ARGUMENTATION SEQUENCES IN TEAM DESIGN COMMUNICATION

SECUENCIAS ARGUMENTATIVAS EN LA COMUNICACIÓN DE GRUPOS DE DISEŃO

Chrysi Rapanta
Department of Education, Universitá della Svizzera Italiana,
Lugano, Switzerland, chrysi.rapanta@usi.ch

Abstract: Team design communication is strongly related to argumentation, due to its problem-solving, deliberative, and practical reasoning nature. In the other way round, argumentation helps promoting team design processes, on the basis of collaborative argumentation sequences of discourse. The aim of this paper is to identify and describe such sequences, as they emerge in a natural professional setting of team design in a Higher Education context. The analysis of the interaction protocol dataset focuses on two main units of analysis, namely joint actions and joint activities. Joint actions refer to the communicative acts formed by dialogical rhetorical relations. Joint activities are composed by communicative acts, or moves, but at the same time they serve a higher team communication goal. The most common joint activities in team design are: cognitive synchronization, collaborative inquiry, negotiation, and deliberation. Argumentation can potentially form part of any of these discourse sequences, as long as: a) it is focused on a concrete design object, such as problem, solution, or goal; b) it serves an argumentation goal, such as consensus, dissensus, or persuasion; and c) it contains at least one argumentative joint action, such as argument, counterargument, or reply.

Keywords: Team design, argumentation as communication, sequences, joint actions, collaboration.

Resumen: La comunicación en grupos de diseño está muy relacionada con la argumentación, debido a su naturaleza de resolución de problemas, deliberación, y razonamiento práctico. A la vez, la argumentación ayuda a promover los procesos de diseño en grupo, a la base de secuencias argumentativas de discurso colaborativo. El objetivo de este trabajo es identificar y describir este tipo de secuencias, tal como ellas emergen en un setting natural de diseño profesional, en el contexto de Educación Superior. El análisis de los datos de interacción focaliza en dos unidades de análisis principales, llamadas *joint*

actions y *joint activities*. *Joint actions* se refieren a los actos comunicativos compuestos de relaciones retóricas y dialógicas. *Joint activities* se componen de actos comunicativos, también llamados *moves*, pero a la vez sirven a un objetivo de comunicación grupal. Las *joint activities* más comunes en el diseño en grupos son: la sincronización cognitiva, la búsqueda colaborativa, la negociación, y la deliberación. La argumentación puede formar parte de cualquiera de estas secuencias discursivas, bajo algunas condiciones: a) que su foco esté sobre un objeto de diseño concreto, como el problema, la solución, o el objetivo; b) que sirva un objetivo propio de la argumentación, como el consenso, el disenso, o la persuasión; y c) que contenga al menos una *joint action* argumentativa, como el argumento, el contra-argumento, o la respuesta.

Palabras clave: Diseño en grupo, argumentación como comunicación, secuencias, *joint actions*, colaboración.

1. Introduction

THE TERM "team design" refers to the context in which two or more people are committed to the common purpose of developing "that-which-is-not-yet" (Nelson & Stolterman, 2003). In such a context, verbal communication plays a crucial role, as it is the main way of externalizing internal representations, which later on will be transformed into the artefacts of the design process. Nonetheless, this is not an easy task for the participants, as they "they think about the work on the design in quite different ways. They do not share fully congruent representations" of it (Bucciarelli, 1988, 167).

At a first glance, the team design process seems to be quite chaotic (Stempfle & Badke-Shaub, 2002), due to continuous topic and activity shifts. However, this is not the case regarding communication during design, which appears as "a linear, dynamic process that grows out of the systematic relationships among individuals engaged in the design process" (Nelson & Stolterman, 2003). These sequences either refer to frequencies of design content and thinking processes (Stempfle & Badke-Shaub, 2002), or to discourse-based sequences of communication acts, such as cognitive synchronization, alternative elaboration, or task management (D'Astous *et al.*, 2004). This paper is focused on team design discourse sequences aiming at a concrete communication goal.

In this context, argumentation plays, or should play, a major role, due to its proven relationship with: collaborative problem-solving (e.g. Baker, 1999a), joint deliberation (e.g. McBurney, Hitchcock, & Parsons, 2007) and practical reasoning (e.g. Walton, 1990). Team design process combines all these three characteristics, as it is: (partly) a problem solving activity (Visser, 2006); requires consensus or at least contributions from different

disciplines-perspectives (Détienne, Martin, & Lavigne, 2005); and design is based on the combination among plans and proposed actions (Visser, 2006), as in any practical reasoning situation (*I want this, thus, I should do that).* For all these reasons, argumentation has been recently treated as part of the design process (e.g. Darses *et al.*, 2001; Baker *et al.*, 2009). Still, more study is needed to better understand its relationship to the design process.

2. Research focus

The broader goal of the research, part of which is presented in this paper, is to identify patterns of communication among the members of a specific design team, which are considered to enhance collaboration in their present, and potentially, their future work. Patterns, in general, refer to systematically repeated behaviours, or "pieces" of behaviour, which, if well reported, can be used as guides for future good action, based on their proven appearance throughout a concrete process. In other words, helping a team understand what their members continuously do as part of a goal-oriented activity is considered to contribute positively to the team's performance in the same or similar context. When the focus is verbal communication, the search is about interactions or pieces of interaction, which are related to the team's collaboration.

   The relationship among argumentation and collaboration is an issue gaining a lot of attention in the recent years, mostly treated by the community of Computer-Supported Collaborative Learning (CSCL). One main assumption behind this relationship is that argumentation dialogue is related to some "hidden" *interactive learning mechanisms* (Baker, 1999a), which are crucial in what is known as *collaborative learning*, such as: socio-cognitive conflict, conceptual change, knowledge co-construction, etc. (Baker, 1999a; Baker, 1999b). Another assumption is that argumentation is a constructive interaction, in the sense that "it generally contributes in some way to co-operative goal-oriented activity" (Baker, 1999b, p. 181). This implies that communication itself can be more or less collaborative, depending on the type of activities emerging in it. Argumentation is one of the possible discursive activities to emerge during team design communication.

   Adopting this second assumption, the main research questions this paper endeavours to answer are:

– What discursive activities related to collaboration emerge during the team design process?

–How can argumentation be identified and distinguished among them?
–What types of argumentation sequences do emerge in this context?

3. Method

In concordance with the research questions mentioned above, the design of this study is natural-observational. Moreover, the duration of the observation is long enough to describe the activity as it really is, in relation to its context. The approach is qualitative, focusing on the analysis of communication, which is treated as a socio-cognitive activity serving a specific goal.

3.1. Context

Team design can emerge in various natural contexts. In a broad sense, we could even say that a family planning and/or processing together their dinner are involved in an activity of team design. Thus, two considerations have to be mentioned in order to better understand the context of the present study: first, that the context under-study is the institutional context of a Higher Education organization; and second, that the unit of analysis is a design project meeting, focusing on the planning of the design activities, mostly prosecuted later on in a distributed way. As a consequence, the main focus of these meetings is to co-ordinate the team members regarding the design activity, and not the design activity (meaning the development of the design artefact) itself.

3.2 Data collection

The main data collection source has been the audio-visual recording of a representative number of meetings done by a specific team during the 18-month production of a specific design artefact –the development of a totally on-line course. Each meeting has an approximate duration of 1,5 hour. The meetings´ records have been fully transcribed and formed a verbal transcription protocol –from now on, *dataset*.

3.3. Data analysis

At the time of analysing the data, the following decisions had to be made: which segmentation rules to apply; what discourse categories to use; how to

decide among types of sequences. The solution to these 'practical problems' was given through some methodological choices, emerging from the theoretical fields presented in this section. The communication of these choices is important for the further understanding of what is meant in this paper by *sequence* and, subsequently, by *argumentation sequence*.

3.3.1. Communication acts or *joint actions*

According to conversational and discourse analysts, sequences are formed by "moves" (Roulet *et al.*, 1985), which are combination of two or more "acts" (Sinclair & Coulthard, 1992). Acts are the minimal units of analysis, they are grammatically defined, and –in this study- they correspond to what is also known as "speech acts". Moves, on the other hand, are functional units, and they correspond to what can be called as "communication acts". When studying discourse as communication, speech acts in the way defined by Austin (1962) and Searle (1969) do not seem appropriate, for the simple reason that when speaking of oral communication the minimal unit of analysis needs to be, in a way, functional. What has been implied by these authors through the use of the term "illocutionary force", in an oral communication context, becomes the focus of the analysis, rather than the "behind-the-scene" hidden reality. This need of speaking of some "other types" of speech acts, which are more *communicative* in their nature, is present in the work of many authors analyzing task-oriented interactions, such as Traum & Hinkelman (1992) and Allwood (2001).

For the needs of our analysis, we adopt a discourse analysis perspective of communication, and subsequently argumentation, according to which the minimal communication units of analysis, namely communication acts, are defined by the rhetorical relations formed among them, as it has been implied by the founders of Rhetorical Structure Theory (Mann & Thompson, 1988). Following this line, Renkema (2009) proposed a model of classification of possible relations found in discourse, in which three levels or types of discourse construction emerge, namely Conjunction, Adjunction, and Interjunction. In Renkema's Connectivity model, oriented for written discourse, conjunction relations refer to form characteristics, such as location, ordination, and combination; adjunction relations are the ones focusing on adding of information, mainly in three ways (by elaboration, or featuring a concept, by extension, or adding a concept or an event to a clause, or by enhancement, by framing an event); and, finally, interjunction relations are the ones that take into consideration the addressee, through expressing

(presentation, comment), processing (explanation, metatext, attribution), or impressing (attention, acceptance, action) a viewpoint.

Inspired from Connectivity model, the following communication acts, on the base of discourse relations, are proposed for our dataset analysis, as it is shown on Table 1.

Table 1. Proposal of communication acts as main units of task-oriented interaction.

Conjunction	Adjunction	Interjunction
Answer	Co-operative completion	Presentation
Repetition (collocation, substitution)	Elaboration	Evaluation
Acknowledgement	Extension	Comment
	Enhancement	Clarification/explanation
		Conclusion
		Justification
		Summary
		Opposition
		Concession
		Agreement
		Attention
		Topic shift

All of these actions, presented in the form of communicative acts, are *joint*, in the sense that they aim at the co-ordination of communication both as content and as process (Clark, 1996). This *jointness* is not necessarily expressed through inter-speaker discourse relations. Most of the interjunction relations, for example, are embedded on the same person's point of view –as a way of further processing or supporting it; their dialogicality is embedded on the communicative function they serve. This is less obvious with the original Renkema's adjunction relations (elaboration, extension, and enhancement), which focus on the factual part of discourse. In an exposition monologue, for example, adjunction relations have a predominant part. Their communication function depends on the communication function of the monologue on which they are embedded, and this again depends on the joint activity (see next section) this monologue belongs to. For the few cases in which adjunction itself takes place at an inter-speaker level, by specifying, continuing, or framing information contained in another party's

speech, we introduce the term "co-operative completion" to focus on this action. Finally, in our proposal, conjunction relations refer to relations of request-answer, repetition (identical or logical) of other party's whole or part of sentence, and acknowledgment as expressed through *evidence of understanding* (Clark & Schaefer, 1989) towards another party's sentence or speech. Last but not least, the dataset segmentation is based on our definition of communication acts, as minimal unit of analysis. Following Carlson & Marcu (2001), if a rhetorical relation, of the ones proposed, exists among two discourse units, these automatically form two separate segments or, as we propose, two separate communication acts.

Finally, a joint action needs the common operation of the participants on the same cognitive object (Baker *et al.*, 1999), unless a new focus is introduced either because a participant is asked for it or because she considers it appropriate. In team design, the following cognitive objects are possible: a) problem data, referring to concepts and/or events related to the context of inquiry or application of design solutions, b) solution ideas, referring to proposals about the desired state of the facts under discussion, c) goal elements, referring to strategies or values explaining the selection of design solutions, d) domain objects, referring to knowledge objects related to a specific (design) domain, e) domain rules, referring to institutional or disciplinary frequently emerging or prescribed processes, and f) task procedures, referring to the meta-planning (co-ordination, scheduling, organization) of the present and future design meetings and actions. These categories have been proposed by Darses *et al.* (2001), as part of the COMET methodology of team design collaboration analysis, but their interpretation is adapted to the needs of this research dataset.

3.3.2. Communication sequences or *joint activities*

As it was already implied in the previous section, *jointness* or the communication function of an act cannot be completely understood outside of its context. At a micro-level, this can be done by looking at the nucleus and the satellite acts together, as a functional unit. Doing this, the communication functions at an act level, presented in the previous section, emerge. At the same time, these communication "micro-functions" are embedded in bigger sequences or macro-structures, which serve more contextualized team communication functions.

According to Clark & Schaefer (1989), the primary communication func-

tion is that of content *grounding*, expressed through a presentation and an acceptance phase. Grounding is essential for any communication because it assures that the other party has understood what one party presents, before the conversation goes on. In institutional, task-oriented communication, grounding can also happen at a more complex –cognitively speaking- level, becoming a communication goal itself. In this case, we speak of a "cognitive synchronization" activity (Darses at al., 2001), during which the partners either make sure that each has knowledge of the facts relating to the state of the situation (i.e. problem data, solution states, accepted hypotheses, etc.), or they make sure that they share a common knowledge regarding the domain (i.e. technical rules, objects in the domain and their features, resolution procedures, etc.).

Joint activities are also strongly related to what Walton & Krabbe (1995) have defined as *dialogue types.* These authors propose the following classification of dialogues with their corresponding joint goal:

1. Persuasion dialogue: resolve the conflict among two contrary opinions
2. Negotiation: make the best deal by selecting among proposals
3. Inquiry: "pooling of information in a structured way", as interpreted by Reed & Long (1997)
4. Deliberation: decide on a plan of action
5. Information-seeking: "spreading information", as interpreted by Reed & Long (1997)
6. Eristics: win a debate

Given the macro-goal of the design meetings, on which this analysis has been based, the focus of the participants is on making explicit and trying to share their representations considering the design object(s). Under this condition, and also due to the formal, institutional context, neither strong conflicts of opinion nor debates have been among the choices of the participants. Also, information-seeking, when expressed, was limited to a request-answer action level; when expanded in a sequence, it formed part of a cognitive synchronization activity, as it was explained before. Having said that, the following team design joint activities have emerged in our dataset, as they are defined in Table 2:

Table 2. Joint activities in team design.

Joint activity	Object	Condition	Goal
Cognitive synchronization	Problem data, past solutions, domain object, domain rule	Cognitive asymmetry	Get to a an equal cognitive status about a concept or event
Collaborative inquiry	New solution ideas, goals	Uncertainty	Get to a broader exploration space regarding the design solution
Negotiation	Domain object, new solution ideas, goals	Multi-perspectivism	Get to a deal about a concept definition (meaning negotiation) or a plan of action (solution negotiation)
Deliberation	Solution ideas, goals, tasks	(Need for) decision-making	Get to a concrete decision regarding a plan of action

Each one of the above dialogical sequences can be more or less argumentative, as it will be better explained in the next section.

4. Argument as action and as an activity

In the frame we have hitherto presented, argument can be conceived both as an action or move and as an activity. This distinction is very much similar to the two-fold definition of an argument as a product and as a process (Johnson, 2000).

First of all, to define an argument as an action, the same discourse relations presented in Table 1 shall be used. Some of these relations (e.g. justification, opposition, concession) have already been proposed as argument relations (Azar, 1999), in the marks of a connection among RST theory and Argumentation theory. In our approach, some general discursive aspects are used, in order to better define and understand argumentation, in the way it happens naturally, as a communication process. For that, both prescriptive and descriptive criteria shall be used.

As far as the prescriptive criteria for an argument definition is concerned, some logical inference (Perelman, 1982) among the acts related to each other through discourse, has to be clear. Secondly, one of the two parts of

the inference –the supporter part– has to be sufficient for the acceptance of the second part –the supported part. And thirdly, the truth of the judgment–under-discussion is not a priori accepted by the other speaker(s), in other words, some other speaker(s) has to be convinced.

As far as the descriptive criteria, any interjunction relation of the ones we presented in Table 1 is potentially an argument relation. However, some are *by nature* argumentative, whereas others become argumentative *in context*. We agree with Azar (1999) that justification, opposition, and concession are *by nature* argument relations, as they also correspond to the three main structural components of an argument: argument, counter-argument, and reply (Leitao, 2000). Also presentation, conclusion, and attention most of the times form part of an argument. Finally, evaluation, clarification-explanation, and summary can form part of an argumentative sequence, but they are not argument moves themselves.

The presence or not of one or more argument moves inside a sequence gives a more or less argumentative character to that sequence. This means that any of the dialogical sequences-activities presented on Table 2 can be more or less argumentative[1] and, as we mentioned in Section 2, this for many authors can also be translated as "more or less collaborative". Additionally, following Baker (1999b) on the idea that argumentation is a type of interaction itself, with its own knowledge construction goals, we propose three main types of argumentative dialogue-activity in a collaborative context, namely: consensus, or expression of agreement on a plan of action; dissensus, or expression of diagreement on a plan of action; and persuasion, or agreement achieved through some type of concession. Moreover, in order to disntiguish an argumentative sequence from other types of sequences, additional criteria need to be fulfilled. Some of them, based on the dataset coding, are shown on Table 3.

Table 3. Argumentation sequences types.

Nature	Object	Condition	Goal
consensus	solution ideas/ goal elements	at least one valid argument	accept the truth of a belief judgment
dissensus	solution ideas/ goal elements	at least one valid counter-argument	put in doubt the truth of a belief judgment
persuasion	solution ideas/ goal elements	at least one valid reply	establish the truth of a belief judgment

[1] This idea is mainly applied to negotiation dialogues, see for example Andriessen *et al.* (2003).

5. Examples of three types of argumentation sequences

Having said that, two steps have been followed regarding the argumentation sequences which appear in this study's dataset: identify them on the basis of the conditions presented on Table 3, and analyze them regarding on the basis of discourse relation types emerging in each one of them. In continuation, five examples from the analyzed dataset are presented. A short description of what is happening at a discursive-dialogical level follows after each example.

Table 4. Example 1.

ID	Sp.	Speech	Act
1	B	I mean I was thinking… it should be a much nicer, much better closer working relationship.	**presentation**
2	B	You know, you've got this developing,	**explanation**
3	B	it's open to everybody	extension
4	C	Yeah	*acknowledgment*
5	B	So when they've got time they can just go in and () (check this)	enhancement
6	B	and give advice early on	extension
7	C	Yeah	*acknowledgment*
8	B	rather than this kind of frustrating …	enhancement
9	B	you know we'll develop it,	explanation
10	B	then we'll give it to LTS () with all these comments,	extension
11	B	which might be fine comments	elaboration
12	B	but bloody hell, you're meant to be moving on to the next thing now,	**attention**
13	B	you don't want to have to go back and redo all this	enhancement
14	C	Yeah	*acknowledgment*
15	B	Whereas if people start getting involved early on,	**opposition**
16	B	seeing the content being developed kind of in front of their eyes	extension
17	B	then it should work really nicely	**conclusion**
18	F	I think we would welcome some guidance though	**opposition**
19	F	on whether we do, as D says, scroll down four or five pages,	elaboration
20	F	whether we make the pages very short	extension
21	F	and have links to go to other pages,	extension
22	F	because that affects the way you organize the learning.	**justification**
23	B	Yeah	**agreement**
24	D	Or do we have PDFs linked in?	extension
25	F	Exactly, we need some sort of guidance.	**agreement**

26	F	What we (need to do) would be to look at the model of another course	**presentation**
27	F	which is deemed to be good practice.	extension
28	F	So… that we could conform to that,	**conclusion**
29	F	but there may be other research	extension
30	B	() [smiles] I think these days we don't have those course particularly in existence,	**opposition**
31	B	but I think you know we could almost set up good practice with this	**presentation**

Notes: a) the number in the first column represents the segment's identity number, b) the letter in the second column represents the participant's identity, c) in the last column, acts in bold correspond to interjunction acts, acts in italics correspond to conjunction acts, and the rest are adjunction acts.

Example 1 starts with B's presentation of a proposal of a co-ordination solution among the design team and another team (LTS). His presentation becomes argumentative not earlier than line 12 (coded as *attention* move), which in relation with moves 15 (opposition) and 17 (conclusion) gives support to his proposal. In lines 18-21, person F gives an alternative solution to the one already proposed, which becomes a presentation of a totally different than B's solution (line 26), justified through a pedagogical perspective (line 22). B expresses his doubt about F's proposal (line 30), but seems to concede to the first opposition proposed by F, that they *need some sort of guidance*. The sequence ends with B's "intermediary solution" that t*heir* course could serve as guidance for other courses, which agrees with his initial proposal. In fact, the way the design team co-ordinated with the LTS team has been an innovative and efficient design decision they took. This sequence is an example of an argumentative negotiation, which arrives at some type of *deal* among the participants having different points of view. As far as the argumentation goal achieved is concerned, we can speak of some type of "light persuasion": persuasion, because of the silent concession of F and the other participants to B's final proposal; and "light", because no explicit conflict was expressed.

Table 5. Example 2.

ID	Sp.	Speech	Act
1	J	But yeah I'm assuming there is some sort of protocol for forums and how that works and and maybe that will	**presentation**
2	A	I think that (forums are different from Elluminate)	**opposition**
3	A	I mean I think it's a balance isn't it between …	**explanation**
4	A	you don't want the ALs to have to do you know to set up the stuff	**justification**

5	J	NO	**agreement**
6	A	you want some flexibility	enhancement
7	A	so that … people can just meet and discuss things and ()	enhancement
8	J	Yeah yeah but if you're providing them with a facility	**opposition**
9	J	then you have to mop up any problems	**conclusion**
10	J	and if the ALs are being told that you know "this person came to me here and said this" and… that's not right or that's bad	**explanation**
11	J	then the AL has to have a way of dealing with that	enhancement
12	J	and so you know it might just be that you have to have kind of a policy or whatever	**presentation**
13	J	that says… to keep away somebody from another room who's come into their I don't know [laughs]	elaboration
14	M	Yeah I agree with that ()	**agreement**
15	J	It POTENTIALLY kind of works	**comment**
16	J	but (how) you get in there (I don't know)	enhancement
17	A	No… but the idea in the Block Two is that we introduce them to Elluminate as a tool that they can use	**opposition**
18	A	anytime just to collaborate	enhancement
19	A	so it's an it should be an easy to use thing…	**conclusion**
20	J	I I suspect that far more of an issue would be getting them to USE it	**attention**
21	A	Yeah	*acknowledgment*
22	J	Than controlling……them over that to be honest [laughs]	enhancement
23	A	Yeah	*acknowledgment*
24	M	Yeah	*acknowledgment*
25	J	But that's that's not that's another issue isn't it	**evaluation**

Example 2 dialogue is about an already discussed problem having to do with one of the tools that form part of the course's activities. The sequence starts with J's presentation of a solution, which seems inadequate, according to A (line 2), who furhter supports his viewpoint through functional aspects of the tool (lines 3-7). Taking into consideration also functional aspects, J returns to support her initial proposal (line 12), adapting it a little bit, until she shifts the attention (line 20) to a totally different aspect (*the problem is not the policy to be followed, but the use of the tool by the students*). At a goal level, it can be assumed from J's last line that her initial intention, maintained throughout the sequence, was not to persuade A of her proposal, but to express her worry about a decision previously taken. This worry seems to be taken into consideration by A, but, in any way, could

not change the content of the initial decision (lines 17-19). Thus, we can speak of a "light" dissensus sequence, which just gave place for some "other voice" to be heard on an already taken decision.

Table 6. Example 3.

ID	Sp.	Speech	Act
1	A	I mean you could get them to draw out their you know to rank themselves on… different abilities…	**presentation**
2	A	I mean at the risk of, at the risk of finding that they're not very good at many things …	**justification**
3	A	and then sort of make a visual diagram of you know…	enhancement
4	A	you know like the what do you call them those plaques that you get	**explanation**
5	J	But I I…but I don't know, that that actually leads to "oh I didn't know that we need to make that much effort" you know.	**opposition**
6	J	I think maybe something much more simple would ()	**evaluation**
7	F	(It would be good to get) that contrast AT THE END	**presentation**
8	F	I mean they might say "I'm not very good at drawing, I'm not very good at finding problems" and at the end they'd say "well actually I've proved myself I was good enough"	**explanation**
9	J	Yeah	*acknowledgment*
10	F	Not very good or good enough at drawing or communicating good enough at resolving or setting themselves problems	**explanation**
11	F	so… it might be quite nice a little thing to do at the beginning and the end for them	**conclusion**
12	F	to say "oh yeah look back at the first chart you made, you did prove to them your work, you did use graphics you did do this you did do this"	elaboration
13	A	Hmm	*acknowledgment*
14	J	So that's effectively us that's us setting up our own Learning Style text	**comment**
15	F	Well yeah	**agreement**
16	J	It is the danger	**evaluation**
17	F	Well yeah	**agreement**
18	J	You know ehm	
19	A	I mean I think I … this TMA it's got to be short	**presentation**
20	A	it's got to be easy …	extension
21	A	it's basically an introduction to the …	extension
22	M	Yeah	*acknowledgment*
23	A	What I like about this,	**attention**
24	A	you know sending them to the Study Skills site	elaboration
25	A	is you know, you've signed up you've paid money to join the () University	**explanation**
26	J	Yes	*acknowledgment*
27	A	and this is what we provide	enhancement

28	J	Exactly	**agreement**
29	C	[nodes positively]	*acknowledgment*
30	A	we provide all this good advice about study strategies and how to learn	elaboration
31	A	and in way they just have to see that and …	enhancement
32	A	and that will that will provoke them to think about it anyway	**conclusion**
33	J	Yeah… and just start them engaging and	co-completion
34	A	Yeah	*acknowledgment*
35	J	And then they might explore it more later yeah yeah	enhancement
36	A	And just you know a little reflection on …learning experiences in the past	**presentation**
37	A	and how you… what they plan to in the future	extension
38	A	and I think that that that's it really I don't think you need much more than that	**summary**
39	J, F	Yeah	**agreement**

Example Dialogue 3 is about deciding on the content of a self-assessment activity that forms part of the course. It starts with the presentation of a simple argument by A (lines 1-4) followed by a simple counter-argument by J (lines 5-7). F goes on with a new, explanatory presentation (lines 8-13), on which J comments and agrees. After this short "grounding break", A gets into the game again with a long contribution (lines 20-38) which gets until the end of the sequence. His contribution is not a by nature argument move, in the way we defined it, but it serves to support A's initial presentation, and moreover, with "success", as it receives the agreeement by both J and F (line 39). However, A's "success" is something different than persuasion; as it can be seen in lines 34 and 36, J, who had initially expressed an antithesis, she is now adding to A's proposal. This change might be due to F's intervention (lines 8-13), which was near to J's viewpoint, but at the same time it helped her reflect on it in a different way (lines 15 and 17). This is an example of argumentation as consensus or co-construction.

6. Discussion

In this paper, a view of team design argumentation as a discursive activity has been presented. As such, it serves concrete goals, defined as consensus, dissensus, and persuasion, which all serve the macro-goal of design deliberation, which is predominant in the project meetings observed. Understanding the micro-processes of the emerging argumentation sequences is assumed to help understanding the team design process itself, and subsequently, the

participant designers in their project meetings. Three examples of argumentation sequences were presented, as they emerged in the analyzed dataset. Some main differences among them have been identified. Our future work consists of: analyzing a sufficient amount of data to be able to get to some generalizations (patterns) regarding the type and structure of argumentation sequences emerging during team design communication; better defining the contextual conditions of all types of moves and sequences presented; and finally, better support the use of discourse relations as a way to identify arguments and argumentation sequences, taking place in natural communication contexts.

7. Acknowledgements

References

Allwood, J. (2001). Dialog coding. Function and Grammar: Goteborg coding schemas. *Gothenburg Papers in Theoretical Linguistics GPTL 85*, Goteborg University, Department of Linguistics.

Andriessen, J., Erkens, G., van de Laak, C. M., Peters, N., &Coirier, P. (2003). Argumentation as negotiation in Computer Supported Collaborative writing. In J. Andriessen, M. Baker & D. Suthers (Eds.), *Arguing to learn: Confronting Cognitions in Computer-Supported Collaborative learning environments* (pp 79-116). Dordrecht: Kluwer.

Austin, J. L. (1962). *How to do things with words*. Cambridge: Harvard University Press.

Azar, M. (1999). Argumentative text as rhetorical structure: an application of Rhetorical Structure Theory. *Argumentation,* 13, 97-114.

Baker, M. J. (1999a). Argumentation dialogue, cognitive-linguistic operations and learning to model in science. *Actes du colloque LEMMAS* (The role of communication in learning to model), Ajaccio, April 1999.

Baker, M. J. (1999b). Argumentation and Constructive Interaction. In G. Rijlaarsdam & E. Espéret (Series Eds.) & Pierre Coirier and Jerry Andriessen (Vol. Eds.) Studies in Writing: Vol. 5. *Foundations of Argumentative Text Processing* (pp. 179-202). Amsterdam : University of Amsterdam Press.

Baker, M.J., Hansen, T., Joiner, R. & Traum, D. (1999). The role of grounding in collaborative learning tasks. In P. Dillenbourg (Ed.), *Collaborative Learning : Cognitive and Computational Approaches* (pp. 31-63). Amsterdam : Pergamon / Elsevier Science.

Baker, M. J, Détienne, F., Lund, & Séjourné, A. (2009). Étude des profils interactifs dans une situation de conception collective en architecture. In F. Détienne, & V. Traverso (Eds.), *Méthodologies d'analyse de situations coopératives de conception : Corpus MOSAIC* (pp. 183-220). Nancy : Presses Universitaires de Nancy.

Bucciarelli, L. L. (1988). An ethnographic perspective on engineering design. *Design studies,* 9 (3), 159-168.

Clark, H. H. (1996). *Using language*. Harvard: Harvard University Press.

Clark, H. H., & Schaefer, E. F. (1989). Contributing to discourse. *Cognitive science,* 13, 259-294.

Darses, F., Détienne, F., Falzon, P., & Visser, W. (2001). *A method for analyzing collective design processes.* INRIA Research Report N° 4258, September 2001.

D'Astous, P., Détienne, F., Visser, W., & Robillard, P. N. (2004). Changing our view on design evaluation meetings methodology : a study of software technical review meetings. *Design studies*, 25, 625-655.

Détienne, F., Martin, G., & Lavigne, E. (2005). Viewpoints in co-design : a filed study in concurrent engineering. *Design studies*, 26 (3), 215-241.

Johnson, R. H. (2000). *Manifest rationality. A pragmatic theory of argument.* New Jersey: Lawrence Erlbaum Associates.

Leitao, S. (2000). The potential of argument in knowledge building. *Human Development*, 43, 332-360.

Mann, W. C. & Thompson, S. A. (1988). Rhetorical Structure Theory: Toward a Functional Theory of Text Organization. *Text*, 8, 243-281.

McBurney, P., Hitchcock, D., & Parsons, S. (2007). The eightfold way of deliberation dialogue. *International Journal of Intelligent Systems*, 22 (1), 95-132.

Nelson, H., & Stolterman, E. (2003). *The design way. Intentional change in an unpredictable world*. New Jersey: Educational Technology Publications.

Perelman, C. (1982). *The Realm of Rhetoric*. Notre Dame: University of Notre Dame.

Reed, C. & Long, D. (1997). Collaboration, cooperation and dialogue classification. *Working notes of the IJCAI'97 Workshop on Collaboration, Cooperation and Conflict in Dialogue Systems.*

Renkema, J. (2009). *The texture of discourse: towards an outline of Connectivity Theory*. Amsterdam: John Benjamins.

Roulet, E., Auschlin, A., Moeschler, J., Rubattel, C., & Schelling M. (1985*). L' articulation du discours en francais contemporain.* Peter Lang.

Searle, J.R. (1969). *Speech acts: An essay in the philosophy of language.* Cambridge: Cambridge University Press.

Sinclair, J., & Coulthard, M. (1992). Towards an analysis of discourse. In M.

Coulthard (Ed.), *Advances in spoken discourse analysis* (pp. 1-34). London: Routledge:

Stempfle, J., & Badke-Schaub, P. (2002). Thinking in design teams- an analysis of team communication. *Design studies*, 23 (5), 473-496.

Traum, D. R. & Hinkelman, E. A. (1992). Conversation acts in task-oriented spoken dialogue. *Technical Report 425*, University of Rochester.

Visser, W. (2006). *The cognitive artifacts of designing*. New Jersey: Lawrence Erlbaum Associates.

Walton, D. N. (1990). *Practical reasoning: Goal-driven, knowledge-based, action-guiding argumentation.* Maryland: Rowman & Littlefield Publishers, Inc.

Walton, D. N., & Krabbe, E. C. W. (1995). *Commitment in dialogue: basic concepts of interpersonal reasoning*. New York: State University of New York Press.