



## **ANALYSIS OF NEGOTIATION AND ARGUMENTATIVE SKILLS IN ONLINE COLLABORATIVE LEARNING FROM SOCIAL, COGNITIVE, AND CONSTRUCTIVIST PERSPECTIVES**

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### **Summary**

*Developing negotiation and argumentative skills is increasingly becoming important for online collaborative learning as they improve the ability to persuade and convince to reach consensus. The purpose of this paper was to examine the development of online negotiation and argumentative skills from social, cognitive, and constructivist perspectives by studying the discourse of undergraduate students who used a specially designed online platform – scale. Qualitative computer transcript analysis was employed as the predominant method. The scale platform conceived for the development of argumentative and negotiation skills also produced results on the type of argumentative discourse observed, and the relationships found between (i) on-line debates between pairs, and (ii) on-line graphic representations of the individual argumentative diagrams. In addition to the data obtained from scale, computer transcripts were analyzed using three transcript analysis models: (a) mcateer et al. (2002) seven categories from a cognitive perspective, (b) curtis and lawson's (2001) model from a social perspective, and (c) gunawardena, lowe, and anderson's (2007) five phase model from a social constructivist perspective. The results discuss the type of learning that occurred through negotiation and argumentative structures, the role of technology in the learning process, and the difference between on-line and off-line modes.*

### **Purpose**

Developing negotiation and argumentative skills is increasingly becoming important for online collaborative learning as they improve the ability to persuade and convince to reach consensus. The purpose of this paper was to examine the development of online negotiation and argumentative skills from social, cognitive, and constructivist perspectives by studying the discourse of undergraduate students from a Portuguese university who used a specially designed online platform – SCALE.

### **Method**

Qualitative computer transcript analysis was employed as the predominant method. The SCALE platform conceived for the development of argumentative and negotiation skills also produced results on the type of argumentative discourse observed, and the relationships found between (i) on-line debates between pairs, and (ii) on-line graphic representations of

the individual argumentative diagrams. In addition to the data obtained from SCALE, computer transcripts were analyzed using two transcript analysis models: (1) McAteer et al. (2002) seven categories from a cognitive perspective, and (b) Curtis and Lawson's (2001) model from a social perspective, and was compared with Gunawardena, Lowe, and Anderson's (2007) five phase model from a social constructivist perspective. This research examines collaborative learning from three perspectives: cognitive, social, and socioconstructivist, whereas previous research focused mostly on a single perspective. The analysis was triangulated by asking two external experts, one from the U.S. and one from Portugal to review the coding and the categories and themes that emerged.

The transcripts were obtained from 16 students in the 2nd year "licenciatura" degree for Elementary School Teachers in a higher education institution in Portugal, who participated in six sessions, for a total of 25 hours in which they worked for the most time in pairs in the on-line mode, although the individual and off-line work modes coexisted.

### Conceptual Framework

McAteer et al. (2002) studied computer-mediated interaction and developed seven categories of interaction from a cognitive perspective, which include: a) suggestion of ideas b) disagreement, c) justification, d) negotiation or new explanation, e) evaluation of new ideas in new circumstances f) feedback, g) connecting to new experiences discussed before.

Curtis and Lawson, (2001) defined a model of interaction from a social perspective. They considered the role that social interactions play in promoting learning such as: a) giving and receiving help; b) changing information; c) explaining and elaborating information; d) sharing knowledge with peers; e) giving and receiving feedback; f) discussing contradictions; g) promoting effort and self confidence between peers; h) developing skills for collaborative work; and i) monitoring efforts and contributions made by others.

The third model selected for analysis of computer transcripts was the five-phase model developed by Gunawardena, Lowe, and Anderson (1997) from a social constructivist perspective. They described the model in phases, as they saw a collaborative group moving from sharing and comparing of information (Phase I), through cognitive dissonance (Phase II), to negotiation of meaning (Phase III), the testing and modification of the proposed co-construction (Phase IV), and to the application of the newly constructed meaning (Phase V). In applying the model to the analysis of an online debate, they note that the debate format influenced the process of co-construction by sometimes supporting and sometimes hindering the efforts made by participants to reach a synthesis. While the debate format was very effective in developing argumentative skills, it hindered the process of negotiating meaning as the purpose of a debate is to win the argument, and not to negotiate.

A coding scheme was developed based on McAteer et al. (2002), and Curtis and Lawson's (2001), model as in Table 1 below, and the analysis that emerged was compared with Gunawardena, Lowe, and Anderson's model (1997).

Table 1: Online Interaction Analysis Framework based on McAteer et al. (2002), and Curtis and Lawson's (2001) Models

<b>To give opinions</b>	DO	<i>To offer simple reasoning's, positive or negative, of a merely opinionating nature.</i>
<b>To agree</b>	C	<i>To accept without explanation</i>
<b>To disagree</b>	D	<i>To disagree, to refuse, to object, to refute contradictory ideas, to express doubt explicitly.</i>

<b>To ask a simple question</b>	Q	<i>To formulate a simple or general question</i>
<b>To ask for clarification</b>	PE	<i>To ask for clarification, in spite of its formulation (declarative, interrogative,...)</i>
<b>To explain procedures</b>	EP	<i>To describe actions, a procedure</i>
<b>To offer justification</b>	J	<i>To elaborate on a topic or a reasoning, rendering it explicit, offering justifications</i>
<b>To negotiate</b>	N	<i>To concede, to negotiate agreement</i>
<b>To correct</b>	Co	<i>To make minor corrections (spelling or other)</i>
<b>To monitor work</b>	MT	<i>To coordinate work, acting as a leader for the development of the task at hand</i>
<b>To evaluate and regulate own work</b>	ARP	<i>To evaluate one's own work, describing or not the meta-cognitive processes involved in self-evaluation</i>
<b>To evaluate and regulate the work of others</b>	ARO	<i>To evaluate the work of others, describing or not the processes involved in such evaluation</i>
<b>To ask for help</b>	PA	<i>To ask for help for any kind of difficulty</i>
<b>To help</b>	DA	<i>To give help for any kind of difficulty</i>
<b>To praise effort</b>	VE	<i>To give positive feedback about effort</i>
<b>To promote confidence</b>	PC	<i>To give positive feedback so as to motivate peer</i>
<b>To greet</b>	S	<i>To say hello and goodbye</i>
<b>To interact off-task</b>	FT	<i>To interact on off-task topics</i>
<b>To use unconventional graphic symbols</b>	SV	<i>Using visual or abbreviation in the text To use smilies, emoticons or abbreviations in writing</i>

1. The last category was added upon agreement between the coders after the initial classification
2. Concerning category Q —To ask a question, if it was associated with a more complex one, it was only classified in the latter.
3. Categories ARP and ARO presuppose that regulation can be made according to previous evaluations. When first person plural is used, category ARP is selected given that the interaction is based on feedback phenomena of a meta-cognitive nature.
4. The code acronyms correspond to Portuguese name of categories.

### **Argumentative Skills and the SCALE Platform**

The SCALE Project (Support Collaborative Argumentation-based LEarning in secondary schools), developed by a team of European research centres, consists of an on-line platform for teachers and students, offering scenarios and pedagogical guidelines on how to learn to argue and how to argue to learn, and includes tools for communication and analysis of results. Therefore, it is an Internet-based platform to guide and support collaborative learning of argumentative discourse.

The SCALE tools comprise a free CHAT, a structured CHAT – ALEX – where the dialogic interaction emerges, and is gradually organised. *“Scripts can be implemented into the communication interface of CSCL learning environments as kind of a guideline. They can interactively suggest the next step with a minimal intervention of a teacher. Therefore, the quality of self-regulated learning can be facilitated with a minimum of external regulation”* (Weinberger et al, 2005:2). In addition, it provides another Internet tool, GRAPHER, used in the visual representation of the debate, since it is possible to create argumentation graphs manually or automatically. Furthermore, the platform offers additional tools of support for the process of learning and its analysis. The Pedagogical Website (PWS) contains the necessary software and help for the creation and use of learning sequences (Scale, 2003).

For the propose of this paper, attention and importance was given to Chat discussion in argumentative pairs, even if the students worked together in i) Creating argumentative graphs based on texts read; ii) Discussing the theme in structured chat; iii) Participating in a forum on the topics to be discussed, with contributions corresponding to the type of text under study.

## Findings

The results address the type of learning that occurred through negotiation and argumentative structures, the role of technology in the learning process, and the difference between on-line and off-line modes.

The study enables us to draw relevant conclusions related to types of interaction in free versus structured chats. Discussion was richer and more profound in the free chats. The graphic representation in diagrams of argumentative maps shows evidence of learning as far as the argumentative structure is concerned. Results show the benefits resulting from pair negotiation, work strategies used for gaining argumentative skills, and the participants opinions on this form of interaction and training.

Regarding the SCALE platform, students agree that it helps them to develop more solid opinions, to structure their own points of view, and to deconstruct arguments, which facilitate understanding. However, they think they must be more familiar with the platform tools, in order to benefit as much as possible from SCALE.

Figure 1: Components of the SCALE Platform and Corresponding Interactions

Tools	CHAT	ALEX	GRAPHER	FÓRUM
interactions	858	124	88	25

The existence of templates in structured chat - ALEX led to a lack of spontaneous exchanges, and to poorer explanations and clarifications, as well as to shallower reflections. Consequently, and the analysis of Replay interactions confirms this, the most important difference lies in the lack of challenge and explanation cycles that characterize positive interchanges in chat, guiding students towards the strategies of learning from peers.

Students preferred to work with regular chat instead of the Grapher or the structured chat – Alex, because they were more familiar with it. Learners entered the chat clearly predisposed towards learning from and with peers with whom they feel comfortable. It was common to witness short dialogues like “I’m not very sure of this topic” – “Don’t worry. I will help you”.

Regular Chat had a big impact and students found strategies to discuss without being in strong conflict situations. As a matter of fact they preferred to ask questions and opinions, leading colleagues into reflection and deeper thinking, instead of discussing their point of view, for example, “what do you think about my suggestion?” “wait a moment. Lets see it better”; “for me it is more evident like that, what is your idea?” Rich cycles of idea explanations and reformulations are perceived and there is also a predisposition of the participants to learn with and from others.

Figure 2 displays the online interaction categories that emerged when the interaction analysis framework developed in Table 1 was applied to the analysis of the transcript. As can be observed, the predominant categories that emerged were: giving opinions, monitoring work, expressing agreement, negotiating--defined as trying to find agreement, asking questions, and explaining procedures. When comparing this analysis to the Gunawardena et al. model, it can be observed that many of the interactions took place in Phase I, sharing and comparing information. This is frequently the case with many online discussions, and is supported by Kanuka and Anderson’s (1998) study, which found that the majority of learning in a professional development forum occurred at the lower phases of the interaction analysis model. The three most exigent cognitive levels were verified according to the regularity of the interactions connected with giving opinions; monitoring work; agreeing; negotiating; asking simple questions; explaining procedures and offering justifications. These interactions correspond to about 73.8% of all the interactions. There were very few expressions of cognitive dissonance, disagreement or discord. Whether this could be related to a cultural trait as explained in the Lopez-Islas study (2001), where cognitive dissonance was almost absent in online discussions as the Latin culture does not favor the open expression of disagreements, needs to be explored further. Few postings reached the level of social negotiation of meaning discussed by Gunawardena et al.

The transcript analysis shows a large number of social messages most probably due to the fact that students knew each other for one year. While this helped the socialization process in a learning community, it also constrained serious discussion. However, because they knew each other well, students did not hesitate in requesting clarification of points or ambiguous opinions. Therefore, building a sense of community is important for creating a conducive learning environment online. This finding highlights the importance of social interaction for facilitating cognitive and constructivist learning. The Gunawardena et al. model does not address the social perspective and its role in constructing new meaning. This current study adds to the Gunawardena model by highlighting the importance of the social dimension of an online discussion.

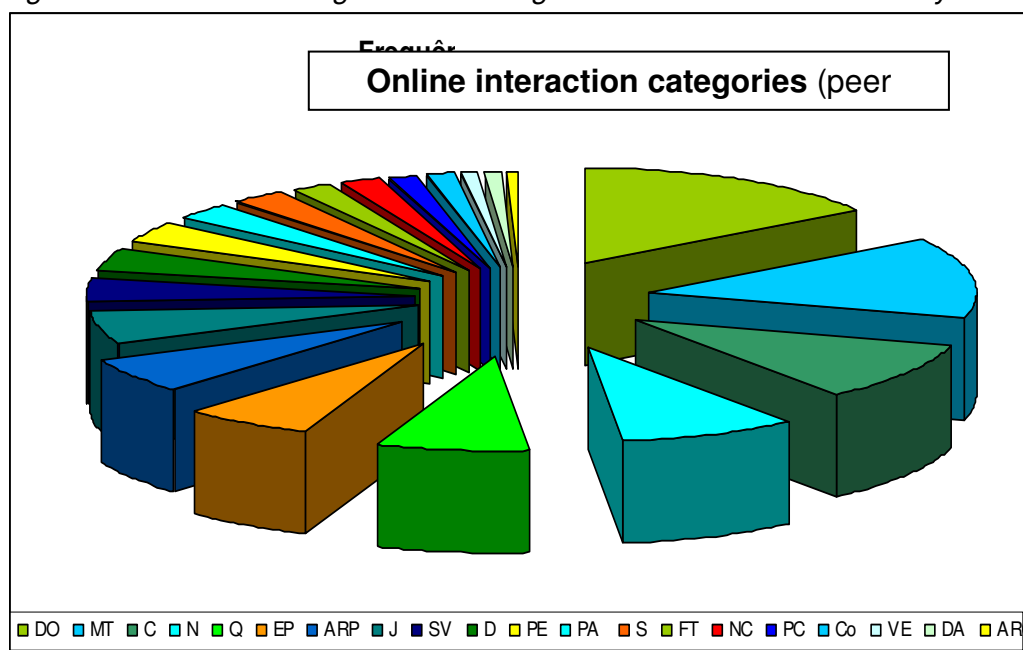
The presentation will address the results in detail with relevant examples. We believe this study contributes to validating interaction analysis methods for analyzing and evaluating online learning.

*Table 2: Frequencies of Interaction Categories by Each Student Corresponding to Table 1*

categories	A1	A2	A3	A4	A5	A6	A9	A10	A11	A12	A13	A14	A15	A16	TOTAL
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DO	11	5	16	4	14	14	15	11	3	5	7	5	14	10	134
MT	18	4	9	4	14	13	8	9	5	6	2	8	9	10	119
C	9	10	7	5	4	10	9	6	5	1	7	4	4	4	85
N	14	6	4	4	5	6	7	10	2	1	5	5	4	3	76
Q	8	6	5	5	4	2	8	4	4	4	3	2	5	6	66
EP	9	4	2	1	0	5	0	6	5	2	11	6	3	0	54
ARP	5	1	2	2	6	12	3	10	2	4	1	1	3	1	53
J	6	2	10	2	4	6	0	0	3	2	4	4	3	1	47
SV	4	2	3	0	1	2	6	8	5	0	1	2	1	0	35
D	5	1	6	1	1	4	3	5	1	1	2	0	3	0	33
PE	3	3	1	1	2	0	1	2	5	0	2	3	3	5	31
PA	0	0	0	0	3	1	0	6	1	2	9	3	0	1	26
S	5	1	0	0	2	3	1	2	1	2	2	2	1	0	22
FT	1	0	0	0	1	2	0	6	3	2	0	2	1	0	18
NC	0	0	0	0	3	3	0	1	1	0	2	3	1	1	15
Co	2	1	1	0	1	1	0	0	1	0	3	0	2	0	12
PC	1	1	0	0	0	4	2	2	1	0	1	0	0	0	12
VE	0	0	0	1	0	3	1	0	3	0	0	0	0	0	8
DA	0	0	0	0	0	1	0	1	1	0	1	2	0	1	7
ARO	0	0	0	3	1	0	0	0	1	0	0	0	0	0	5
TOTAL	101	47	66	33	66	92	64	89	53	32	63	52	57	43	858

Figure 2: Interaction Categories according to the Online Interaction Analysis Framework



1. To give opinions
2. To monitor work
3. To agree
4. To negotiate – find agreement
5. To ask a simple question
6. To explain procedures
7. To offer justification
8. To evaluate and regulate own work
9. To use unconventional graphic symbols
10. To disagree
11. To ask for clarification
12. To ask for help
13. To greet
14. To interact off-task
15. Not code

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| <ol style="list-style-type: none"><li>16. To promote confidence</li><li>17. To correct</li><li>18. To praise effort</li><li>19. To help</li><li>20. To evaluate and regulate the work of others</li></ol> |
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