Assessing e-moderation behavior from synchronous discussion protocols with a multi-dimensional methodology

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ARTICLE INFO

Keywords:
E-moderation
Computer-mediated communication
Peer discussions
Multi-dimensional methodology
Moderation styles

ABSTRACT

The role of the human instructor in online learning has received increasingly more attention in the e-learning literature. In the present paper we focus on the particular case of human moderation of peer-to-peer debates in educational settings. A multi-dimensional methodology is proposed to identify and characterize different moderation styles in such settings. The method triangulates superficial and qualitative features of both moderation actions as well as the discussion as a whole. The application of this methodology to a sample of synchronous group discussions moderated by assigned peer moderators yielded five distinctively different moderation styles: A scaffolding, an orchestrating, an authoritative, an observing and a participative style. Implications and limitations of the coding methodology are discussed, as well as future directions for research and methodology development.

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1. Introduction

Many tutors and teachers are asked to contribute to their institution’s online courses or to blend their face-to-face teaching practices with computer-mediated activities. Unfortunately, however, many of these lack the appropriate background or do not have any experience with online instruction. As mentioned by Bennet and March (2002: 15), most of these online moderators “(...) are literally being asked to run before they can walk”. In addition, it has been argued that research on e-learning too often focuses on the human instructor in online learning processes (e.g., Lentell & O’Rourke, 2004; McPherson & Nunes, 2004). This lack of attention has changed in the last decade or so, during which various publications have appeared that offer pedagogical frameworks for e-moderators (e.g., Berge, 1995; Collison, Elbaum, Haavind, & Tinher, 2000; Duggleby, 2000; Goodyear, Salmon, Spector, Steeples, & Tickner, 2001; Palloff & Pratt, 2001; Salmon, 2000). Most of these frameworks are based on personal reflections and extensive personal experience from e-course development in post-secondary education settings. They generally aim to conceptualize the role of the human tutor in distant, online learning and provide helpful guidelines for newcomers to the field. They are therefore an important step forward. However, even though the number of research-based works is rapidly growing (e.g., Anderson, Rourke, Garrison, & Archer, 2001; Asterhan & Schwarz, 2010; Hlapanis, Kordaki, & Dimitriakopoulou, 2006; Katz & O’Donnell, 1999; Lakkala, Muukkonen, Ilomaki, Niemiverta, & Hakkarainen, 2001; Lim & Cheah, 2003; Mazzolini & Maddison, 2003; Packham, Jones, Thomas, & Miller, 2006; Schwarz & Asterhan, in press) empirical research on e-moderation practices is still relatively sparse. The present study hopes to contribute to this growing body of literature, by discussing several methodological issues in assessing moderation behavior in online, synchronous discussion environments and by presenting a multi-dimensional scheme that aims to assess, identify and categorize different aspects of human moderation of group discussions. This methodology will then be used to analyze and characterize the moderation practices of five different assigned peer moderators in a synchronous discussion environment.

In their attempts to successfully guide and moderate peer discussions in learning settings, moderators have to solve questions concerning how much, how and when they should intervene in the discussion. The empirical literature has mainly focused on the first two: How much moderation is enough and what type of interventions do moderators enact?

1.1. The frequency of interventions: How much is enough?

First of all, online instructors have to work out how much to intervene in students’ discussions in order to ensure a fruitful, yet critical discussion, without actually taking over in the process. The instructor’s role in asynchronous discussion forums can vary from being the ‘sage on the stage’, to the ‘guide on the side’ or even ‘the ghost in the wings’ (Mazzolini & Maddison, 2003). Discussion in the literature generally suggests that it is important that instructors play an active, visible part in online discussions, especially in
distant, asynchronous settings (Berge, 1995; Salmon, 2000; Salmon & Giles, 1997). Still, too much tutor intervention may dampen students’ motivation to actively participate. Mazzolini and Maddison (2003), for instance, showed that the number of postings contributed by the e-tutor was negatively related with length of discussions in an asynchronous discussion board environment. Similar findings have also been reported from face-to-face settings (Hogan, Nastasi, & Pressley, 2000). A mere focus on frequency and timing of the instructor posts is therefore not sufficient. However, the Mazzolini and Maddison study (2003) failed to take in account one important aspect of e-moderation, namely: The content of different tutor interventions. The relation between frequency of moderation interventions and student participation is likely to be conditioned by the type of interventions that were enacted. For example, interventions that contain direct tutor-centered pedagogical support (i.e., tutor solved the issue and revealed the “correct” answers) may shorten discussions, whereas those that aim to increase interaction and responsiveness between participants may lead to longer discussions. To accurately characterize moderation practices the content and function of each tutor-discussant(s) communication as well as their timing within the on-going discussion should be taken into account.

1.2. Content of moderator interventions: What type of student actions is supported?

The role of the e-tutor or the e-moderator of e-learning is a complicated one. Many authors have emphasized the multi-functional task of e-moderation and distinguished between the different roles and responsibilities an e-moderator has to fulfill at once (e.g., Anderson et al., 2001; Berge, 1995; Goodyear et al., 2001; Packham et al., 2006). Their exact number and their respective specifications somewhat vary among researchers however (see for example, Denise, Watland, Pirotte, & Verday, 2004). Lund (2004) reviewed and summarized many of these different distinctions and definitions, and proposed the following taxonomy of human support in computer-supported collaborative learning settings: Pedagogical support aims at the students’ learning, whether in terms of content or thinking skills, by providing factual information, scaffolding reasoning and knowledge construction, controlling the focus of attention, providing explanations, and so on (Lund, 2004, see also Ashton, Roberts, & Teles, 1999). Social support focuses on the social relations between the discussants, on student motivation and on maintaining a pleasant atmosphere. Interaction support, on the other hand, aims at ensuring that students participate, are responsive to each other and do not overlap each others’ contributions. Finally, managerial support focuses on task design, completion and monitoring and technical support aims at detecting operational and technical difficulties with the software and providing help accordingly.

1.3. Goals of the present work

The literature review presented here shows that different theorists and researchers have focused on different features of e-moderation behavior. However, these dimensions have often been used in isolation. Moreover, many of these, such as verbal content, have rarely been developed into coding categories that can reliably be identified and quantified from online discussion protocols. Our first goal is then to develop a coding scheme that capitalizes on these distinctions and examines whether these can be reliably quantified and triangulated in a multi-dimensional coding scheme. Second, we will illustrate how such a scheme may be applied to identify different e-moderation styles of synchronous peer-to-peer discussions. Prior to presenting the coding scheme, the development process and the results of its application, we first present detailed information on the type of data that was collected and the settings in which this was achieved.

2. Data collection procedures

2.1. Participants

Twenty graduate students at the Hebrew university (15 discussants and 5 assigned tutor moderators) that participated in a course on technology-enhanced instruction. Students learned about the role of the teacher in preparing activities (learning scenarios, cases, etc.) and in intervening during activities. Prior to the e-discussions, the lecturer explained the importance of adhering to ground rules for civil, rational peer discussions (Mercer, 1996). The course was delivered at the School of Education. All the assigned moderators were in-service teachers. Therefore, while this population was chosen for reasons of commodity (it is easier to enroll students, to train them to use CSCL tools and to moderate e-discussions), observing these in-service teachers was instructive for e-moderation of the general population of teachers.

2.2. Communication software

The discussions were conducted in the Digalo discussion environment (freely available to the public at http://www.argonaut.org). This diagram-based discussion tool enables the management of argumentative discussions and the representation of argumentative processes and components among participants. Group discussions in Digalo consists of co-creating maps that consist of textual contributions inside geometrical shapes and are linked with different arrows that represent different relations between the contribution shapes (supporting, opposing or neutral). The output from this activity is then a collaboratively constructed argumentative diagram (see Figs. 1 and 2). Each discussant works on a personal computer and sees the display of the on-going argumentative map while constructing his/her own contribution. The different geometrical shapes constitute the ontology that specifies and constrains the kinds of argumentative moves discussants choose during their discussions. The palette of ontology labels and shapes that discussants have to choose from is determined by the teacher, before the start of the session. In the present study, the array of ontology labels students could choose from were “idea”, “claim”, “explanation”, “argument”, “comment”, and “question”. Together with the three different types of arrows, this ontology covered various kinds of argumentative moves.

Figs. 1 and 2 show two moderated discussion maps of two different groups.

In these maps, the upper bar displays the pallet of tagged shapes to be chosen from. The lower left window displays the icons of the four discussants that are attached to each shape in the map. The wizard icon is reserved for the discussion moderator. Discussants may write the title of their contribution in the title rubric (visible at all times). The content of their contribution is visible when hovering over a shape or by opening a shape by double-clicking on it.

2.3. Procedure

From the total of 20 course participants, five in-service teachers were chosen to moderate the discussions, based on their involvement in class activities and academic achievement. We informed these teacher students in advance that they would fulfill the role of moderators in the following class. Each was instructed to moderate as s/he saw fit. Five discussant groups were formed from the fifteen remaining course participants, so that they were equally...
heterogeneous with regards to social status and academic achievement of the different group members (group size was 3). The discussants were presented with an example-based educational dilemma, namely whether to give a price of excellence for school achievements to a certain student whose marks are outstanding, but who has shown a certain undesirable social behavior. The
participants in each group were given a choice between several discussant roles: School principal, teacher, or school counselor. Each group was instructed to reach an agreed-upon solution to the dilemma presented in the task. The lecturer and a teaching assistant were present to provide operational and/or technical assistance. The Digalo discussions ranged from 50 to 69 min.

The discussions yielded five Digalo discussion maps. Figs. 1 and 2 display two of these maps. As aforementioned, every shape represents a posted discussion contribution. The links between the shapes show the rhetoric relationship between the contributions (support, opposition, [neutral] reference). The darkened shapes represent the contributions of the moderator. The maps in Figs. 1 and 2 show two very different types of discussions. In the map in Fig. 1, the moderator intervened only at the end of the discussion when the group had to decide on the solution to the problem. In the map in Fig. 2, on the other hand, the moderator intervened nine times during the discussion. However, although the moderator linked his contribution to the participants, on six occasions no one reacted.

As aforementioned, the main aim of the current paper is to develop a coding scheme to assess potentially crucial features of online moderation practices of synchronous discussions in instructional settings. We then first describe the development process in detail and present the different coding issues that arose during this procedure. The resulting coding scheme was then applied to characterize the moderation practice of each of the five facilitators by triangulating the different quantitative and qualitative features. The results from that application process are reported in a separate section.

3. Developing a coding scheme

The literature review presented at the beginning of this paper showed that different theorists and researchers have focused on different aspects of e-moderation behavior. We distinguish here between superficial and qualitative features of the protocol content, based on the distinction that the latter requires a human coder’s interpretation (such as in analyzing of free textual content), whereas the latter does not.

3.1. Superficial features of moderation behavior

In quantitative research, the most frequently featured dimension is the frequency of moderator moves during a discussion session. Frequency of moderator contributions in a session represents his/her extent of participation, either in general (raw frequency) or relative to the total number of contributions in a session (relative frequency). However, discussion environments that have been particularly developed for educational settings often require users to label the nature of their discussion contribution, by choosing from an existing pallet of options. In the Digalo environment, for example, users are often asked to choose from options such as “argument”, “question”, “explanation”, “idea”, “information” and “claim”. These labels carry potentially important information for identifying different moderation behaviors. For example, frequent moderator use of “idea” and “explanation” labels may be indicative of a more directive, didactic style of intervention, according to which the moderator answers questions, provides explanations and directly steers students towards certain ideas. Use of “argument” and “claim”, on the other hand may be indicative of a very involved style of participation, according to which the moderator actively participates in the argumentative discussion as a regular discussant which reveals his/her personal opinions and tries to persuade others to his/her side. Therefore, in the current scheme it was decided to count not only the total and relative frequency of moderator contributions, but to also break this down by type of ontology label.

In a similar vein, the raw and relative number of links created by moderators was taken into account. As in other diagram-based discussion environments, such as jigaDREW (Lund, Molinari, Séjourné, & Baker, 2007), and Knowledge Forum (Scardamalia & Bereiter, 2006) Digalo participants can draw links between any two contributions. Therefore, mere link frequency is indicative of participation. Moreover, in Digalo a link represents a certain relation between two contributions (opposing, supporting, neutral) which is chosen by its creator. Using many opposing and supporting links may thus be indicative of a more involved moderation style, in which the moderator is defending and encouraging a certain stance within the discussion. Vice versa, use of neutral links may be more representative of an impartial moderation style.

In addition to the frequency and type of moderator participation, the temporal dimension of participation may be indicative of moderation style as well. De Laat, Lally, Lipponen & Simons (2007) already mentioned that traditional methods for online communication analyses often ignore the temporal dimension of student interaction processes. Prescriptive models for e-moderation, on the other hand, often describe effective moderation of e-courses as occurring in different stages that serve different goals, with stages that focus on socialization and motivation preceding the more instructionally focused stages (e.g., Salmon, 2000). In comparison, synchronous e-discussions are much shorter and immediate in nature. Even so, it is likely that the temporal distribution of moderator contributions during the course of a discussion may represent differences in moderation styles. For example, a moderator that prefers that students will explore their own ideas without too much intervening, may be more likely to contribute only in the end of the discussion, to encourage them to come to a common solution or closure. An even distribution on the other hand is characteristic of more active moderation styles.

Finally, we also take into account the extent to which students were responsive to moderator contributions. Whereas this is not a characteristic of moderation style itself, it is an indicator of its impact on student discussants and of how they perceive and relate to the moderator interventions. It is operationally defined as the percentage of textual moderator contributions that were posted during the discussion session (not including link to the initial discussion question) and received at least one direct response from a discussant.

In sum, the superficial discussion protocol features that are expected to provide useful information on moderation behavior and therefore included in the multi-dimensional coding scheme, are as follows: Total and relative frequency of textual contributions and links created by a moderator, the relative distribution of type of shapes (ontology labels) and links, temporal distribution of textual moderator contributions, and discussants’ reciprocity to moderator contributions. Table 1 presents the outcomes of applying these coding categories to the five online discussion protocols that were collected as part of the present study.

The data in Table 1 reveals that, in contrast to face-to-face classroom discussions in which teachers are usually very active (Mercer, 1996), the majority of the contributions and links in the discussion maps are created by the discussants and not by the moderator. The percentage of moderator contributions out of the total number ranged from 5% to 32% for the shape creations, and from 15% to 29% for the link creations. The types of shapes used by the moderators were not uniform across groups. Whereas this is also true for the types of links, the majority of links were of the neutral type, which is typical of a moderator that is careful not to manifest his/her own personal standpoint in the discussion. This inter-group variance was also characteristic of the types of moves each moderator enacted and the temporal distribution.
Students’ responsiveness to the moderator’s contributions was relatively low overall: The percentage of moderator moves they responded to did not exceed 37%.

3.2. Content analysis of moderator contributions

In this section, we describe our attempts to characterize and categorize the moderation actions according to the textual content of the assigned moderators’ contributions in the discussion maps. The unit of analysis chosen for this analysis constitutes a conversation turn. In the current environment a conversation turn is defined as the text within a discussion map contribution, that is: Within a geometrical shape. The coding scheme for analyzing the content of moderator contributions was developed and validated according to a procedure similar to the verbal analysis method suggested by Chi (1997):

(1) A thorough reading of the protocols to examine them for moderator contributions that are and that are not in line with the five different moderation dimensions of moderation suggested by Lund (2004), and to develop a method of coding to capture these impressions. (2) This was followed by a period of coding scheme refinement during which two human raters (the author and a research assistant) independently coded the moderator contributions, compared outcomes, discussed disagreements and fine-tuned the scheme accordingly. (3) The entire corpus was then independently coded by a third rater and inter-rater reliability was calculated (Cohen’s $\kappa = .90$, $p < .001$). Disagreements were resolved through discussion.

This procedure yielded a total of five different moderator action categories, which are summarized in Table 2.

3.2.1. Pedagogical scaffolding support

According to Lund’s distinctions, pedagogical support aims at improving students’ learning, for example by providing factual information, scaffolding reasoning and knowledge construction and providing explanations. Asterhan and Schwarz (2010) posited that these can be further divided into direct pedagogical support, such as providing correct explanations and giving factual information, and indirect support, such as attempts to scaffold students’ reasoning and knowledge building. We refer to the latter as pedagogical scaffolding support. Overall, we found five instance of this type of moderator moves in our sample. Examples of such scaffolding moves are: “Can you please justify your case?” (group 1, contribution # 6) or “In your opinion, is it enough that Shai [the student whose marks are outstanding, but that has shown some undesirable social behavior] excels in learning? What about social value and social relationships?” (group 2, contribution # 8). Characteristic of these scaffolding moves is that they were all directed at an individual shape or student and therefore attempted to cause an individual student to further develop and elaborate on his/her own reasoning.

3.2.2. Interaction support

This category includes overt attempts by the moderator to direct the social interaction by encouraging students to participate more frequently and to be responsive to each other. Four moderator contributions were identified as belonging to this category. Typical moderator’s interventions of this sort are, for example, “Girls, what’s up? You should express your opinion” (group 1, contribution # 4) and ‘Principal, a question was asked, please answer it” (group 1, contribution # 16). As is clear from the two examples, they can be directed at the group as a whole or to an individual student.

3.2.3. Managerial support

This type of support focuses on task design, task completion and task monitoring (Lund, 2004). In the particular type of settings that

Table 1
Superficial features of moderation behavior in the five different discussion protocols.

<table>
<thead>
<tr>
<th>Moderation feature</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of map contributions created by moderator</td>
<td>8</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Percentage of total map contributions created by moderator</td>
<td>32</td>
<td>23</td>
<td>5</td>
<td>24</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 2
Types of moderator moves, based on content analysis of textual contributions.

<table>
<thead>
<tr>
<th>Coding category</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedagogical scaffolding</td>
<td>1</td>
<td>4</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Interaction support</td>
<td>4</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Managerial support</td>
<td>2</td>
<td>–</td>
<td>1</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Involved discussant</td>
<td>–</td>
<td>3</td>
<td>–</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Moving forward</td>
<td>1</td>
<td>1</td>
<td>–</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* Time intervals defined as the first (beginning), second (middle) and final (end) third of the total duration of a particular Digalo discussion.
we focus on here (co-located, synchronous, small-group discussions) managerial support during group discussions was mainly manifested in the form of moves that aimed at task completion. Four instances of managerial moves were detected: In one instance a moderator drew students’ attention towards the proper choice of ontology and in three others the moderators summarized the discussion and/or the commonly reached decision. The posting of the initial discussion question at the beginning of each discussion is also a managerial move. However since the question content and its posting was identical in each of the five discussion sessions and a given of the study design, we did not include them in the analyses if this study. The managerial moves then focused on task completion in accordance with the instructions that were given beforehand. 

There were several aspects of Lund’s description of managerial support that could not be assessed in the protocols collected, which can be attributed to the specific settings or the specific data collection procedure. For example, we did not have access to data showing which of the contributions were read by moderators during the course of the session. The reading of and browsing through different discussion contributions could be regarded as an aspect of non-intrusive monitoring. However, most discussion software do not log these behaviors, not in the least because reading textual contributions often does not require a key stroke or mouse movement to do so. Also, since we focused on the moderation during the discussion itself only, management actions that relate to the design of the task and therefore occurred prior to the discussion session itself were not assessed here either. In co-located synchronous settings, it is clear that a teacher or tutor makes a lot of face-to-face preparatory moves prior to the discussion session, actions that are not logged in the digital discussion environment. These involve among others, designing the task, arranging student seating and group formation, instilling ground rules for productive discussions, and compiling the palette of ontology labels students can choose from.

3.2.4. Moving forward

In four additional contributions moderators proposed a compromise or introduced a new perspective to the dilemma the group was asked to solve. They were posted after the discussion had been going on for some time and it seemed to have reached some sort of impasse, such as when discussants from opposite sides of the debate were unable to convince each other or, vice versa, when there was a strong consensus on a certain solution pathway without considering alternative perspectives. For example, the discussants in group 1 were strongly divided between giving and not giving the particular student the award of excellence. Each side provided strong and convincing arguments in favor and against presenting the award, and at a certain point students were repeating these arguments without moving the discussion further ahead or coming closer to a solution. The moderator then intervened and proposed a creative solution that allowed for a compromise between these two sides: “How about handing out two awards, one for academic excellence and one to another kid for social achievements?” (group 1, contribution # 30).

This type of moves cannot be assigned exclusively to any of the existing categories proposed by Lund (2004). They are different from managerial moves, since they do not summarize the views proposed during the discussion; instead they add something new and creative to the discussion that allows students to move forward and beyond the impasse. And even though they contain some elements of scaffolding (i.e., by improving the group level of reasoning quality), we feel that such moves should be separately assessed, since their primary intention is to create a pivotal turn in the discussion, either by integrating the different viewpoint into a compromise or by opening up a new direction in the discussion.

3.2.5. Involved participation

This category includes the discussion contributions posted by moderators in which it is clear that they do not provide any explicit support, but instead participate as equal-status discussants, by arguing with the others and articulating their own personal opinion. This occurred in five of the total of 32 moderator contributions included in the protocols. For example, one moderator wrote “That’s not true. Have you forgotten all the problems he caused?” (group 4, contribution # 34) and “I can see that you guys are trying to aggravate me. Well, let me make it easy for you: I do not think that he should receive the award” (group 4, contribution # 23).

3.2.6. Missing categories

In the present data, we did not find evidence of what Lund termed social support and technical support. Lack of evidence for the latter is not surprising, given that the settings were co-located and the teacher and teacher assistant could provide technical support on the spot, if needed. However, the reason for not finding distinctive instances of social support has a different origin. As aforementioned, acts of social support aim to create and sustain a pleasant, supportive atmosphere and to improve student motivation. The importance of this type of support has been particularly emphasized in models of distributed e-learning, such as in e-courses, with some models even dedicating separate stages of socialization, motivation and community building activities (e.g., Salmon, 2000). However, in blended learning models, and in particular when computer-mediated activities are embedded in regular, face-to-face classroom settings, socialization and community building are more likely to be accomplished in the everyday face-to-face activities. Going into the activity, students and teachers already are familiar with each other, share a common history and have a set of social norms and values. In such settings, specific stages of socialization and motivation or direct, distinctive moves of social support are therefore less likely to occur in through digital communication channels, since they are a given feature of the overall setting. Having said that, however, it is possible that social support in co-located, synchronous moderation is manifested through more subtle means. For example, social support could be conveyed through the phrasing of a certain intervention (in a more supportive rather than a direct manner) or as nested within a different move. This is evident in the following contribution by group 2’s moderator: “You raised good points, but are you sure that they are ‘explanations’?” (contribution # 34). Whereas the overall aim of this contribution is to improve a person’s understanding of reasoning ontology (suggesting that the student should consider another ontological label for his contribution) and the first part of the sentence (“You raised good points”) could technically have been left out. However, its addition serves goals of social support by acknowledging the moderator’s esteem of the student’s contributions in public. In addition to leaving out the first part of the sentence, the moderator could have also phrased her intervention more directly, such as in “Please change the ontology label of your contribution”, instead of using the phrase “are you sure that”. The way in which the request is phrased is less directive and intrusive, and it expresses a greater respect for student autonomy.

In sum, no instances of distinct social support were detected at the conversation turn level, even though we acknowledge that social support may have been expressed in other, more subtle ways. We will further discuss the implications of this finding in the Discussion section. In the next section, we will illustrate how the combination of these qualitative and superficial discussion and moderation features may be used to identify differences in moderation styles.
4. Applying the coding scheme to identify moderation profiles

The application of the multi-method coding scheme presented in the previous section to the moderated discussion maps that were collected, yielded the identification of five distinctively different moderation profiles. These styles were the outcome of integrating the data on all of the different quantitative and qualitative dimensions discussed (see Tables 1 and 2). A discussion of each type of moderation profile is presented separately.

4.1. Moderation as orchestrating

The moderator in the first discussion group was relatively active throughout the discussion. Six out of the eight moves were characterized by interaction or managerial support in which the moderator encouraged discussants to participate. In this particular discussion no text was used to direct the flow of interaction from one participant to another, but rather the moves were directed to the group discussion. The moderator asked questions to arrange graphical moves on the screen to prevent their overlap. For example, in contribution # 4, the moderator wrote “Girls, what’s up? You should express your opinion”. In this move, the moderator encouraged the group toward action, but did not elicit any further interaction between him/herself and the group. However, in light of the type of contributions this type of moderator posted, it is hardly surprising: For example, in contribution # 6, the moderator wrote “If you have a suggestion for a move, then please express it”. In this move, the moderator encouraged the group toward action, but did not elicit any further interaction between him/herself and the group. However, in light of the type of contributions this type of moderator posted, it is hardly surprising: For example, in contribution # 7, the moderator wrote “We, therefore, refer to this type of (absence of) moderation as an ignored style which

Table 1 shows that for this orchestrating style of moderation, most of the moderator’s contributions remained unanswered. However, in light of the type of contributions that this type of moderator posted, this is hardly surprising: For example, in contribution # 4, the moderator wrote “Girls, what’s up? You should express your opinion”. In this move, the moderator encouraged the group toward action, but did not elicit any further interaction between him/herself and the group. In contribution 13, the moderator wrote “Girls, try to make your shapes smaller, so we can read your message easier”. This kind of moderating action is aimed at drawing the group’s attention to improve visual organization of the discussion map.

Such prompts aim to orchestrate the interactional and organizational aspects of discussion and, as such, are not intended to elicit direct, reciprocal interaction with the moderator. In this particular discussion, only once did the moderator ask for an argument following an unresolved claim (a scaffolding move): In contribution 3, a student wrote “In my opinion, Shai does not deserve the title of Excellent Student”. The moderator asked her subsequently “Could you give a reason for your opinion?”, but no response was received. In summary, in the case of this e-discussion, the lack of student–moderator reciprocity is natural since the overall aim of this orchestrating style seems to direct the flow of interaction from a distance, without active participation in content-related aspects of the discussion.

4.2. Scaffolding reasoning

The moderator in group 2 was also active throughout the discussion. However, the types of moves he enacted testify of a different moderation style: Four out of the eight moderator moves were identified as scaffolding interventions for reasoning and knowledge building. For example, the moderator wrote “You raised good points, but are you sure that they are “explanations”? (contribution # 34) or “I am sure that your idea is interesting, but could you please rephrase and explain your idea?” (contribution # 38). However, she did not restrain herself to scaffolding moves, since in three different shape contributions she actively took part in the discussion and revealed her personal opinion. In addition, in contribution # 28 she proposes a compromise to the different participants, which is then picked up and further developed by the others.

Only one of the four scaffolding moves received responses from participants. Interestingly, this particular contribution evoked a total of five responses: In contribution 8 the moderator asks the following questions: “Do you think that it is enough that Shai excelled in his studies? What about social values and interpersonal relationship?” This moderator intervention elicited, for example, the following responses by Dina: “I am for it (to honor Shai with the award), and what do you think of the idea?” (contribution # 15). Maria, on the other hand, posted the following two contributions in response: “[We] come to school not only to study, but also to develop and construct personality.. .” (contribution # 17) and “As a counselor, I think he deserves the prize, not because of the learning issue, but rather due to his influence in the social-personal domain” (contribution # 19).

The low responsiveness to scaffolding moderation is surprising and troubling, since they are expected and intended to elicit direct responses. Following the session, we conducted a reflective group discussion with the participants. It revealed that the discussion was rather superficial and that they often overlooked the moderator’s contributions and that they found it difficult to distinguish between the different roles (i.e., the educational personas they played and the moderator’s role). It seems then that the combination of a concurrent flow of information from various speakers and the additional constraints that were placed on the discussion caused an overload, which, among others, caused difficulties to relate to the moderator interventions.

4.3. Involved participation

The moderator in group 4, in contrast, behaved as a regular participant in the discussion. His contributions to the discussion did not reflect his specific, instructive role in the discussion at all. We termed this (lack of) moderation as an involved style which was characterized by the following features: In five of the total of seven contributions this moderator actively stated his/her opinion (“involved discussant”), whereas in the other he proposed a compromise (contribution # 26) and summarized the discussion (contribution # 35). The discussion did not include any attempts to scaffold students’ quality of reasoning or to direct the interaction. This involved style was also reflected in the choice of shape and link types (see Table 2). Moreover, unlike the first two moderators, he was mostly active in the middle phase of the discussion.

4.4. Moderation as observation

The moderators in groups 3 and 5 were rather inactive. They only created 1 and 3 textual contributions and 6 and 3 links, respectively. The moderator moves were all enacted at the end of the discussion. The group 3 moderator only summarized the group decision concerning the educational dilemma at the end of the discussion: “The group decision is to not allow the award of excellence to Shai” (shape no. 23). The six links she created were all between different discussants’ shapes. This seems to indicate that in spite of the lack of textual proof of involvement throughout the discussion, she was in fact monitoring the discussion and its content. We, therefore, refer to this type of (absence of) moderation as observing.

4.5. Authoritative moderation

Whereas the group 5 moderator was also inactive for the most of the discussion, the three moves she made towards the end of the discussion were of an entirely different nature than from the group 3 moderator: She allowed the discussants to present their views,
yet towards the end of the discussion she proposed a compromise (contribution # 23) by suggesting that they should come to a common decision concerning clearly defined criteria for awarding prices of excellence. However, when one of the discussant commented that it is too late for that, she enacted an involved move, by insisting that she is convinced that this is the correct way of solving the dilemma (Argument, contribution # 27). In contribution # 29, she used her authority in order to impose her solution: “I think that the teachers should propose a list of recommended children for getting the award and we will vote for appropriate students from the list”. This moderation style is, therefore, termed authoritative.

5. General discussion

The focus of the present paper has been on the development of a methodology to study and characterize e-moderation of small-group debates in educational settings. It was suggested that in order to adequately capture and assess e-moderation behavior, a multi-dimensional approach is needed that triangulates superficial and qualitative features of moderation actions. A number of dimensions were identified from the literature as potentially relevant for studying moderation behavior: Content analysis of moderator’s textual communication, frequency of participation, temporal distribution of participation, and choice of contribution and link labels. We then proposed a multi-dimensional coding scheme in which these features were translated into separately quantifiable and reliable coding categories. A potential way of using this scheme was then illustrated by applying it to a set of five moderated discussion protocols that were collected from a synchronous discussion environment and situated in a higher education, co-located classroom setting.

Overall, the combination of the different qualitative and superficial discussion features proved to be quiet helpful in the identification of several distinctively different moderation profiles: Only two moderators were found to have adopted a moderation style that actively aimed at guiding the discussion, either by orchestrating the social interaction or by scaffolding knowledge and reasoning. The other three were either mostly inactive (i.e., adopting an authoritative or observing style) or acted as regular, equal-status discussant participants (involved style). It is clear that the five profiles that were discerned here do not represent the full range of moderation styles, nor was this our intention. The main goal was to test and illustrate the newly developed framework of analysis. It would be interesting, however, to explore the moderation styles of a different group of e-moderators with slightly different student–teacher role definitions (such as high-school teachers and students, instead of assigned adult peer moderators) and compare our findings with them.

In the remainder of this concluding section, we will discuss the coding scheme and the methodological issues that arose during its development and application. We conclude by delineating future directions for research and development.

Whereas previous quantitative studies have mainly focused on superficial behavior features such as frequency of interventions (e.g., Mazzolini & Maddison, 2003) and content analyses of moderation behavior have mainly been qualitative in nature (e.g., Hlapanis et al., 2006), the present study shows that the content of textual moderator actions can be reliably coded along the lines of commonly accepted distinctions and that they can be successfully combined with other, more superficial features of the interaction. We distinguished between the following different types of moderation moves in electronic debates: Pedagogical scaffolding, interaction support, managerial support, involved participation, moving forward. Technical support was not found to be a relevant category in synchronous discussion protocols, but this type of support could have been provided off-line or prior to the start of the session.

The application of the coding scheme first and foremost proved the importance of analyzing the verbal content of moderator actions in order to characterize moderation styles: Of all the different dimensions included in the coding scheme, the content analyses proved to be the most decisive in determining the moderation style within a given session. The other, more superficial features of moderation behavior were generally in alignment with the content analyses and therefore further strengthened the initial identification of a moderation style through content analyses. For example, an orchestrating moderation style which predominantly included managerial and interaction support moves, was also characterized by high frequency of participation, even distribution of participation throughout the discussion, use of neutral shapes and links and low student reciprocity.

Overall, the ontology labels that moderators chose for their textual interventions (e.g., Idea, Claim, Argument) proved to be the least useful for characterizing and identifying moderation styles. Even though in principle, the choice of a certain label over another could potentially provide useful information about the moderator’s intentions, in reality moderators may not be so distinctive in their usage of this function, especially in synchronous discussion formats where all participants have less time to reflect (Asterhan & Eisenmann, 2009). Another reason for the rather limited informational value of moderators’ ontology label use may be found in the particular labels that were offered to participants in this study. The labels were chosen to facilitate and support student reasoning, and not meant to be indicative of different types of moderator support. If, on the other hand, moderators would be allowed to choose from a palette of different moderation ontology labels (e.g., “Reasoning”, “Interaction”, “Task completion”) or different sentence openers (e.g., “What do you mean by…?” “Could you please refer to…?”) label usage may be found to be more indicative of moderation style.

The coding scheme proposed in this paper is based on the assessment of moderation behavior features at the conversational turn level of communication. Different grains of analysis may yield slightly different results. One instance in which the choice of unit of analysis affected the outcomes in the present study concerned the category of social and motivational support. As aforementioned, in the current data set we did not find any evidence of discrete moderation contributions that were specifically targeted at this type of support. It was argued that in prolonged e-interactions and distributed e-learning communities this type of support may be more salient as a separate class of actions or even stages (e.g., Mason, 1991). When short computer-mediated group activities are embedded in more traditional face-to-face classroom settings, on the other hand, social and motivational support is more likely to be mediated outside the CMC channels.

Still, it was acknowledged that whereas social support could not be distinguished as a clearly distinctive category on the turn level, there was evidence that it could be manifested through more subtle means, such as in different ways of phrasing an intervention. For example, moderators may choose a direct way of confronting students with mistakes or they may gently hint students to consider different options. The former is likely to cause much more ‘face threat’ (Brown & Levinson, 1987) to the student, which may result in decreasing perceived self-competence and motivation (Daron, Doll, & Butera, 2007). Choosing to phrase interventions in a certain way may therefore be considered as some form of social support.

To properly assess these differences, however, is not just a matter of segmenting conversational turns into smaller coding units, such as idea units, or partial sentences. Consider for example the following moderator contribution: “Could it be possible that there
is another perspective that we haven’t looked at yet?" This intervention cannot be subdivided into one particular part that aims at pedagogical scaffolding support (i.e., improving the reasoning quality of the discussion) and a separate one for social support. Instead, the social support is embedded in the pedagogical support by using face-saving phrasings (e.g., the use of “we”, and “could it be that”) instead of more direct, confronting choices of words. We therefore suggest that in order to adequately assess these more subtle manifestations of social and motivational support, a separate, independent coding scheme should be developed that can be used alongside the present content analysis scheme. Recent developments in conversation analysis have shown that such an approach is not only feasible but can be very productive. Asterhan (in press) developed a dual coding scheme in which epistemic features of student–student dialogue (what was said) are separately coded from social regulation features of dialogue content (how it was said). Future studies should explore whether a similar dual coding approach could be successfully applied to study moderator–student communication.

The synchronous discussion sessions that were the focus of the present study may be significantly shorter in nature than in other common e-learning settings, such as asynchronous discussion boards that are embedded in e-courses. Even though in the present study it was possible to characterize each moderation session according to one distinctive style, the present coding scheme may also be used in more prolonged interactions. For example, it may be interesting to see whether and how moderators change their moderation styles over time and how this may be associated with changes in student needs and/or type of learning activity.

More research is also needed on the effectiveness of different moderation styles. Moderation effectiveness of peer discussions in learning settings is likely to be dependent on a large number of factors. A partial, non-exhaustive list of such factors should include, among others, intended goal of the learning activity (e.g., scaffold student reasoning, learning content, brainstorming or information sharing), student population (e.g., college students, high-school pupils), type of discussion topic (e.g., scientific, ethical, personal), and the moderator's pedagogical philosophy and previous experience with online communication and moderation. In a recent study, Asterhan, Schwarz, and Gil (submitted for publication) studied the effect of different moderation styles (orchestrating vs. scaffolding reasoning) on parameters of argumentation quality in an in-vivo, experimental design. It was found that, compared to a control condition which did not receive moderation, only the scaffolding style resulted in better argumentation quality of the discussion.

In addition to these factors, the type of communication format and the specific affordances of a given discussion environment are also likely to mediate the effectiveness of certain moderation styles over others. For example, student discussants may expect and react differently to moderator actions when these appear and persist in the discussion environment, compared to when these are conveyed through separate communication channels that are specifically designed for moderator–discussant interaction (Asterhan & Schwarz, 2010). Unfortunately, the effects of communication format and design affordances are often overlooked in the literature. Future research should then pay more specific attention to these aspects.

Finally, in the present study we reported on a multi-dimen- sional methodology to study e-moderation behavior based on verbal interaction protocols. Whereas this approach proved to be fruitful for characterizing and distinguishing between different moderation styles, it does not provide direct insights into the phenomenological side of e-moderation, that is: How moderators make decisions about when and how to intervene, what discussion features they focus on during moderation, and how they monitor their own moderation effectiveness in real-time. For this, a phenomenological approach is warranted, one that focuses on process, rather than on discrete actions. This can be accomplished by, for example, applying the technique of cued retrospective reporting (Van Gog, Kester, Nieuwelst, Giesbers, & Paas, 2009) to the study of e-moderation. This technique has been successfully applied in a first study (Schwarz & Asterhan, in press), in which moderators were asked to retrospectively report on their thoughts during physical actions of moderation, while looking at a screen-recording of their moderation session. The screen-recordings also showed their mouse and keyboard actions made during the task. This first study showed how such techniques can provide useful insights into the process of e-moderation and how the affordances of different computer technologies may shape moderation behavior. Both phenomenological research, as well as studies that focus on moderation outcomes, are then necessary to unravel the multi-faceted nature of the evolving and – for many people – relatively novel practice of e-moderating group discussions.

Acknowledgements

The research reported here was supported by the 6th Framework Program of the European Community (project 027728). The author is grateful for Julia Gil's assistance in data collection and coding development efforts.

References


