Facilitate the Facilitator: Awareness Tools to Support the Moderator to Facilitate Online Discussions for Networked Learning

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Abstract

This paper is part of an ongoing European research project, called ARGUNAUT in which we present some of our findings regarding the development of online awareness indicators aimed at supporting moderators to facilitate online discussions. Firstly we discuss our theoretical orientation towards online argumentation and dialogues. This results in a multidimensional analytical framework to analyse synchronous discussions in order to develop awareness tools for the ARGUNAUT system. Secondly we present an overview of this system and in particular the moderators interface (MI). The MI will be used by the moderator to select awareness visualisations about students' discussions. The moderator can request for example various descriptive statistical information about the number and type of contributions made by students or more advanced visualisations that show live interaction patterns of the participants using social network analysis (SNA) techniques and Deep Loop classifications of contributions written by the students. The Deep Loop, is an AI-based indicator that can automatically detect for example if students are talking of / on-task, critical reasoning and question-answer patterns. This paper ends with a discussion of current discourse analysis done by our team aimed at the identification of important critical moments in the discussion that feature particular dialogic properties and might need the attention of the moderator.

Keywords

Online facilitation, synchronous, awareness,

Introduction

This paper is part of an ongoing European research project, called ARGUNAUT, in which we like to present some of our initial findings regarding the development of online awareness tools supporting the moderator to best facilitate online discussions. The ARGUNAUT system that is being developed during this project is based on synchronous learning and embeds an integrated suite of tools in order to set up and moderate synchronous disussions. The synchronous discussion are held by the students in either Digalo or Freestyler (developed at the University of Duisburg) which are tools that support online visual argumentation and dialogues. Our focus in this paper however is on the Moderators Interface (MI), which is a tool especially designed for the moderator. This tool allows moderators to log on to one or more ongoing discussions and presents the moderator a set of awareness indicators based on which the moderator can remotely (using the MI) facilitate these discussions.

The central idea behind this project is to develop these awareness indicators, using data mining techniques and artificial intelligence trained on pedagogically annotated events of teaching and learning activities in online discussions, to inform the moderator about teaching and learning activities that occur in online discussions. The challenge is to find ways in which pedagogical ideas of online argumentation, teaching and learning processes can be articulated into rules used by the awareness tools to find patterns or examples of particular networked learning behaviour that signify these rules.

In this paper we will present the use of the MI awareness indicators and some of the ongoing pedagogical research.

Facilitating online argumentation and dialogues

The conceptual pedagogical framework of the ARGUNAUT system is a combination of three main theoretical orientations. Firstly argumentation and dialogic theory; secondly we integrate these with current understandings of teaching and moderating online and thirdly we situate them both within the paradigm of social learning, which influences how we frame collaborative learning and construction of knowledge. The integration of these three aspects made us realise that we needed a multi-dimensional analytical framework to analyse synchronous discussions in order to develop awareness tools for the MI. From the argumentation point of view one might focus on the quality of critical reasoning. Dialogic theory focuses more on the multiplicity of perspectives and the creative emergence of new ways of seeing problems. Moderation aims to reflect on the impact of interventions made by the moderator to steer the discussion in a desired direction and social learning theories, in principle, focus on the level of participation and the conditions in which groups learn collectively. The analytical framework developed in this project aims to address and synthesize these different orientations in a meaningful way.

Many coding schemes used for investigating the quality of online collaborative learning have been derived from argumentation theory (see De Laat and Wegerif, 2006). This can be seen in the focus on the key moves of argumentation: claim, counter-claim, warrant, grounding etc. However there is increasing interest in real contexts of problem solving and learning, which the traditional argumentation model does always fit well. According to Chi (1997), for example, learning new concepts in science involves the 'creativity' of seeing familiar things from a new theoretical perspective. According to us, although this is not necessarily Chi's position, the capacity to shift perspective, to see things from multiple alternative points of view at once and to collaboratively construct together a new perspective all imply 'dialogic' skills. 'Dialogic' here implies not only 'pertaining to dialogue' but also that these skills relate to the fundamental nature of dialogue as the co-presence together of different perspectives (Wegerif, 2007). In the light of this Wegerif and De Laat (2006) have argued that 'higher order thinking skills' including creativity and critical thinking need to be reconceptualised as aspects of engagement in dialogue, rather than in terms of argumentation alone. This is not to do away with traditional accounts of argumentation but to expand them to include more of the dialogic context of arguments. Our argument is that the quality of dialogic engagement, or the capacity to see from more than one perspective at once, is one influence on the quality of critical thinking as well being fundamental to creativity and to learning. The challenge for our analytic framework then is how to capture the quality of dialogic engagement as this impacts on creativity and on openness to learning.
A shift towards dialogic engagement and collaborative learning argues for active student engagement with not only learning but also peer-tutoring activities. The traditional relationship between the teacher and students, where the teacher is responsible for designing and evaluating learning activities for example has changed into a more shared responsibility. Research on networked learning shows that the teacher in an online discussion environments acts as a learner and teacher (De Laat, 2006), but is mainly concerned with guiding and facilitating the group. The students on the other hand adopt or develop roles to deal with coordinating and regulating their shared group task. An important strand of research in networked learning environments is looking into the development of networked learning skills and competencies of both the teacher and students. How do they design and moderate teaching and learning activities when discussing and learning online?

Engaging in high quality online argumentation means a mixture of learning and teaching qualities providing a context in which groups of learners participate in open ended dialogues in which they challenge each others perspectives guided by a skilled moderator. Being able to see the wood from the trees we needed to cut across the various theoretical lenses combined in this project in order to develop awareness indicators to improve the quality of online discussions.

One strategy we have adopted is to analyse ARGUNAUT-based dialogues according to several different dimensions at once:

1. *Pedagogical setting and group dynamics* dimension is aimed at understanding the conditions and ways in which students are participating in their learning task. In some ways this dimension also serves as a precondition needed to contextualise the data.
2. *Critical reasoning* is focused on the more argumentative dimension present in the maps. Based on the more structured or grammatical approach used in this tradition we are concerned with how students develop the syntax of their arguments.

3. *Dialogic reasoning and engagement* dimension seeks to highlight the quality of student interaction, perspective taking and mutual engagement through the discourse
4. *Moderation* dimension describes the impact of interventions made during the online discussion aimed at moderating and facilitating the quality of the discourse.

The outcomes of this analysis serves two aims. Our first aim is to code and annotate ARGUNAUT discussions in order to develop awareness indicators used in the MI by the moderator. The aim of coding is to detect (reoccurring) patterns and actions. This is mostly done by applying a comprehensive coding scheme aimed at identifying structural argumentative and dialogical events in the synchronous discussions. These expert coded events are used to develop learned classifiers using artificial intelligence techniques (McLaren, Scheuer, De Laat, Hever, De Groot & Rose, 2007), that will be able to detect and classify these events automatically and inform the moderator. This will be done by a component called the Deep Loop. Our second aim is to advance dialogic theory and pedagogical practices of teaching and learning online.

ARGUNAUT system

The ARGUNAUT system is aimed at facilitating moderators by offering them with several awareness indicators providing feedback about ongoing events in the online discussion. For this reason the project has developed the moderators interface (MI) through which the moderator can remotely observe one or more ongoing online discussions (see figure1). The MI consists of two main components. The first being a set of awareness indicators providing visualisations of students' engagement with the online discussions. These awareness indicators are the core of this project and based on the pedagogical research (as discussed above) a set of visualisations are currently embedded in the MI. Using the MI the moderator can select a visualisation of the actual discussion graph as it is created by the students, in order to read their contributions. Furthermore the moderator can request various descriptive statistical information about the number and type of contributions made by students. More advanced visualisations for example shows live interaction patterns (see for more information De Laat, Lally, Lipponen & Simons, 2007) of the participants using social network analysis (SNA) techniques and the Deep Loop classification of contributions written by the students. The Deep Loop can automatically detect for example if students are talking of / on-task, critical reasoning and question answer patterns.

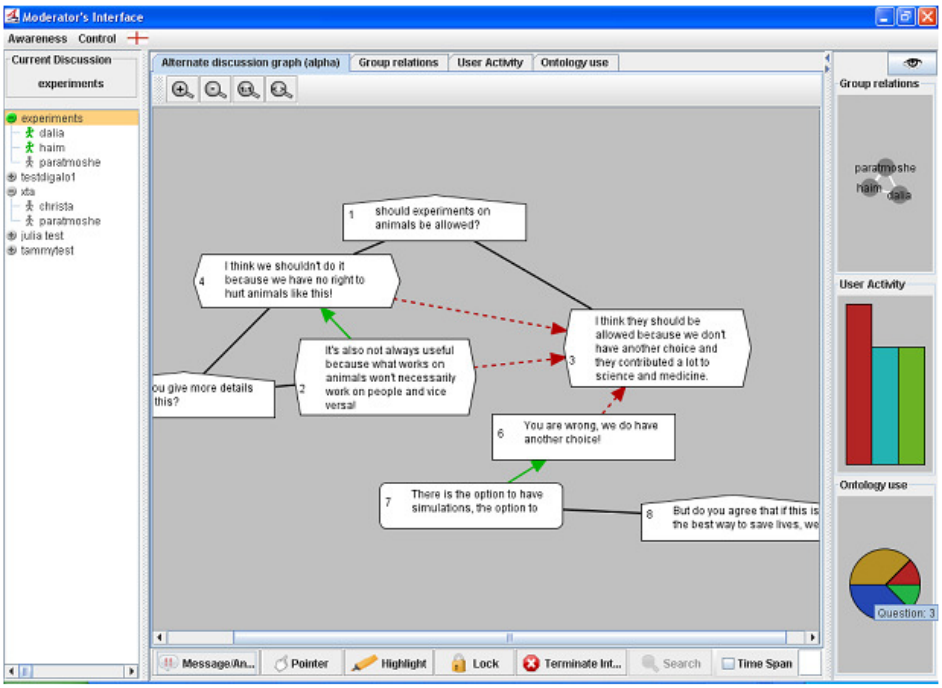

Figure 1. Screen shot of the Moderators Interface

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The moderator can not only use these visualisations to observe and interpret student behaviour and engagement with the online discussion but can also develop a set of rules based on which the MI will alert the moderator if certain events occur following the conditions set in these rules. For example the SNA tool can be used to create rules about student participation and notify the moderator if a student did not participate during the last 10 minutes for example. These rules can therefore be action-based but also directly related to the discussion content by using the Deep Loop classifiers or a set of key words as conditions.
The second component is called the remote control which can be used by the moderator to facilitate the discussion. Based on observations made or alerts received (using a set of rules) the moderator can choose to sent a pop-up message to a particular student, group of students or the entire class. The moderator can also annotate student contributions to make more in-depth comments directly related to what a student is saying. Further more the moderator can highlight messages in the discussion to direct attention to it or can use a remote pointer to point out to the students particular contributions or links featuring the discussion.

Current pedagogical research - future directions

As presented in this paper the ARGUNAUT system can facilitate the moderator in many ways, but besides pointing out content-based and behavioural aspects of the discussion we would like to push a little further and see if we are able to automatically detect critical moments in the discussion that feature particular dialogic properties and might need the attention of the moderator. Our research is currently focused at detecting patterns within the discussion that show elements of deepening and widening. These are important steps in a discussion as they on the one hand try to provide further argumentation for a perspective that is currently being discussed (deepening) on the other hand widening means an attempt to 'break away' from a particular perspective by either questioning it or presenting a new perspective. When thinking about acts of deepening and widening (critical reasoning and dialogic reasoning), from a dialogical point of view the widening moves in particular are of great interest since not much is known about how widening moves are triggered. A widening move is often a creative act, i.e. the ability to step back and come with a new 'solution' not thought of before. Such moves however are very important in discussions as they stimulate people to think 'out of the box', and or stimulate further creative thinking amongst the group members. These 'eureka' or 'aha' moments are hard to plan or moderate but should be encouraged in order to open up the discussion space into new and unknown territories providing real learning opportunities by and for its members.

In our research focused on discourse analysis we are coding single contributions as well as sequences of related messages. Our coding framework (see De Laat & Wegerif, 2007) utilises of multiple levels (*contribution, sequence of contributions, and the entire discussion map*) and multiple dimensions (*group dynamics, critical reasoning, dialogic reasoning, dialogic engagement, and moderation*). Our work has been to try and find a way to develop a coding methodology that shows some kind of continuum between the various levels. Because we are looking at dialogues one can often assume that what is said in a particular message will relate to something that is said in a previous message. For this reason we are trying to find a way where the coding at shape level will inform the coding that is done at sequence or even map level. This is a crucial step in our analysis as it determines the individual discussion threads-sequences that later on inform the analysis of emergence of critical dialogic moments in a discussion.
By sequence we mean a continuous thread of dialogue in which all messages are linked together by their content. Although it would be natural to identify these sequences by the links between different shapes, this method proved to be unreliable due to inconsistencies in using the links by the participants. The process of identifying these sequences begins for example with the opening question asked usually by the moderator, who posts the first message. In Digalo, each shape is numbered according to the order in which it has been posted (see figure 2 for an typical example of a Digalo discussion map). This order is chronological; therefore it is possible to identify the development of the map from the time perspective.

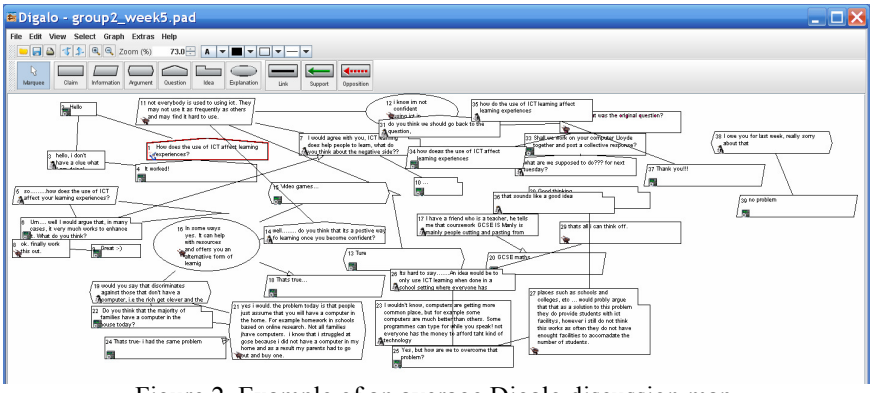

Figure 2. Example of an average Digalo discussion map

The construction of these discussions is very organic and by using the spatial and visual properties of the Digalo tool these discussion can become rather complex. When creating these sequences we try to abstract this complexity in order to create a more accessible representation of the discussion. At this point of the analysis, sequence (or tree) diagrams are created.

Sequence diagram (see figure 3 for an example) – a visual representation of an online discussion that serves the purpose of having an instant abstracted overview of the following aspects of a discussion:

1. The number and length of sequences of messages. A new sequence starts at the top representing the first contribution of this particular discussion thread followed by related (linked) contributions shown directly below this contribution in a vertical layout. When a new sequence is developed it will be placed next to existing sequences.
2. The branching of sequences at different moments during the discussion. This happens when a message in a sequence has more than one linked message.
3. Identifies messages that are not part of any sequence. They will appear isolated at the 'top line' of the diagram

Once all the contributions are coded individually, these sequence diagrams can be used to visualise the multiple dimensions of our analytical framework (*group dynamics, critical reasoning, dialogic reasoning, dialogic engagement, and moderation*). The tree can for example be used to visualise group dynamics properties of the discussion showing student engagement with the dialogues. This is shown in figure 3 which presents the interaction patterns between the students. Here each dot (signifying discussion contributions) in the tree is coloured to represent contributions made by each student. The blue dots represent student A, the yellow dots student B, etc. From this diagram it is instantly clear who is talking to whom.

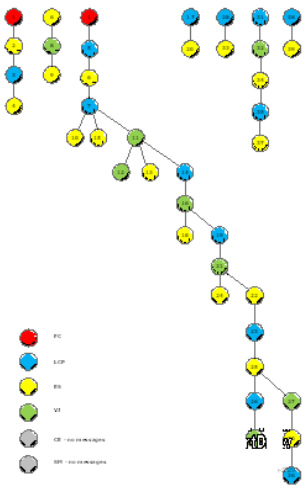

Figure 3. Group interaction patterns shown by a discussion tree-based visualisation of the Digalo map

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Our next and current step in the analysis is to detect critical dialogic moments in the discussion by mapping out previously discussed widening moves in the tree diagrams. In the tree diagram below (figure 4) the coloured dots represent opening questions (coloured blue) and disagreements (coloured red) suggesting either new perspectives or opinions being presented or sought for by the students. Our preliminary results indicate that the presentation of these widening moments coincide with branching activities in the map. Almost each time when the tree structure branches to the left, rather then directly down, it appears that participants tend to widen the discussion rather then just deepen a given perspective. This means that when finding critical moments in a discussion the moderator needs to pointed out to messages related to branching activities. Instead of having to browse through the entire map (see figure 2) our coding results suggest that the moderator can focus on the surrounding messages related to branching events in the discussion.

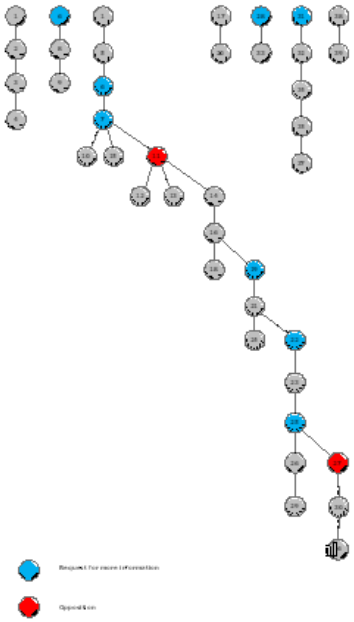

Figure 5. 'Critical' moments in the discussion

Some Concluding remarks

We need to analyse a larger data set to find out to what to extend this behaviour could be some kind of reoccurring pattern featuring the discussions. Secondly we are planning to have several critical event recall interviews with some of the students of these maps to question them about these critical moments as a way to validate (or falsify) our initial findings. This is an important step in our attempt to triangulate our findings (see De Laat & Wegerif, 2006). If branching events might be an indication of critical moments in the discussion, we need to see if can we somehow annotate these critical moments to see if they can be patterned in some way. In the ARGUNAUT project we are currently discussing with our DFKI partners about the possibility of using artificial intelligence to train classifiers that might be able to detect these critical moments based on our patterns as a way to extent the current Deep Loop features in our ARGUNAUT system. Being able to detect these moments will mean a major step forward for online moderation and student engagement in rich dialogues representing multiple alternative points of view.

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