



Mediated Chat 2.0

Embedding Coordination into Chat Tools

Mariano Gomes PIMENTEL, Hugo FUKS, Carlos José Pereira de LUCENA
Catholic University of Rio de Janeiro (PUC-Rio)
R. Marquês de São Vicente, 225
22453-900 - Rio de Janeiro, Brazil

Abstract. This research project investigates the coordination of debates using chat tools. In order to evaluate the Mediated Chat 2.0 tool, which implements coordination mechanisms to facilitate the application of group conversation techniques, debates were held during a distance education course using the AulaNet learningware. The logs were analyzed to evaluate how appropriately the proposed mechanisms helped during the coordination of the chat.

Keywords. Coordination, Chat tools, Conversation techniques, Groupware design and evaluation.

1. Introduction

The main objective of this research project is to investigate how to design and evaluate groupware based upon the concepts of communication [1], coordination [2], cooperation and awareness [3]. This article focuses on the embedding of coordination mechanisms into chat tools.

Textual chat tools have achieved widespread popularity and, increasingly, people want to use these tools in activities that go beyond socialization and recreation. In this research project, the use of chat tools for running synchronous debates in on-line courses was investigated. In these debates, participants frequently complained about confusion during chat sessions. The research presented in this article sought to investigate coordination mechanisms that could render better-organized chat conversations.

The theoretical bases that guide this research project are summarized in Section 2 of this article. In Section 3, the dynamics used to hold synchronous debates during a distance-learning course is discussed. In Section 4, the Mediated Chat 2.0 tool developed during this research project to facilitate the coordination of debates is presented. The experiment and its results are discussed in Section 5. Finally, conclusions about the research are presented in Section 6.

2. Collaboration, Groupware and Communication tools

In order to collaborate, an individual must debate ideas (communicate), be in tune with the other participants of the group (coordinate) and operate with others in a shared space (cooperate). Communication is successful if there is understanding of the messages, in order to ensure that the intentions of the sender result in commitments being assumed by the receiver or by both. Coordination deals with conflicts that may have emerged during

communication, and organizes the group in order to avoid the loss of communication and cooperation efforts. It also ensures that the tasks that have resulted from commitments being assumed are carried out in their correct order, at the correct time and comply with the corresponding restrictions and objectives. Cooperation is the joint operation of group members in a shared space, which seeks to ensure that the tasks being enforced through coordination are carried out. The members of a group that uses shared space obtain feedback from their actions and feed-through from the actions of their companions through awareness elements. Through them, individuals become conscious of the changes that have taken place in the environment and can redirect their actions and anticipate future requirements. The diagram in Figure 1 represents the model for collaborative work based upon these concepts [4].

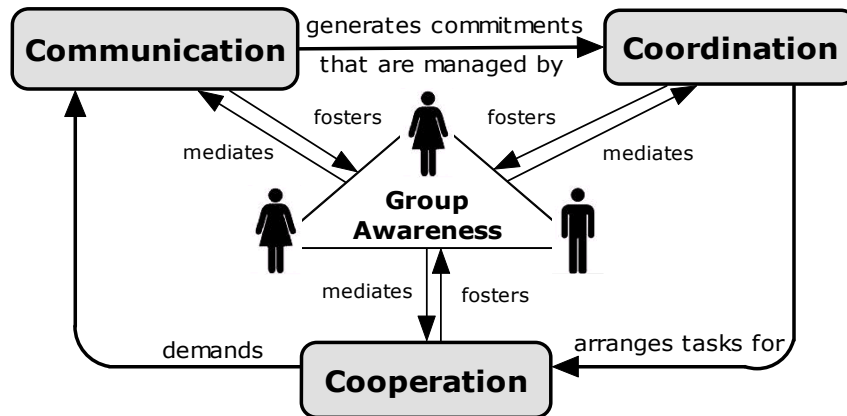


Figure 1. 3C collaboration model

Based on the key concepts of this model—communication, coordination and cooperation—groupware applications [5] are classified according to the degree of support they offer each of these concepts, being located in the triangular space shown in Figure 2 [6].

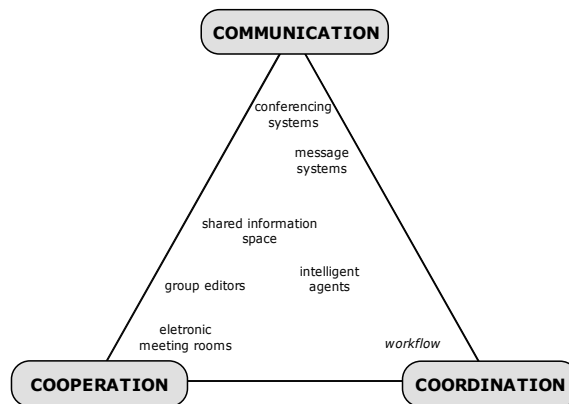


Figure 2. Classification of groupware according to the 3C collaboration model

The research presented in this article investigates the running of debates using a chat tool (a conferencing system). During this collaborative learning activity, an attempt was made to identify and reduce the problems stemming from the weak support these tools provide for conversation coordination.

3. Synchronous Debates during the ITAE

The ITAE (Information Technology Applied to Education) course [7] is a subject of the PUC-Rio Information Technology Department. As of the second semester of 1998, this course has been taught entirely at distance using the AulaNet learningware[8]. The AulaNet is an environment that is based upon a groupware approach to teaching-learning on the Web that has been under development since June 1997 by the Software Engineering Laboratory of the Catholic University of Rio de Janeiro (PUC-Rio). The AulaNet is freeware, and is available in Portuguese, English and Spanish versions at <http://www.les.inf.puc-rio.br/groupware> and <http://www.eduweb.com.br>.

TIAE is organized by topics, with one topic discussed each week. Learners must read selected content about the topic, conduct in-depth research and participate in a conference where specific questions about the topic are discussed. The conference is held over three days through the AulaNet Conferences service. This service functions as a discussion forum that makes it possible to thread and categorize messages [9]. After discussion on the Conference, the topic under discussion is concluded during a synchronous debate on the AulaNet debate service lasting approximately one hour.

The following debate dynamic is actually applied on ITAE. The mediators open the debate. Then, the moderator (a learner) presents one of the questions previously discussed in the conference; each learner sends a comment about the question; and the learners elect one comment. Based on the elected comment, a free discussion takes place. After this step, the participants summarize what was being discussed and present their conclusions. This cycle—topic presentation, statements, vote, free discussion, synthesis and conclusions—is repeated 3 times, dealing with all of the questions discussed in the conference. After the discussion of the third question, the mediators end the debate. These steps are detailed in Table 1, showing the nature of the expected messages and the tasks related to them.

Table 1. Messages expected and tasks to be carried out during the ITAE debates steps

Debate Steps	Messages expected	Tasks to be carried out
Opening the Debate	Mediator's Messages	<ul style="list-style-type: none"> Interrupt the socialization and recreation conversation. Present the topic to be discussed during the debate Indicate the learner moderator
Posing a Question	Moderator's Messages	<ul style="list-style-type: none"> Posing a question previously discussed in the conference Summarize the convergences and the controversies that emerged during the conference
Commenting on the Question	Learners' Messages, one at a time in an established sequence	<ul style="list-style-type: none"> Each learner must send a comment about the question Ensure that the learners send in their contributions respecting the established order
Voting on a Comment	Learners' Messages (no established order) indicating the statement they want to have discussed	<ul style="list-style-type: none"> Each learner must vote about what she wants to discuss Ensure that all learners vote
Presentation of the Elected Comment	Moderator's Messages	<ul style="list-style-type: none"> Count the votes Indicate which comment was elected Initiate the free discussion
Free Discussion	Contributions of all of the participants, as long as they are pertinent to the question being discussed	<ul style="list-style-type: none"> The learners must discuss the elected comment without losing sight of the scope of the discussion question The moderator must: conduct the free discussion maintaining its focus on the elected comment; ensure that the debate is neither too fast paced or monotonous; maintain order and respect; encourage everybody's participation
Synthesis and Conclusions	Contributions of all of the participants, as long as they present summaries or conclusions	<ul style="list-style-type: none"> Summarize what was discussed Present conclusions
Concluding the Debate	Mediator's Messages	<ul style="list-style-type: none"> Present general notices about the course Declare the debate concluded

4. Mediated Chat 2.0

It can be seen that the ITAE course debate is organized in steps where there are sets of tasks to be carried out following a structured conversation protocol (with the exception of the Free Discussion step). The application of this dynamic requires considerable effort in order to coordinate the participants in carrying help these steps. Nevertheless, the AulaNet chat tool Mediated Chat 1.0 (as well as the majority of the typical chat tools) does not have specific mechanisms to support such coordination. For that purpose, the Mediated Chat 2.0 tool (Figure 3), which has embedding coordination mechanisms, was developed.

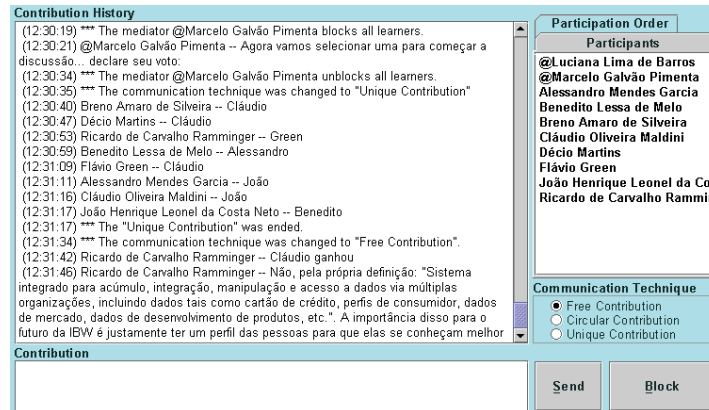


Figure 3. The Mediated Chat 2.0 tool that is part of the AulaNet Debate

The Mediated Chat 2.0 tool implements the following group conversation techniques: *Free Contribution*, where participant can send messages at any time; *Circular Contribution*, where the participants are organized in a circular queue and, one by one, the first one in the queue can send a message; and *Unique Contribution*, where each participant must send a single message at any time. It is also possible to block or unblock the sending of messages by the learners. It is expected that the new features of Mediated Chat 2.0 tool will help mediators and moderators to coordinate the debate dynamics specified for the ITAE course debates.

5. Evaluation of the Mediated Chat 2.0 tool

The debates held during the ITAE 2002.2 edition (second semester 2002) were analysed to investigate the appropriateness of the mechanisms implemented in the Mediated Chat 2.0 tool. The Mediated Chat 1.0 tool also was used into this course to establish comparisons between the coordination of debates run using these different tools. For each debate log, the steps of the debate and the messages that interrupted each step were identified. A message is identified as an interruption whenever the message is unexpected or does not carry out the proposed task as specified in Table 1.

The percentage of the interruptions during the well-defined conversation steps of the debate (all except for the Free Discussion step) provides a summarized comparison of the coordination difficulties in both of the tools. This comparison is displayed in Figure 4.

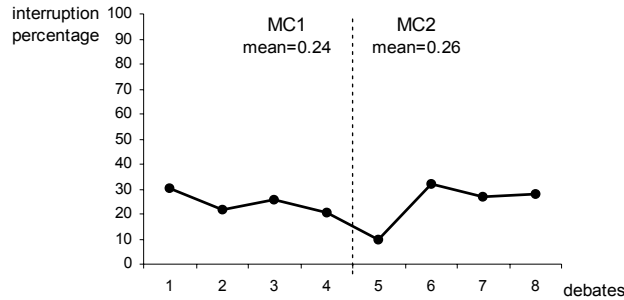


Figure 4. Percentage of interruption during the well-defined steps of ITAE 2002.2 debates

On average, about 25% of the messages in both of the tools were not appropriate to the step underway, interrupting the expected flow of messages or not carrying out the expected task. This is an indication that the coordination of the debate is a difficult task to accomplish, even with the use of the coordination mechanisms implemented in the Mediated Chat 2.0 tool.

Contrary to the initial hypothesis, the use of the coordination mechanisms implemented in the Mediated Chat 2.0 tool did not result in a significant reduction of the quantity of interruptions in the structured conversation steps of the debates. To the contrary, the percentage remained practically unchanged. However, the negation of the initial hypothesis does not indicate that the mechanisms that were implemented did not influence the coordination. In the following subsections, it will be seen that the implemented mechanisms still were not sufficient for an adequate coordination.

5.1. Steps in which only the mediator should be sending messages (best case)

In the dynamics for the debates of ITAE 2002.2 edition, there are two steps in which the interruptions were completely eliminated when the Mediated Chat 2.0 tool was used: Opening the Debate and Concluding the Debate, according to data presented in Figure 7.

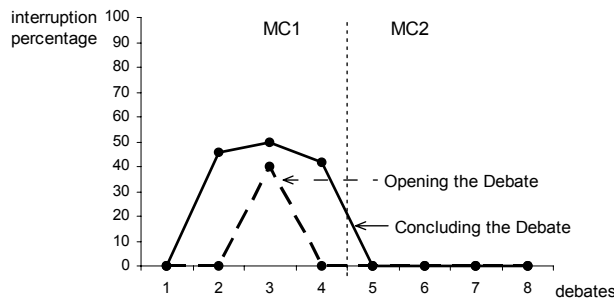


Figure 5. Frequency of interruptions that occurred in the ITAE 2002.2 edition debates during the Opening the Debate and Concluding the Debate steps

In order to carry out these steps, mediators blocked the learners, sent the opening or the concluding messages of the debate and, then, unblocked the learners. Using the blocking mechanism, mediators ensure possession of the channel for themselves; no learner can send messages while the Block button is activated. This feature was used during all of the Opening the Debate and Concluding the Debate steps, as can be seen from the analysis of the logs of the ITAE 2002.2 debates in which the Mediated Chat 2.0 was used. That concludes that this mechanism is effective and supports adequate coordination of these debate steps.

5.2. Steps in which only the moderator should send messages

In the dynamics developed for the debates in the ITAE 2002.2 edition, there are two steps during which only the moderator should send messages: Posing a Question that was previously discussed in the conference; and Presentation of the Elected Comment. The Mediated Chat 2.0 tool does not have a mechanism that lets only a given learner (the moderator) send messages. Thus, there is no way to ensure the absence of interruptions during these steps. And, in fact, they did occur in debates 6 and 8 during which the Mediated Chat 2.0 tool was used, as can be seen in Figure 6.

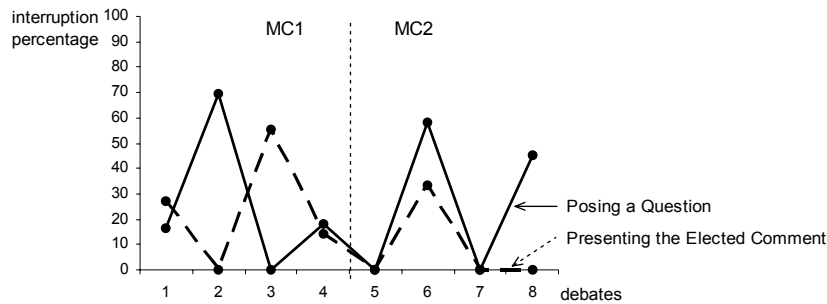


Figure 6. Frequency of the interruptions that occurred during the ITAE 2002.2 edition debates, during the Posing a Question and Presenting the Elected Comment steps

A mechanism to selectively block and unblock learners would avoid the interruptions during these two steps of the debate. Another possible solution would be the assignment of privileges to the Moderator during the debate sessions. A learner-moderator should be able to activate some coordination mechanisms; or, at least, not be blocked together with all of the other learners.

5.3. Steps during which all learners should participate only once

There are two steps when learners have to send in a unique contribution: Commenting on the Question, where learners must wait their turn to send in a comment on the currently question; and Voting on a Comment where, without a predetermined order, each learner chooses the comments she wants to see further discussed. In the Mediated Chat 2.0 tool, techniques were implemented to ensure that each learner sends only a single message: Circular Contribution, used in the Comments on the Question step; and Unique Contribution, used in the Voting on a Comment step.

Although these mechanisms ensure the turn of the learners and the sending of a single message, there is no way of guaranteeing that the learner will send a message containing the expected content. These coordination mechanisms also did not ensure that learners would actually send a message. During the use of the Circular Contribution technique, when the learner that has the floor control does not send a message, all of the other learners are blocked, making it impossible to continue the conversation technique. The same happens during the Unique Contribution technique, when one learner does not send a message. Both situations took place during the ITAE 2002.2 debates. The delay or lack of a message led the mediators to interrupt the use of the technique, generating confusion and making room for more interruptions. These problems made that no significant difference regarding interruptions could be perceived using either chat tool, as shown in Figure 7.

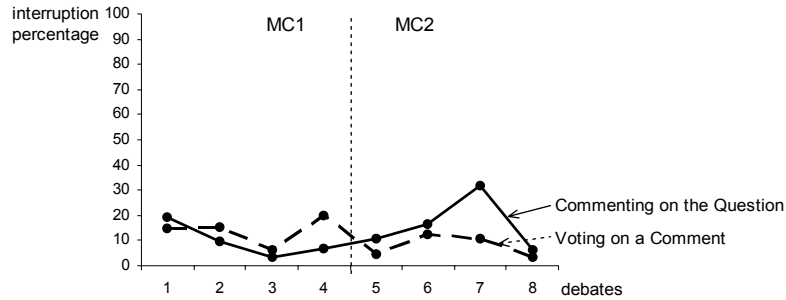


Figure 7. Frequency of interruptions occurring in the ITAE 2002.2 edition debates during the Commenting on the Question and Voting on a Comment steps

The occurrence of interruptions indicates that the Circular Contribution and Unique Contribution need to be improved. In the former case, the mediator should be able to remove a learner from the beginning of the queue. In the latter case, the mediator should be informed about who still has not sent a message. These improvements would help to adopt new strategies for coordinating these debate steps.

5.4. Step in which only one specific type of message should be sent (worst case)

The majority of interruptions occurred during the Synthesis and Conclusions step. As shown in Figure 8, on average more than 50% of the messages were not appropriate for this step. Generally, participants continued previous discussions and did not carry out the proposed activity namely, to synthesize what was discussed and present their conclusions.

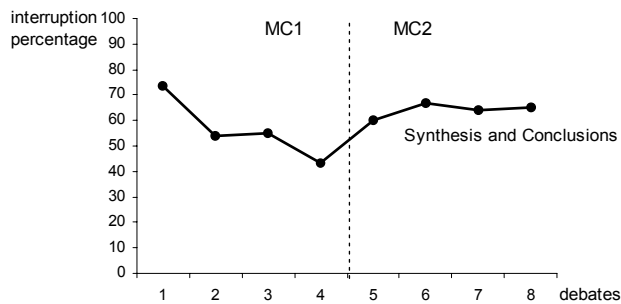


Figure 8. Frequency of interruptions occurring in the ITAE 2002.2 edition debates during the Synthesis and Conclusions step

None of the mechanisms implemented in the Mediated Chat 2.0 tool are proper for coordinating the conversation during this step. The percentage of interruptions remained practically unchanged using either chat tools.

A conversation technique denominated Mediated Contribution could facilitate the coordination of this step. Each message sent to the debate would be published or not according to mediators' analysis. This mechanism would permit proper selection of messages relevant to this debate step. Some chat tools used for conducting interviews already employ this feature.

6. Conclusion

Taking into account only the total percentage of interruptions that occurred during the ITAE 2002.2 debates (Figure 4), it is not possible to note a significant improvement in the coordination of the debates when the Mediated Chat 2.0 tool was used. The analyses of the debate steps indicated possible improvements that might solve this problem.

The use of the blocking mechanism proved to be satisfactory, according to subsection 5.3. However, a selective blocking feature would be a welcomed improvement, according to subsection 5.4. Regarding the message flow problem described in subsection 5.5, further improvements should be done on the Circular Contribution and Unique Contribution. In the former case, it should be possible to skip the silent learner. In the latter case, there should be an indication of the silent learners. Finally, according to subsection 5.6, it would be appropriate to selectively publish learners' messages using the Mediated Contribution technique.

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