Learning from reading argumentive group discussions in Facebook: Rhetoric style matters (again)

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Abstract

We explore the potential of learning from reading discussions in social network settings. Undergraduates were asked to read an argumentive discussion between students of a closed, course-related Facebook group. The discussion revolved around a social-economic-ethical, ‘hot’ topic of debate and contained several links to online resources in support of the discussants’ opinions. Based on previous research on argumentive discourse style, two different online discussions were created to reflect either a disputative or deliberative discourse goal, while controlling for all other verbal content. Students in a control condition only received the links to the same online resources, without the discussions. Following the reading phase, declarative knowledge on the topic was significantly lower in the disputative discourse condition, but no differences were found between the deliberative argumentation and the control condition. Reading behavior measures (time-on-task, time spent reading the online information resources, number of online information sources, time spent reading the discussion) could not account for the differences in knowledge performance. A program for future research is outlined to explore the effects of learning through reading discussions, the role of argumentive style, and the affective and cognitive processes underlying them.
1. Introduction

The growing reach and impact of social network sites (SNSs) in recent years has sparked the interest of researchers and educators alike. Merchant (2012) describes three approaches or types of learning activities in the context of formal education and SNSs: learning with SNSs, learning from SNSs, and learning about SNSs.

Learning with SNSs involves using learners’ existing online social networks or creating course- or class-specific SNSs aimed at supporting and extending curriculum-based work. This approach builds on the unique affordances of SNSs to facilitate collaborative learning, work and discussions around curriculum materials. Learning from SNSs attempts to reflect on the informal learning that SNSs can support and their affordances for social interaction, in order to re-think and refresh existing pedagogies and learning designs. This approach applies lessons learned from and aspects of SNS interactions to educational practices. In the words of Owen et al. (2006, p. 5): “It is the combination of the technological affordances of social software, with new educational agendas and priorities, which offers the potential for radical and transformational shifts in educational practice.” Finally, learning about SNSs focuses on the study of SNSs in academic life and in general, their role in learners’ lives, and the knowledge, skills, dispositions and social and cultural capital involved in interaction and informal (or formal) learning in such settings.

Studies in both secondary education (Asterhan & Rosenberg, 2015; Bouton & Asterhan, 2015; Caduri & Schwarz, in press; Hershkovits & Forkosh-Baruch, 2013; Ofir, Rosenberg, Asterhan & Schwarz, 2015) and higher education (Arteaga Sanchez, Cortijo & Javed, 2014; Grosseck et al, 2011; Hew, 2011; Lampe et al, 2011; Selwyn, 2009; Arteaga Sanchez et al, 2014) have described the social, relational and pedagogical dimensions of SNS interactions between
students and between teachers and students. Thus far, however, these have remained descriptive in nature, focusing on the interactions themselves, without assessing their potential effects on subsequent individual outcome measures.

In the present study we focus on a particular form of learning from SNS: We examine the potential of learning from reading argumentive group discussions in Facebook (FB). It would seem that FB as a social arena is a hotbed of discussion, usually between FB contacts (friends) but also with relative strangers who happen to subscribe to the same group or page, or to read the same article using the FB social plug-in. While browsing and clicking through one's “newsfeed” (the posts of one’s FB contacts and pages/groups of interests), FB users may be exposed to various types of often heated or controversial discussions on a variety of topics (politics, economics, science, religion, history, current affairs, etc.), as well as external materials linked from those discussions (e.g., articles, images, multimedia). This offers a venue for informal learning about new topics and different viewpoints, even if it may not be intentional, even when FB users may not be aware of it, and even when they are merely reading the discussions and links. In spite of the above-mentioned logical arguments about informal learning opportunities from and through FB interactions and discussions, it has not been empirically studied. Moreover, compared to normative models of productive argumentation that supports learning (e.g., Asterhan, 2013; Keefer et al., 2000), the quality of these FB discussions “in the wild” may often prove to be sub-optimal for learning purposes: Discussions may be polarized, highly emotional and disputative or, in direct contrast, highly consensual in nature.

In the present study, we take a first step towards exploring the potential benefits of learning from SNS interactions, by focusing on a specific aspect of it: Learning from online 'listening' to (that is: reading) online, argumentative group discussions. We first present the
rationale for why online 'listening' could result in learning gains, and then discuss how and why rhetoric style of the online discussions is expected to play an important role in learning from listening to online discussions.

1.1 Learning from 'listening' to dialogues

Theory and research on learning through dialogue has traditionally focused on the benefits of active participation (that is: contributing a verbal contribution), rather than observing or listening to dialogue (see Littleton & Howe, 2010; Resnick, Asterhan, & Clarke, 2015, for extensive overviews of the literature). This skewed focus can in part be attributed to the technical constraints of data collection in face-to-face settings, that is: acts of 'listening' can (could) not be reliably recorded. It is also influenced by the cognitive-constructivist premise that active engagement in explanation, construction and elaboration leads to improved information processing (e.g., Chi & Wiley, in press). However, if learning benefits from dialogue are indeed contingent on actually contributing and overtly participating in it, then many students would unfortunately miss out on these learning opportunities. It is well-documented that the number of students who overtly contribute to classroom discussions is small (e.g., Clarke, 2015) and that certain students are ignored in peer group discussions (Barron, 2009).

The move to online discussion formats could potentially address these unequal participation rates: Communication patterns are often more democratic since turn-taking is absent and participants are less socially inhibited and less affected by social status markers a (Asterhan & Babichenko, 2014; Asterhan, Butler, & Schwarz, 2011). In spite of this potential, however, online course-related discussions often suffer from low levels of interactivity (e.g., Thomas, 2002). The fact that students do not contribute, however, does not mean that they are not 'listening', that is: reading the contributions posted by others. Indeed, Wise, Speer, Marbouti
and Hsiao (2013) found that online ‘listening’ is a substantial component of college students’ participation in online course discussions, averaging about 75% of their time. Several scholars have then recently become interested in these ‘silent participants’, and have begun to explore why they choose not to contribute (Clarke, 2015) and to identify different 'listening' behavior profiles (Wise et al., 2013). The question remains, however, whether 'listening' to online discussions also results in learning?

Research by Chi and colleagues has shown that watching a video of a high-quality tutor-tutee interaction is as effective as participating in one-on-one interaction with that same expert tutor (Chi, Roy, & Hausmann, 2008; Craig, Chi, & VanLehn, 2009; Muldner, Lam & Chi, 2014), and more effective than watching tutorial monologue (Muldner et al., 2014). No study to date has examined whether similar gains can be obtained from observing collaborative, peer-peer learning dialogues or from 'listening' online as opposed to F2F discussions.

Previous studies have reported positive correlations between the number of discussion posts students access (read) and their course achievement (e.g., Morris et al, 2005). However, individual differences (e.g., in prior knowledge, interest and motivation) may account for the covariance between the two variables and a more experimental approach is then called for. To examine whether reading online discussions on a controversial topic has an added value over and above reading online informational resources about the topic, we then chose to conduct a controlled, experimental study in which we directly compare the two.

In the present study, we test the effect of reading an argumentive FB discussion which includes links to external information resources, by comparing it to a control condition in which students only received the online resources, without the accompanying discussion. We expect that the framing of the online resources within an argumentive peer-to-peer discussion will
benefit learners' knowledge gains about the topic. The reasons for these expectations are as follows: First of all, studies on actual participation in argumentative discussions has shown that the addition of peer discussions results in deeper processing to make sense of the arguments and of the topic domain (e.g., Asterhan & Schwarz, 2007; 2009; Chi & Wiley, in press). Secondly, the framing of the topic within a peer discussion setting may be more motivating than the mere reading of resources by itself. Thus, participations are likely to invest more time in reading and learning from the online resources when these are framed within a peer discussion.

In addition, we also compare the effects of reading two different types of argumentative discussions, namely disputative and deliberative argumentation. We will briefly describe the importance of this latter distinction in the next section.

1.2 Argumentation to learn: The role of rhetoric style

The argumentation literature has traditionally distinguished between different types of argumentative discourse, each defined by a distinctively different goal and style (Walton, 1992). Two of these types are particularly relevant for educational settings (Asterhan, 2013; Asterhan & Babichenko, 2014; Garcia-Mila, Gilabert, Erduran & Felton, 2013; Keefer et al, 2000; Mercer, 1996): disputative argumentation and deliberative argumentation. In disputative argumentation, speakers defend a viewpoint and undermine alternatives to convince an opponent to switch sides. The goal is to win at the expense of one’s opponent. In deliberative argumentation, on the other hand, the goal of each speaker is to collaboratively arrive at a conclusion by contrasting, comparing and evaluating alternatives. Deliberative argumentation is then both critical and constructive. In other words, argumentation may be viewed as a competition between individuals (who is right?) or between ideas (which idea is right?).
Theoretical accounts of learning through argumentation (e.g., Keefer et al, 2000; Mercer, 1996; Nussbaum, 2008; Schwarz & Asterhan, 2009) contend that these seemingly subtle differences are important, since deliberation is likely to promote learning, whereas dispute is less likely to do so. For example, a focus on the interpersonal, competitive dimension of social interaction raises uncertainty and threatens self-competence (Butera & Mugny, 1995; Darnon, Butera & Harackiewicz, 2007; Pool, Wood & Leck, 1998). It may also reduce cognitive flexibility and a person’s openness to considering alternative viewpoints (Carnevale & Probst, 1998) as well as learners’ willingness to publicly share their own incomplete ideas (Asterhan & Babichenko, 2014). Since these actions are believed to be at the heart of learning through argumentation (Asterhan & Schwarz, 2009; De Vries, Lund & Baker, 2002; Keefer et al, 2000; Nussbaum, 2008; Osborne, 2010), by not engaging in them, learners would likely forego important opportunities for learning.

Until recently, the conjecture that dispute and deliberation have different effects on learning academic content was mainly supported by theory, case studies and correlations between existing differences (e.g., Asterhan, 2013; Nussbaum, 2009; Keefer et al, 2000; Schwarz & Asterhan, 2010). However, a recent controlled study by Asterhan and Babichenko (2014) provided further experimental evidence. Learners interacted in scripted, computer-mediated interactions with a confederate on their understanding of a scientific concept (diffusion in liquids). The peer confederate’s verbal behavior was controlled for conceptual content and the type of argumentative moves, but only differed in argumentative discourse style (disputative or deliberative). Results showed that participation in deliberative discourse resulted in higher conceptual knowledge gains, compared to disputative argumentation.
In the present study, we seek to explore whether argumentive discourse style also affects learning from reading online discussions. Expectations regarding effects of reading a disputative vs. a deliberative discussion on learning are less straightforward than for actual participation in them: On the one hand, the disputative tone may vicariously induce anxiety and cause the reader to cognitively invest less, having an adverse effect on learning, similar to the direct participation settings. On the other hand, however, reading a disputative discussion could lead to higher arousal and increase motivation and emotional investment, while not offering direct face threat to the reader (unlike in active participation), therefore not inducing anxiety. The more heated tone of the debate could also bring to mind FB discourse in more organic, “natural” settings, and this could lead to positive learning results, because of a better fit between expected and actual discourse type. Finally it could also lead to negative results if the disputative style causes readers to perceive it as biased or to be discounted as not ‘serious’ enough.

1.3 The topic domain of the present study

In light of fact that (at the time of this study) students do not consider Facebook an arena in learning "school topics" occurs, we chose to focus on a controversial, 'hot' topic, instead of a traditional, neutral topic from school curricula. The particular topic selected for this study concerned the growing numbers of foreigners from the African continent that do not hold recognized, legal immigration permits, and who have arrived at Israel in the past decade (AIs, African immigrants, from here on). AIs area topic of ongoing and heated debate both in the traditional media and SNSs in Israel, as well as among policy makers. The debates are often very emotional and polarized, guided by personal attitudes, opinions and value systems, rather than informed by and based on factual knowledge. The potential of gaining factual knowledge about
this heated, controversial topic made the topic of AIs particularly suitable for a study on the effects of reading disputative and deliberative FB discussions.

The specific question that was selected for discussion is whether or not AIs should be given some form of work permit in Israel. Multiples terms -such as *refugees, asylum seekers, illegal immigrants, work immigrants*- were used in the study to describe the population of AIs, since the choice of any specific term could have indicated a position towards the question at hand or towards this population, thus potentially biasing the results. For example, those legally recognized as “refugees”, i.e. people who have fled their countries for fear of death and/or persecution, have the legal right to work in Israel, as granted through international treaties. However, obtaining such legal recognition is a long and arduous process, throughout which one remains in the status of “asylum seeker”, whose rights are under debate. The term “illegal immigrant” (in Hebrew, “mistaken”, someone who crossed state borders in stealth), while referring solely to the mode of arrival and not to the reasons behind it, is generally viewed to have negative connotations towards this population and its rights. Finally, the term “work immigrant” could imply that the reasoning behind the immigration was economic, and thus perceived by many as less ‘valid’ than that of a refugee (whether recognized as such or not).

2. Method

2.1 Participants

Sixty undergraduates (13 male, 47 female) from a large Israeli university, ranging between 19-40 years of age ($M = 25.10$, $SD = 3.34$) participated in the study. They were recruited through offline and online notice-boards on the Social Sciences and Humanities campus. Only native Hebrew speakers were selected for participation. Participants received either financial reimbursement (82%, approximately US$14) or course accreditation (18%).
2.2 Design

A 1 X 3 experimental design with random assignment to condition was used for this study.

2.3 Tools

2.3.1 Attitude survey The survey contained 6 items measuring Ss’ general attitude towards AIs, each with a 5-point Likert type scale. Three items expressed favorable attitudes (*We have a moral duty to take care of AIs, The majority of AIs are not criminals, A humane solution should be found for AIs within the country’s borders*) and 3 expressed negative attitudes towards AIs (*The country cannot and should not be held responsible for the AIs, Most AIs conduct criminal activities, AIs should be expelled from the country*). Internal reliability was satisfactory, Cronbach’s alpha = .84, and an overall measure of attitude toward AIs was composed, based on the six items measuring (after reversal).

2.3.2 Learning Materials Twelve existing online articles from 6 different, mainstream Israeli media outlets were selected to reflect a variety of opinions and to introduce a variety of perspectives (economic, moral, ethical, legal and social) on the topic of AIs in Israeli public discourse. The articles included news reports, interviews, opinion editorials and statistic studies provided by politicians, police officials, the judiciary system, AIs, human rights and refugee-support organizations, low-SES residents of areas with large concentration of AIs, Israeli employers relying on AI work, and more, and included various arguments for and against granting work permits to AIs.

A FB discussion was created, revolving around this question of whether authorities should issue legal work permits to AIs, as mentioned above. The discussion was composed of 12 contributions by 4 (fake) discussants. Each discussion contribution contained a claim, an argument (claim with justification) and/or a question by one of the discussants, as well as a link
to one of the abovementioned online resources as a reference. Two versions were created, each containing identical content, but differing in rhetoric style to convey either a disputative discourse goal (to win a debate at the expense of one’s opponent) or a deliberative discourse goal (to collaboratively arrive at the best solution through critical discourse). Based on distinctions developed in earlier work (Asterhan, 2013; Asterhan & Babichenko, 2014) these included the following differences: (1) interest in and attempts to understand, as opposed to disqualify the other’s thinking; (2) reference to shared, collaborative efforts to reach solutions, as opposed to individual repartition of opinions and ideas; and (3) decreasing as opposed to increasing face threat during disagreement. A short example is presented in Table 1.

2.3.3 Knowledge test

The knowledge test contained 6 multiple-choice and 3 open items, each assessing a different aspect of the information about AIs and policies towards them that appeared in the online sources only (i.e., not in the discussions or in the article titles). Multiple-choice items consisted of four alternatives, one correct and three distractors. Each correctly answered multiple choice question was awarded one point. Following is a representative example of a multiple choice test item:

Which of the following statements, as regards the law concerning the employment of AIs, is correct?

a) The employment of AIs is forbidden by a law enforced by the government as of 2010, and the punishments indicated by law include fines and criminal procedures towards employers.

b) The High Court of Justice ruled in 2011 that fining or pursuing criminal procedures for employing AIs recognized as asylum seekers would not be possible. (correct answer)
c) The previous government legislated a special law against the employment of AIs, including punishments such as high fines and imprisonment for employers.

d) AIs working illegally face immediate deportation from Israel.

Grades for open-ended questions ranged from 0-3 points each, and included the following:

(1) Who are the main parties that stand to lose from the employment of AIs, and why? (1 point for a relevant population sector, 2 points for including a reason, and 3 for indicating more than one sector along with reasons).

(2) What economic contribution could the legal employment of AIs have? (1 point for each type of contribution, up to 3 points).

(3) What is the difference in terms of definitions and Israeli law between a refugee, an asylum seeker and an illegal immigrant? (1 point for each correct definition).

Thus, a total of 15 points could maximally be rewarded. Nominal scores (0-15 points) were transformed into percentage scores (0-100 %) for ease of interpretation.

2.4 Procedure

All subjects participated individually in a 60-80 min. long session that included the following activities: (1) administration of consent forms, a demographic and an attitudes survey; (2) the experimental intervention (see further on); (3) a 10 min. long filler task during which participants wrote down free associations in reaction to excerpts of classical music; and (4) a declarative knowledge test. Participants also wrote short argumentive essays on the topic of AI, both prior and after the intervention. However, these data are not included in the present study.

In the intervention phase, subjects in the two discussion conditions were instructed that they were about to read an educational discussion between 4 students from a Sociology class at the university. They were told that this discussion was part of a class requirement and that the
four students had received instruction to support their arguments using links to online resources. They each received one of the two versions of the FB discussion: the deliberative one or the disputative one. In the control condition, the subjects only received the titles of and the links to the online articles, along with the source and date of each. The maximum amount of time assigned for the intervention phase was 35 min., and participants in all conditions were instructed to use this time to learn more about the topic of work permits for AIs, and call the experimenter if they were done before that. During this time, participants' screen actions were recorded with the help of screen-recoding software (CAMTASIA). A time-stamped log file of the screen reading behavior was created for each participant, which specified (in min and sec) time spent reading the ‘fake’ discussion page, time spent reading/scrolling through each particular online article/information source, the order and times in which links were opened and/or participants switched between the discussion page / page with links and the online articles, and whether and for how long the participant scrolled/read through the online readers’ responses appearing at the bottom of a particular article. Due to technical issues, the screen-recoding files of four participants (2 in control and 1 in each discourse style condition) could not be collected.

3. Results

3.1 Control measures

Analyses of variances were conducted to rule out differences between conditions on measures that were each assessed prior to the intervention: General attitude toward AIs, own evaluation of expertise on the topic of AIs, and perceived importance of the AIs issue. No differences between conditions were found on any of these measures, $F < 1$ for each.

3.2 Effects of condition on knowledge performance
The mean knowledge performance scores per condition are presented in Table 2. An analysis of variance of condition on students’ knowledge performance scores was conducted. A significant main effect of condition was found, \( F (2, 57) = 6.55, p = .003 \), partial \( \eta^2 = .19 \). Post-hoc tests (with Tukey-Kramer adjustments) revealed that students in the disputative discourse style condition (\( M = 56.67, SD = 12.64 \)) achieved significantly lower knowledge performance test scores compared to both the deliberative discourse style condition (\( M = 67.62, SD = 8.96 \)) \( p = .016 \), as well as the control condition (\( M = 69.52, SD = 14.19 \)), \( p = .004 \). No differences were found between performance scores in the control and the deliberative discourse style conditions, \( p = .873 \).

3.3 Reading behavior across conditions

Based on the screen-recording log files, the following screen reading behavior measures were obtained (measure names are in parentheses): Total amount of time on task during the reading phase (time-on-task), total net amount of time spent reading online information sources (reading sources), total net amount of time spent reading the discussion and/or the links page (reading discussion), net total amount of time spent reading the responses to online articles (reading public responses), number of different online information sources accessed (number sources). Means of these reading behavior measures in each condition are presented in Table 3.

An analysis of variance on overall time-on-task during the reading phase showed a significant effect of condition, \( F (2, 53) = 3.76, p = .030 \), partial \( \eta^2 = .12 \). Post-hoc tests (with Tukey-Kramer adjustments) showed that students in the control condition spent significantly more time-on-task (\( M = 26.51, SD = 5.51 \)) than the disputative discourse condition (\( M = 20.95, SD = 7.38 \)), \( p = .025 \). No differences were found between the control and the deliberative
discourse style condition \( (M = 22.73, SD = 5.76), p = .171 \), nor between the two discourse condition, \( p = .656 \).

A main effect was also found for the net amount of time students spent reading the online information resources, \( F (2, 53) = 12.54, p < .001 \), partial \( \eta^2 = .32 \). Post-hoc tests (with Tukey-Kramer adjustments) showed that students in the control condition spent significantly more time reading the information sources \( (M = 24.78, SD = 5.49) \) than both the disputative discourse condition \( (M = 15.25, SD = 6.32), p < .001 \), and the deliberative discourse condition \( (M = 17.62, SD = 6.41), p = .002 \). No differences were found between the two discourse style conditions \( (p = .450) \).

The number of information sources students opened was not found to differ between condition, \( F (2, 53) = 1.06, p = .353 \). With regard to the two remaining measures, amount of time spent reading public responses and time spent reading the discussion / links page, Levene’s tests for equality of error variances showed that this assumption could not be met. Kruskal-Wallis comparisons for the effect of condition on these two measures were conducted instead. No differences between conditions were found on the amount of time dedicated to reading public discussion responses to articles, \( p = .816 \). However, an effect of condition was found on the amount of time students spent reading the page which contained the discussion protocol and links (in the discussion conditions) or the links and titles only (in control condition), \( p < .001 \).

4. Discussion

4.1 Disputative and deliberative argumentation for learning

The educational argumentation literature has traditionally focused on argument structures and argument quality, but neglected the role of rhetoric and style. Recent research has shown that even when informational content and argumentive structure is controlled for, argumentive style
affects learning gains: Participation in disputative discourse is associated with lower individual knowledge gains from verbal interaction, compared to deliberative discourse (Asterhan & Babichenko, 2014; Asterhan et al., 2010). The findings reported here further extend these findings to a setting in which students read (as opposed to participate in) disputative and deliberative discussions.

To examine whether effects of rhetoric style on learning from reading online discussions could be attributed to online "listening" behaviors (e.g., Wise et al., 2013), a range of overt reading behavior measures were assessed and analyzed. However, comparisons between the two discourse style conditions did not show significant differences and any of the measures (overall time-on-task, the number of online resources accessed, the time spent reading the online sources, the time spent on the discussion protocol itself). It then appears that the effect of discourse style cannot simply be attributed to what students overtly do, because they engage in the same types of learning behaviors. It is noteworthy that in previous research on actual participation in deliberative and disputative discussions, learning effects could neither be explained by overt behavioral measures, such as participation rates or the amount of new inferences introduced to the discussion (Asterhan & Babichenko, 2014).

We then argue that the search for reasons behind the effect of discourse style in future research should focus on more subtle, covert processes. These should include psychological, affective measures, such as emotions, motivation and affective states, but also epistemic evaluations of the knowledge sources, such as plausibility appraisals (Lombardi, Sinatra & Nussbaum, 2013). It is possible that the disputative rhetoric caused students to take the task less seriously and/or to discount the believability of the information sources and their information. Finally, more fine-grained measures of reading processes based on eye-tracking methods could
provide further insight on more covert processes of information processing. The task required the integration, comparison and evaluation of information from multiple sources and involving multiple perspectives. It is conceivable that even though the overall amount of time dedicated to reading the information sources did not differ, students may have been more distracted and less focused, or less strategic in their reading in the disputative condition.

4.2 Learning from reading argumentive discussions

Extrapolating from research showing benefits of actual, active participation in structured, deliberative argumentation (e.g., Asterhan & Schwarz, 2007; 2009; Chin & Osborne, 2010; Nussbaum & Sinatra, 2003) and based on recent findings on vicarious learning from observing tutoring dialogues (Chi et al, 2008; Craig et al, 2009; Muldner et al, 2014), it was expected that students would learn more when, in addition to the information resources, they also read an online, deliberative peer discussion on the topic. The results presented here indicate, however, that the addition of a deliberative discussion did not improve learning outcomes over and above providing the links to the information sources only. One could then conclude that the benefits of participation in argumentive dialogue do not extend to observing such dialogues. We contend that this conclusion is premature, however.

First of all, even though students in the deliberative condition invested less time reading the information sources, students performed equally well on the knowledge test as students in the control condition. The knowledge test only targeted information that appeared in the online resources and was not mentioned in the discussion content itself. One could argue, therefore, that students in the deliberative discussion condition were more effective since they gained the same amount of knowledge with substantially less reading investment (7 minutes less on average). In addition, we propose several alternative explanations for our finding that reading deliberative
discussions did not improve learning over the control condition, each of which warrants further research on this novel venue of study:

The formal, artificial settings of this study may have contributed to the lack of effect. Students in the control condition were placed in a room and told that they had maximally 35 minutes to read 12 online resources on a particular topic. So they did. In more authentic settings, however, they may not have been tempted to invest that much effort in reading all that information. Even though this compliance with an unwritten "experimenter-subject contract" also holds for the discussion conditions, it is likely to have affected the control condition more. One would expect that potential advantages of embedding online sources in a deliberative discussion will become more apparent in more natural, informal settings, when a discussion is more likely to draw readers in than merely seeing links, especially if the contributors are one's network of SNS "friends". Future research should then compare the effect of reading online discussions in more natural discussion settings.

A comparison with the existing literature on the effects of active participation in argumentive discussion vs observing effects reveals two additional differences in experimental set-up that warrant further research: Past studies have shown that benefits from learning through actual participation in argumentive discussion may only become evident at delayed post-tests (e.g., Asterhan & Schwarz, 2007; 2009; Howe et al., 2005; Sampson & Clarke, 2009). Unfortunately, the present study did not include any delayed assessments. Future studies on learning from observing argumentive discussion should therefore include multiple test occasions.

A second difference concerns the type of topics and informational resources. In previous studies that reported benefits of argumentation for learning academic content (Asterhan & Schwarz, 2007; 2009; Chin & Osborne, 2010; Nussbaum & Sinatra, 2003), focused on the
learning of scientific concepts (such as, diffusion) and the resources that students were provided were of the informational, didactic type, specifically designed for educational contexts (i.e., textbooks, educational movies). Students are believed to learn complex scientific topics better when they have to explain their incomplete understanding to a peer, to examine alternative explanations and to face their own misconceptions. This can, in principle, be achieved in individual settings; however, it is more likely to occur through argumentive discussion with a peer, not in the least because of individual differences in the skills and academic motivation required to achieve this individually. In the present study, on the other hand, learners read a discussion on a hot, controversial topic and they were given argumentive texts presenting multiple perspectives and opinions on the topic. One of the main mechanism through which argumentive discussions are believed to benefit learning (i.e., forcing learners to face alternative views and working through different arguments in a rational matter) may then have become redundant in the deliberative discussion condition, since this goal was also achieved through the reading of the online resources themselves. Future research that examines basic processes of learning from observing argumentive peer dialogue should then also include neutral, scientific topics and expository learning materials.

Finally, we compare the current findings with the only setting in which learning from observing dialogues has been systematically studied in controlled settings, namely tutor-tutee dialogues (Chi et al, 2008; Craig et al, 2009; Muldner et al, 2014). For example, Muldner et al (2014) found that observing videos of tutor-tutee dialogue led to superior learning gains than observing tutor monologue videos. There are several noteworthy differences between the current study and the literature on observing tutoring dialogue: First of all, participants in the current study read written protocols of online dialogue, whereas in the tutoring studies learners watched
videos of face-to-face dialogues. Secondly, the strongest effects of watching tutoring dialogues are obtained when two participants watch them together and discuss the content collaboratively. Thirdly, the tutoring dialogues were led by adult tutors who are topic experts and the dialogues were designed in a way that supports and targets tutee learning. The tutor-tutee dialogue ended with a resolution: The tutee came to understand the topic. Gains from observing such dialogues are then better explained in terms of vicarious learning, by identifying with the tutees’ questions, learning progress and attempts to come to grips with the materials, guided by the tutor’s expertise prompts.

Therefore, the lack of a dialogue observation effect in the current study may potentially be due to any of these three factors, namely: (1) The medium, where written protocol may be less engaging than face-to-face, oral dialogue; (2) The observation setting, where collaborative study of the discussion may yield a stronger effect than individual work; and/or (3) The type of educational dialogue, where learning effects may be expected from more pedagogically driven dialogue in which participants try to learn and understand something and where a solution is achieved in the end, instead of participants merely trying to persuade each other without a resolution. These directions should be further explored in future research.

4.3 Conclusions

The present study extended findings from research on disputative argumentation, indicating that the negative impact on learning that such argumentation might have can apply also in situations in which direct face threat is neutralized (i.e. listening, rather than participation in online discussion). Furthermore, this study has taken a first step in a new field of research, inspired by an emergent SNS learning practice – learning from reading online discussions. Further research is required to determine the potential value of such a practice in more formal
learning settings, as well as “in the wild”. Many questions remain open, though the above discussion has sketched a number of directions for future research.

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Table 1. Excerpt of the FB group discussion content according to two different argumentive discourse styles

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<thead>
<tr>
<th>Disputative style</th>
<th>Deliberative style</th>
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</thead>
<tbody>
<tr>
<td>Ronit: It's obvious that we have to let the refugees work, so that they can make an honest living and contribute to our society. Otherwise they'll be lying in the streets and will depend on charity or crime in order to have something to eat, and we see that crime amongst them is really on the rise. [LINK TO SOURCE]</td>
<td>I think we should let the refugees work, so that they can make an honest living and contribute to our society. Otherwise I fear they'll be lying in the streets and will depend on charity or crime in order to have something to eat. Unfortunately for us it seems that crime amongst them is indeed on the rise. [LINK TO SOURCE]</td>
</tr>
<tr>
<td>Limor: You're talking nonsense! Do you mean to tell me that they commit crimes because they don't have anything to eat? And what about all the rapes we hear about? [LINK TO SOURCE]</td>
<td>But perhaps we should think about another solution to crime, because there are all these rape cases we've heard about recently and I am not sure how they are related to not having anything to eat. [LINK TO SOURCE]</td>
</tr>
</tbody>
</table>
Table 2. Mean (and SD) knowledge performance scores, by experimental condition ($N = 60$)

<table>
<thead>
<tr>
<th></th>
<th>Disputative discussion</th>
<th>Deliberative discussion</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>56.67</td>
<td>67.62</td>
<td>69.52</td>
</tr>
<tr>
<td>SD</td>
<td>12.64</td>
<td>8.96</td>
<td>14.19</td>
</tr>
</tbody>
</table>
Learning from reading argumentive group discussions

Table 3. Mean (and SD) of reading behavior measures during the intervention phase, by experimental condition

<table>
<thead>
<tr>
<th></th>
<th>Disputative discussion (N = 19)</th>
<th>Deliberative discussion (N = 19)</th>
<th>Control (N = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number sources read</td>
<td>7.74 (2.99)</td>
<td>9.05 (3.06)</td>
<td>8.61 (2.36)</td>
</tr>
<tr>
<td>Time reading sources (min)</td>
<td>15.25 (6.32)</td>
<td>17.62 (6.14)</td>
<td>24.78 (5.49)</td>
</tr>
<tr>
<td>Time reading discussion page (min)</td>
<td>4.87 (1.82)</td>
<td>4.24 (2.00)</td>
<td>1.62 (.91)</td>
</tr>
<tr>
<td>Time reading public responses (min)</td>
<td>.82 (2.09)</td>
<td>.88 (2.22)</td>
<td>.12 (.18)</td>
</tr>
<tr>
<td>Total time-on-task (min)</td>
<td>20.94 (7.39)</td>
<td>22.34 (5.75)</td>
<td>26.51 (5.51)</td>
</tr>
</tbody>
</table>