Online and face-to-face discussions in the classroom: A study on the experiences of 'active' and 'silent' students

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Abstract: Even though the advantages of online discussions over face-to-face discussion formats has been extensively reported and investigated, the blending of online discussion tools in co-located classroom settings has been considered with far less intensity. In this paper, we report on secondary school students' experiences and preferences concerning two different discussion formats in co-located classroom settings, namely face-to-face (F2F) and synchronous, computer-mediated communication (CMC). In addition, we also differentiate between students that are known to be active participants in F2F classroom discussions and those who usually remain silent. The findings highlight several advantages of CMC over F2F discussions in co-located settings and show that different students ('active' and 'silent') experience F2F and computer-mediated communication differently.

Introduction

Many theories of learning have recognized the importance of peer dialogue in learning and teaching (e.g., Rogoff, 1998; Wegerif, 2007). However, whereas passive observation of peer dialogue may be beneficial in some cases, several studies have shown that it is the *active* participation in processes such as constructing explanations , providing help and engaging in dialectical argumentation that seem to be responsible for the more substantive learning gains (e.g., Asterhan & Schwarz, 2009; Chi, Roy & Hausmann, 2008; Webb, Troper & Fall, 1995). When implemented in authentic classrooms, discussions usually take on a format of teacher-led classroom discussions or small group peer discussions. Both formats have significant shortcomings which may reduce the effect of the advantages of un-moderated peer dialogue (e.g., superficial student involvement, unequal participation rates and extensive teacher interference, and disorganization, peer dominance and lack of coherence, respectively).

Computer-mediated discussion boards have been suggested to be able to overcome several of these shortcomings: First of all, and as has been discussed extensively (e.g., Kiesler, Siegel & McGuire, 1984), a great deal of the non-verbal cues that are present in face-to-face (F2F) communication are lacking in distributed CMC. Since these non-verbal cues are, among others, used to assess social status, computer-mediated communication has the potential of being more democratic (Herring, 2004). Moreover, the increased anonymity of on-line communication is thought to cause people to become less inhibited and to self-disclose more frequently (Suler, 2004). This decrease of authority, social status and inhibitions in combination with the lack of need to compete for speaking rights may thus promote free expression of individual standpoints and increased and equalitarian participation by all discussants. In addition, the textual medium of communication, the ability to re-read and re-vise contributions, and the fact that in a-synchronous CMC there is an increase in the amount of time available to think and consider one's response before posting it, are all thought to encourage reflection (Guiller, Durndell, & Ross, 2008; Kim, Anderson, Nguyen-Yahiel, & Archodidou, 2007). Others have argued that even though F2F discussion modes may be particularly suitable for the creation of new ideas and for brainstorming, a-synchronous CMC promote explicitness in communication and increase the rate of substantive and reasoned contributions (Kim et al, 2007; Newman, Webb, & Cochrane, 1995). This, in turn, may have been the result of increased opportunities for reflection and the need to be more explicit in light of the lack of non-verbal cues.

However, most of the studies that compare F2F with on-line discussion formats have focused on text-based discussion environments that occur in a-synchronous, distributed, distant communication modes (such as in the framework of e-courses, homework assignments, and after-school social communication). In this study we will focus on the blending of *synchronous*, text-based discussion tools within *co-located* classroom settings, a topic that has, thus far, rarely been the focus of research (Cuban, 2002). The use of on-line communication in co-located settings may combine some of the advantages of online communication, without some of the potentially problematic aspects of distant, anonymous communication formats in educational settings: On the one hand, its textual nature, lack of non-verbal cues, persistence of contributions and simultaneous nature may encourage reflection, explicitness, interactivity and participation. On the other, student discussants share a physical space, they personally know their discussion partners and the teacher is physically present. This could avoid some of the negative sides of distant, anonymous CMC in secondary education settings, such as teacher difficulty to verify whether a certain task is actually completed by the student or not, instances of flaming and other social disturbances, and lack of accountability for communication content. Another difference with the above-mentioned studies and the present one concerns the fact that the former have mainly focused on objective

rates and aspects of communication and have not explored how these different communication formats are perceived and experienced by the students using them.

In the present study, we then seek to investigate students' preferences of and experiences with two different discussion formats (F2F and CMC) in co-located classroom settings. We focus on several discussion aspects, such as participation, interactivity, learning and classroom management. The student population should not be considered as homogeneous in their behavior and in their preferences for different communication modes (see also Caspi, Chajut, Saporta, & Beyth-Marom, 2006, Eisenmann & Even, in press). We therefore differentiate between students that are known to be active participants in F2F classroom discussions ('active' students) and those who do not participate frequently ('silent' students). We expect that they differ in the extent to which they welcome the introduction of these new technologies in the classroom: Compared to active students, silent students are expected to show a stronger preference for the online format. We also expect this difference to be strongest for discussion characteristics that involve rate of participation, rate of peer interaction and motivation.

Method

Participants

Twenty-three 9th grade students and ten 11th grade students from a secondary school in the Jerusalem metropolitan area participated in this study. All students filled out a questionnaire on their experience of face-to-face and on-line classroom discussions (see Tools section). In addition, four 9th graders (two 'active' and two 'silent' classroom discussion participants) participated in short, individual structured interviews on this experience. They were selected based on the teacher's evaluations of the most active and most silent students in face-to-face classroom discussions.

Tools and Procedure

All students had participated in at least two classroom activities in three different subjects (civic education, biblical studies and history) that blended traditional teaching activities with online discussions. The discussions were conducted within the Digalo environment (e.g., Schwarz & de Groot, 2008) which enables synchronous, textual talk through mediation of geometrical shapes (diagrams) that represent different dialogical moves (such as, argument, explanation, claim, and so forth).

A questionnaire was developed in which students were asked to indicate their personal experiences with on-line Digalo and face-to-face classroom discussions in a comparative way. It included twelve statements that described different aspects of students' personal experience in discussions. The items assessed aspects of interaction ("Students reacted to my contributions", "I reacted to the other students' contributions"), participation ("I participated in the discussion", "I had the opportunity to express myself"), the learning experience ("I felt that I learned new things on the subject", "The discussion caused me to think about the subject",), clarity ("I understood the discussion topic", "I managed to follow the discussion development"), motivation ("I was interested in the topic", "I enjoyed the discussion"), and classroom management ("There were a lot of classroom disturbances", "Students engaged in off-topic behavior"). For each item, students were asked to indicate whether the statement characterized themselves more in Digalo discussions, more in face-to-face classroom discussions, or equally well. Values ranged from 1 (much more in Digalo discussions) to 5 (much more in classroom discussions). In addition, students were asked to self-report on their frequency of participation in face-to-face classroom discussion, ranging from 1 (almost never) to 4 (a lot). Finally, the questionnaire also contained an open-ended question which asked of students to indicate whether they would like to have Digalo discussions in their classroom activities more frequently and why.

The interview was developed in parallel to the questionnaire and its aim was to expand the understanding of the findings from the questionnaires analysis (Johnson & Onwuegbuzie, 2004). The interview was conducted by a previously unknown person to the students and started with a request to describe classroom discussions and electronic discussions. During these descriptions the interviewer prompted for further explanations and examples. Following, students were asked why they believe the electronic tool was developed and whether they expect that its usage will impact the discussion practices in the classroom.

Results

The comparison between the different discussion styles (F2F and CMC) proved to be quite natural for the students and they were very cooperative. Student responses to the twelve forced-choice items were recoded by a linear transformation, such that a preference for Digalo discussions was indicated by positive response values, a preference for classroom discussion by negative response values and a lack of preference by null values. Values for the two classroom management items were reversed, such that more disturbance or more off-task behavior in one discussion format indicates a preference for the opposite discussion format. Mean preference scores were

calculated for the whole sample and are reported in Table 1. Positive values indicate a mean preference for on-line discussions and negative values a mean preference for F2F classroom discussions (range from -2 to 2). All statistical analyses were conducted with two-tailed t-tests.

Table 1. *Mean number (and SD) of pupils' self-reported preference scores for face-to-face or on-line discussions on selected discussion characteristics (N=33)*

Discussion characteristics	*M*	*SD*	
Reactions of others to self	.42	1.30	$p = .070$
Reactions of self to others	.49	1.35	*
Self-expression	.48	1.30	*
Participation	.24	1.20	
Interest	-.06	1.12	
Enjoyment	.00	1.20	
Caused to think	.19	.10	
Learned new things	-.09	.88	
Understand topic	.80	1.10	
Follow discussion	-.33	1.24	
Classroom disturbances	.97	1.04	****
Off-task behavior	.85	1.15	****

* p < .05, p < .005, ****

The mean preference scores in Table 1 show a general trend for preference of online Digalo discussion over face-to-face classroom discussions for 8 out of the 12 different discussion characteristics tested. These preferences in favor of online Digalo discussion formats were significantly larger than chance for measures of classroom management (classroom disturbance and off-task behavior), interactivity and self-expression .Indeed, in all interviews differences related to classroom management were mentioned. The students distinguished between the different discussion formats: while one is quiet ("in Digalo it's quite" or "the lessons were conducted quietly because the discussion was going in writing"), the other is noisy ("there is much more noise"). In addition, the interviewees mentioned that in a regular lesson the teacher is occupied with discipline problems, while in Digalo-lessons the teacher is more available for other issues:

> "in Digalo[-lesson] the teacher walks between the students and checks if everything is OK… and if there are questions we can ask him. In regular lesson [F2F discussion] the teacher is busy with discipline problems…" (*interviewee #3)*

The difference that students experienced with regards to the opportunities to interact with fellow peers was also recurrently mentioned in the interviews, as is shown in the following excerpts :

> "I think it would have been easier [in Digalo-discussion] … to understand other side's opinion, what they think… would have been easier to change your opinion or understand another opinion" (*interviewee #4*)
>
> "… and in Digalo it is quiet and you can see, you sit in front of the computer by yourself, see what people write… and can refer to each thing separately and in your own pace… next to the computer I found it easier to express myself" (*interviewee #3*).

Following this exploration, we then turned to a comparison of discussion format preferences as a function of students' self-definition as high or as low frequency participants in face-to-face classroom discussions. Low participants were operationally defined as those students that indicated that they "almost never" or "every now and then" participated in classroom discussions ($N = 15$), whereas high participants indicated that they did so "often" or "a lot" ($N = 18$). Mean preference scores for these two groups are presented in Table 2.

First of all, the data in Table 2 show that, overall, discussion format preferences were consistent with being high or low frequency participants in face-to-face classroom discussions on most discussion aspects: On all but the classroom management aspects and understand topic. The high frequency participants' scores indicate an overall preference for face-to-face classroom discussions (10 out of 12 different discussion characteristics tested). These preferences reached statistical significance on the following aspects: rate of participation, the ability to follow the discussion, the ability to learn new things and the number of classroom disturbances. In the interviews the high-frequency students did not reveal any clear preferences for one format over the other.

The low frequency participants, on the other hand, consistently tended to indicate preferences for the online discussion format on all test items. This preference was strongest and statically significant for the following dimensions: They reported that they interacted more with their peers, that they participated more and felt that they could express themselves more, and that the group as a whole suffered from far less classroom disturbances and off-task behavior.

Table 2. *Mean number (and SD) of pupils' responses, by low frequency participants and high frequency participants in F2F classroom discussions*

Discussion characteristics	*Low F2F participants (n=15)*		*High F2F participants (n=18)*		
	M	*SD*	*M*	*SD*	
Reactions of others to self	1.20****	.77	-.22	1.31	*t* (33) = 3.87***
Reactions of self to others	1.40****	.74	-.28	1.27	*t* (33) = 4.50****
Self-expression	1.53****	.52	-.39	1.09	*t* (33) = 6.63****
Participation	1.77****	.49	-.67**	.77	*t* (33) = 9.08****
Interest	.40	1.06	-.44	1.04	*t* (33) = 2.31*
Enjoyment	.47	1.19	-.39	1.09	*t* (33) = 2.15*
Understand topic	.07	1.03	-.61	1.09	*t* (33) = 1.82
Follow discussion	.13	1.19	-.72*	1.18	*t* (33) = 2.07*
Caused to think	.73**	.79	-.28	.96	*t* (33) = 3.25***
Learned new things	.40	.74	-.50*	.79	*t* (33) = 3.37***
Classroom disturbances	1.33****	.72	.67*	1.19	*t* (33) = 1.90
Off-task behavior	1.27****	.80	.50	1.29	*t* (33) = 1.99

* p < .05, ** p < 0.01, *** p < .005, **** p < .001

It seems that those students had started to develop new discussion practices, which they find it interesting and efficient for their learning. As one of the student mentioned:

> "In Digalo most of the students are busy with writing, [it gives] opportunity to each one to express himself more than he does usually… from Digalo I learned more than discussion of the same topic in the class… in the class I don't participate so much" *(interview #2)*

At a later point in the interview he furthermore added that in his opinion the written discussion is in "*higher language*" due to the need to be more precise and different communication norms.

Statistical comparisons between high and low frequency participants' scores proved that the above-described differences in preference patterns between these two types of students were significant for nine of the twelve discussion characteristics assessed in the questionnaire. Interestingly, even though 'active' students indicated a weak overall personal preference for the F2F format, they did voluntarily acknowledge and appreciate the advantages of CMC discussion for their fellow 'silent' classmates:

> "Specifically, for me there was no difference, but I know about other students who found it easier to express themselves in writing rather than verbally… for me it was about the same… during discussion in class there are much less students participating… Digalo really helps, for me as well as for other students, to express themselves, it teaches a lot" (*interviewee #1*)
>
> "For me it is about the same because I do participate, but [for] students who don't participate it helps them to better understand the material, to understand what other students say" (*interviewee #4)*

This was further supported by the students' responses to the open-ended question in the questionnaire, in which many mentioned this particular advantage voluntarily (without being prompted).

Discussion

The blending of online discussion tools in co-located classroom settings can alter discussion practices in a classroom. Since turn-taking is not required and many non-verbal cues are not conveyed, it may promote more democratic student participation, the free expression of ideas and increase student peer interaction. In addition, students also reported that they experienced less classroom interruptions and disturbances in this format. On the other hand, it avoids some of the more undesired phenomena associated with distant, anonymous CMC, such as social and learning disturbances. Our findings also showed that different students (active and silent) experience F2F and computer-mediated communication differently. In CMC environments, students that are usually quiet in F2F classroom discussions seemed to have begun to develop discussion practices as *active* participants and readily identified the advantages of online peer discussions. The more "active" students, on the other hand, had well-founded discussion practices and therefore received the new communication format with reservations. However, they did acknowledge the advantages for their "silent" fellow classmates. To further examine these first findings on different communication media within co-located classrooms, direct observations of student behavior during on-line and F2F discussions will have to complete the picture. A particular interesting venue for future research concerns the questions whether the development of these new practices will carry over to F2F classroom discussion activities. For example, will the participation in a sequence of online discussions change the silent students' behavior in F2F discussions?

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