTS AND DISCUSSION

The data obtained from the analysis of the interactions among students can be looked at from different perspectives. In this exploratory study, we propose to use the model to identify differences in the way each activity fostered the indicators of each dimension. The idea is to explore to what extent the degree of structuredness of the different types of activity influenced the quality of the learning process, and possibly to go into more detail by investigating whether some of the three Ts are more influential, with some respect, than others.

[*] The unit of analysis chosen for the coding procedure was the "unit of meaning" (De Wever et al., 2006) and each unit could be assigned at maximum one indicator. The coding process was carried out by two independent coders, who – after a period of training - worked separately; the inter-rater reliability between the two was calculated on a sample of 20% of the total messages and resulted in a Holsti coefficient of 0,90 (percent agreement 0,84), which is usually considered a good result.

For example, Table II reports the mean number of sent messages per student (indicator of "active participation") during the Discussion, the Case Study, the Role Play, the Peer Review and the Jigsaw. From the Table, one may note that the Jigsaw, which is highly structured especially in terms of Task and medium structured in terms of Teams, produced the highest level of sent messages per week, while the Discussion, which has – on the opposite - a low degree of Task and Teams structure, produced the second highest. According to these data, there is no apparent correlation between the structure of Task and Teams and the level of participation on the side of the students.

Table II – Active participation (messages sent) for each activity

Structuring technique	*Mean number of messages sent per student*	*Standard deviation*	*Mean per student/ per week*
Discussion (3 weeks)	11.04	5.98	3.68
Case Study (3 weeks)	7.56	5.53	2.45
Role Play (3 weeks)	8.68	5.16	2.89
Peer Review (2 weeks)	4.05	2.54	2.02
Jigsaw (2 weeks)	8.23	3.64	4.11

Table III contains the mean values of units (per student per week) detected for each indicator.

When looking at the Table, one may note that overall while for the social dimension (both indicators S1 and S2) there is no evidence of a direct relation between level of structuredness of activities and levels of development of indicators, something more interesting seems to happen within the cognitive and the teaching dimensions.

In particular, as to C1 (Individual knowledge building) this results very high in the Peer Review where both the Task and the Teams dimensions are medium structured. C2 - Group knowledge building is more evident in the Jigsaw, which is the activity mostly structured as to Task and medium structured as to Teams.

Finally for the cognitive dimension, even it is true that the indicator C3 – Meta-reflection is never so much developed, it is again the Jigsaw among the proposed activities which seems to foster it at the most.

As to the teaching dimension, it is with little surprise that the reader may note that the Discussion, which is low structured in terms of both Task and Teams, required the highest level of expressions directed to Organizational matters (T1), while the Peer Review, which was medium structured, showed the highest levels of Direct Instruction.

Table III – Indicators of social, cognitive and teaching dimensions for each activity (mean values per student per week)

	Social dimension		*Cognitive dimension*			*Teaching dimension*		
Structuring technique	*S1 - Affection*	*S2 - Cohesion*	*C1 – Individual knowledge building*	*C2 – Group knowledge building*	*C3 – Meta-reflection*	*T1 – Organiza-tional aspects*	*T2- Discourse facilitation*	*T3 – Direct instruction*
Discussion	1,70	5,17	1,86	2,59	0,46	**1,92**	1,19	1,06
Case Study	2,35	3,48	2,29	2,48	0,56	1,19	1,75	1,29
Role Play	1,00	3,25	1,13	2,25	0,10	1,14	1,92	0,83
Peer Review	2,03	2,63	**7,32**	1,68	0,29	0,76	0,71	**1,79**
Jigsaw	1,42	4,69	2,26	**4,21**	**0,61**	0,85	1,38	0,54

5. CONCLUSIONS

The main claim of this paper is that the structure of CSCL activities is not a continuum, going from unstructured activities, to those which are most structured and pre-defined, but a three dimensional space, where the axes are the structure of Task, Teams and Time. The results of this study should be confirmed by further statistical analysis, but they seem to indicate that there is not a direct association between structure (as a unique variable) and the frequency of the various indicators of our model, but rather, the relationship, if any, seems to be more complex. In most cases, it is the *lack* of structure of one of our Ts that seems to be associated to a higher rate of some of the indicators.

In other cases, the key element to influence one indicator, seems to lay in the combination of different degrees of structure, as for example in the case of Individual knowledge building, which seems particularly promoted when Task and Teams are medium structured and Time is not, or even in the case of Group knowledge building, which seems fostered when Task and Teams are highly structured.

To conclude, even if we agree with Dillenbourg (2004) that the kind of activity chosen by an instructional designer may “enhance the probability that productive interactions occur” but will never determine or guarantee the features of the learning process, we believe further research

deserves to be carried out to understand which are the variables (besides students, of course) that influence the nature of the learning process.

For this reason this study will be enriched with statistical measures to determine whether the results obtained so far can be considered statistically significant or not, and to further investigate the correlation between each T and the various indicators of the model.

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