FUTURE EARLY CHILDHOOD EDUCATORS EVALUATE INDIVIDUAL AND GROUP PERFORMANCE IN WEB 2.0 BASED COLLABORATIVE LEARNING ACTIVITIES

Tharrenos Bratitsis
University of Western Macedonia
Greece

Abstract

This paper raises the issue of students being able to evaluate their performance and participation in collaborative learning activities, both on an individual and a group level. It reports findings of a comparative study, using a blog, a wiki and a discussion forum, in which students documented their preference of a Computer Mediated Communication (CMC) tool as a collaboration platform, along with their perception of the tool's effect on the actual collaboration. Finally, it addresses issues on students' common misconceptions on aspects of collaboration.

Introduction

CMC tools are being used within the context of web-based teaching approaches, especially distance learning ones, often connected to students' improvement of critical thinking, problem solving and communication skills (Kim, 2008). Such tools have been utilized within learning context for many years (e.g., email service). Web 2.0 tools, such as blogs and wikis have been gaining momentum in educational research during the past few years. As stated in the literature there are numerous studies which employ both traditional CMC tools (e.g., emails, discussion forums) as well as Web 2.0 ones in educational settings (Kim, 2008). Although one can find studies on the advantages and disadvantages of these CMC tools individually, as well as their drawbacks when exploited for educational purposes, there is a lack of comparative studies (Kim, 2008). This paper attempts to address this issue by focusing on three CMC tools, namely blogs, wikis and discussion forums, applying the perspective of the end user. In this case, the end users are students, trained to become Kindergarten teachers.

The paper is structured as follows: initially the field of Computer Supported Collaborative Learning (CSCL) is discussed, outlining the significance of communication within its settings. Then a brief overview of the educational uses of the three CMC tools is presented, followed by the research approach undertaken. Finally, the results are presented, before the concluding discussion.

CSCL Research Area

CSCL has been an intensively active research field for more than 20 years, related to Collaborative Learning with the help of computers (Stahl et al., 2006). According to Dillenbourg (1999), Collaborative Learning is a situation in which

two or more people learn or attempt to learn something together. Within Collaborative Learning people capitalize on one another's resources and skills, by asking one another for information, evaluating one another's ideas, monitoring one another's work, etc., while undertaking specific roles during the process (Chiu, 2000). Consequently, Collaborative Learning refers to methodologies and environments in which learners engage in a common task where each individual depends on and is accountable to each other.

Thus, CSCL is related to learning within a group. In an attempt to distinguish Collaborative from Cooperative Learning, Roschelle & Teasley (1995, p.8) defined collaboration as "a process by which individuals negotiate and share meanings relevant to the problem-solving task at hand…. Collaboration is a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem." Thus, they examine collaboration as a social activity within a problem-solving situation, actually describing the *collaborative construction of new problem solving knowledge.*

 Consequently, collaboration is not just about individuals working and sharing/combining results on a group level, but rather a process of socially co-constructed knowledge in order to establish a mutual benefit and advance the commonly shared knowledge at the same time (Bratitsis & Demetriades, in press). Individuals' actions are examined not only as such, but as group interactions as well, usually within a social context, which lead to group learning. Thus, in CSCL learning is also analyzed as a group process; analysis of learning at both the individual and the group level is necessary (Stahl, Koschmann, & Suthers, 2006).

Within this context, the role of computers in collaboration shifted from the initial provision of assistance/guidance for learning to the facilitation of peer interaction. The most common form of collaboration support by computer systems is for them to operate as communication media. Ludvigsen and Mørch (2010) address these approaches with the term *dialogic approaches*. It is through talk and interaction with significant others that we can understand how participants use tools and resources in learning and cognition. Following Vygkotsky's socio-cultural theory, they state that a basic premise is that both physical and abstract tools mediate human activities, and the main abstract tool is language.

Numerous applications can be utilized for that matter, such as email, chat, discussion forums, videoconferencing, instant messaging, social networking, etc. The main goal of CSCL computer systems is to create artifacts, activities and environments that enhance group meaning making and at extend, group well being. The rapid expansion of Internet technologies has significantly contributed to CSCL systems' design, taking into account that it has altered the way people work, play and learn, in the first place. One of the most common approaches for facilitating the construction of common ground of understanding through negotiation is collaborative writing or computer mediated discourse. Through written communication, collaborators exchange ideas, information, comments and

thus knowledge, while sometimes jointly constructing a final product in the process. Environments like shared documents editors, blogs, wikis, interactive whiteboards, mind map editors and discussion forums have been widely used for that matter. These communicational means have been utilized in multiple ways in CSCL approaches with the learning activity being entirely or partially implemented through the communication medium.

This paper focuses on three Computer Mediated Communication (CMC) tools, namely blog, wiki and discussion forum, examining user experience and the facilitation of self- and group-level evaluation.

Blogs, Wikis and Forums in Education

There is a wide range of technologies that support educational activities by facilitating communication and collaboration among students. CMC tools in particular, are utilized by instructors for supporting students in communicating and collaborating with other peers. This paper focuses on three CMC tools: blogs, wikis and asynchronous discussion forums. In this section, a brief overview of their functionalities and the ways they are used in educational settings is attempted, allowing the understanding of the facilitation they offer to the students.

Blogs are easily updated personal web spaces for registering information in a multimedia and multimodal manner, following a chronological order and offering several interesting facilities (e.g., tagging). In educational settings, blogs can be used as communication media among collaborating students or between teacher and students (Sigala & Christou, 2007). Teachers, have used blogs for publishing announcements and/or information, thus provoking students' participation for publishing material (ideas, opinions, assignments, etc.) in order to receive feedback from the teacher or other student peers. Students have used blogs for sharing learning experiences and expressing their thoughts (Maag, 2005). Also, blogs have been utilized for discussing reflections on course materials, thus extending in-class discussions beyond class time and space limits (Betts & Glogoff, 2004). Overall, the benefits of utilizing blogs in educational settings are well documented in the literature, outlining the strengthening of communication channels among collaborating student groups, the development of social skills, the engagement of students in meaningful dialogue, assisting them to apply multiple perspectives in problem solving situations (Sigala & Christou, 2007).

Wikis as web-based platforms that allow the collaborative construction of material by a group of people who are not required to have programming or other technical knowledge at all. Actually a wiki is an electronic version of a writing board, upon which every collaborating peer can write, delete or alter the content using their own "marker" and "sponge," with some significant features, such as versioning which allows rollback and the comparison of any two versions. The most common task for which wikis are utilized is that of collaborative manuscript construction. The construction and interconnection of multiple articles-pages is possible, thus allowing a set of interconnected web pages to grow as collaboration

among peers evolves (Sauer et al., 2005). Wikis have been used by educators for presenting course material (resources, external links, FAQs, etc.) and creating interactive student activities (Schwartz et al., 2004). As in the case of blogs, the educational benefits of wikis have been well documented in the literature. For example in Fountain (2005) a complete list of such benefits is presented.

Finally, asynchronous discussion forums are eminently communication tools. They are the oldest of the three CMC examined in the current paper, having been used also for educational purposes for more than 30 years, whereas blogs and wikis exist for about 7 years. Since forums are being used for so many years, a great number of research studies have been conducted in order to examine ways of integrating them in educational approaches. They have been used for content delivery, hosting of students' discussions, means for students' inter-assistance (exchange of expertise and/or experiences) or simply for the development of social skills. As part of many CSCL approaches, the use of discussion Forums has been based on the notion that for collaboration to occur, a team has to set up a common ground of understanding first. Thus a lot of work has been documented regarding the educational exploitation of forums, including the development of collaborative scripts for dialogic activities, discussants' interaction analysis, development of critical thinking and metacognitive skills (Bratitsis, 2007).

Research Approach

In the study presented in this paper, the three aforementioned CMC tools were used for a comparative study. The research took place during the Spring semester of 2011, with the participation of 110 second-year undergraduate students of the Early Childhood Education Department of the University of Western Macedonia, in Greece. The activity took place within the context of the "Informatics' applications in Education" course and the duration was 8 weeks (between April and June). The students randomly formed three equally populated groups.

All three groups were assigned exactly the same collaborative task. They were asked to function as an editorial board in order to create a book for the course syllabus. They had to decide upon the content of the book, its arrangement, but justify their choices as well, not only for the material they decided to include, but also for the material they chose to omit. They had to decide what a novice, regarding Information and Communication Technologies (ICT), Kindergarten teacher should read in order to start using ICT in his/her class. Throughout the semester significant issues related to the course syllabus were raised, during the lectures. In the end they were obliged to select one or more group members to present their "book" to the whole class.

No additional instructions were provided regarding the collaboration process. The groups had to initiate collaboration and proceed in any way they wanted to, in order to reach consensus. The only differentiation among them was the collaboration medium; Group A had to use a Blog, Group B a Wiki and Group C an Asynchronous Discussion Forum. Regarding the technological platforms, the

Wordpress system was used by Group A, Mediawiki was used by Group B and the Discussion Interaction Analysis System (DIAS) system (Bratitsis & Dimitracopoulou, 2010) was used by Group C.

During the final presentation session, a four-stage questionnaire was used. About 70% (73 students) of the total population were present at the time and filled in the questionnaires, which aimed at recording the students' perspective on their collaboration and the product they submitted. Specifically, the questionnaires consisted of four sections with each one occupying one page. Section A included 12 questions which aimed at examining what the students' perspective and understanding of their collaboration, as well as their groups' performance and well being. For example they were asked: "How many members of your group were active and how active were they?", "Describe the collaboration process within your group", "Did you undertake any discrete role in your group and how did you undertake it?", "How many (and which ones) discrete roles were there in your group?". Overall, this section aimed at recording if the students were able to understand and describe the collaboration process within their group as a whole, while understanding their positioning within the group collaboration at the same time. This section of the questionnaire was filled at the beginning of the session in order to capture the unbiased perspectives of the students.

Then, the three groups proceeded with their presentations, followed by a short discussion with questions and comments by the students only (the lecturer was only coordinating). Afterwards, the students were asked to fill in Section B of the questionnaire, which included 8 questions related to the collaboration platforms they used. They were asked to evaluate their medium and compare it to the other two in matters of usability, collaboration and discussion facilitation. This section aimed at provoking students' reflection upon the tools they used, the way they used them and forced them to compare their tool with the other two and think about how they would function, both as individuals and as groups, if they were to use one of them. This reflective session led to the completion of Section C, which included 6 questions related to the students' performance as individuals and as groups. They were asked: "to describe their criteria of evaluating performance", "if they were able to quantify their collaborators' activity", "how important are the qualitative over the quantitative criteria", etc.

Finally, a set of diagrams was presented to the students, depicting quantitative and qualitative aspects of their individual and group performance. All the diagrams were Interaction Analysis (IA) Indicators produced by the DIAS system (Bratitsis, 2007). For Groups A and B, data from the blog and the wiki were transferred in the DIAS system using XSLT transformation. This procedure aimed at provoking another reflective examination of the students' criteria of evaluating and understanding their activity, as well that of their collaborators and their groups functionality and well being. The final section (D) of the questionnaire contained questions related to the diagrams and the possibility of them facilitating evaluation of the collaboration by the students and/or the teacher. Overall, the

students were forced to evaluate themselves and their fellow students, while reflecting upon their perspective on what makes a good collaboration, while evaluating and becoming familiar with three widely used CMC tools.

This paper presents the first draft analysis of the questionnaires. The answers were correlated with the actual material that the students uploaded to their assigned technological platforms.

Findings

Overall, Group A produced 290 posts and comments in the blog, Group B created 23 articles and a total of 130 web pages through 937 edits in the wiki and Group C wrote 676 messages in the discussion forum, divided in 13 topics. As stated in the previous section, 73 out of 110 students attended the presentations' session, thus filling the questionnaires. Except from a few students who were excused, the rest had extremely low or no participation at all during the collaborative activity, so the collected answers represent almost all the active population.

The initial set of questions aimed at investigating if the students could understand the group activity and project their own activity within the group. Question No 1 requested that the students estimated how many (number) of their group-mates were active and how much (a 5-grade scale was provided). Overall, 16 distinct values for the number of active participants were provided, varying from 5 to 35. The mean values were 14.68 (Group A), 19.63 (Group B) and 21.67 (Group C). Examining the actual data, the correct values were 22, 28 and 27 accordingly, indicating that the students' estimation was erroneous (Table 1).

Table 1

Students' Estimation of the Group Activity

	Group A	Group B	Group C
Mean Values	14.68	19.63	21.67
Actual Values	22	28	27

Regarding the estimation of their group-mates' activity, there were too many combinations in the answers. Consequently, the students seem to have an increased difficulty in understanding the extent of participation and activity within their group as a total, but also in distinguishing the variety of participation patterns among their collaborators. Also, the students were asked to describe how their group organized their collaboration and all the intermediate steps and milestones until the completion of their task. Interestingly enough, 85% of the students described the process that their representatives described during their presentations. This was an active discussion topic among the students on their way to the final meeting. Thus it is difficult to distinguish if the answers actually depict their own perspective or if they are a result of the pre-class discussions.

When asked to grade collaboration with a 5-grade scale, 85% of the students used the positive grades (average to excellent). This complies with their answers to the question "*what was the most significant positive aspect of your collaboration?*", in which 80% of them stated that they were actually able to collaborate by distance and directly communicate with each other. It is important to mention that they had no prior experiences of working via computers in group assignments, especially with groups of these sizes (about 35 members each). On the other hand, the *most negative aspect of their collaboration* was the fact that *not everybody participated* (32.3%), *poor collaboration* (12.3%) and *lack of democracy* (12.3%). These answers (positive and negative aspects) are rather contradictory, thus enhancing the conclusion that the students experience difficulties in understanding the group activity, both quantitatively and qualitatively (Table 2).

Table 2

Students' Evaluation of the Collaboration

Collaboration	Positive aspect	Negative aspect
85% positive	Managed to collaborate (80%)	Participation (32.3%) Poor collaboration (12.3%) Lack of Democracy (12.3%)

This observation complies with the literature (Dimitracopoulou, 2008). Moreover, when the students were asked what would they change on a group level half of them (50.68%) replied, "the collaboration and coordination process," and 15% replied that they "would like to see more active participation by more students." Thus, a total of about 65% would like to see better collaboration, although they stated that they were happy with what they accomplished up to that point.

When asked if they held a distinct role within their groups, 76.7% of the students answered yes and 23.3% answered no. Most of them (78.6%) stated that they nominated themselves for undertaking their role and the group agreed. Also, 89.2% of the students considered that they met the demands of their role, as they understood them. On the other hand, only 58.6% stated that they wouldn't want to undertake another role. Consequently, a significant percentage of the students thought that their performance was satisfactory, but they would like to contribute to the group on another level. Since most of the students stated that they volunteered for their roles, it becomes more evident that their understanding of the group activity is rather problematic. Also, the students were asked to enumerate and describe the distinct roles within their groups. Although almost all of the students (93%) admitted that there were such roles, most of them (80%) recognized 2-4 roles (Word file preparing, PowerPoint file preparing, Presenters, Information contribution). Actually, there were more abstract roles within the groups, like group leaders, coordinators, editing teams and decision makers, but the students failed to recognize them (with minor exceptions). They considered as

a role the undertaking of a task that was visible and connected to a tangible artifact, such as the preparation of the final manuscript or the presentation.

In Section B of the questionnaire, students were asked to evaluate the CMC tools. In the literature, most of the papers related to the educational use of CMC tools (see Section 2), examine collaboration processes, learning outcomes, learners' interactivity, design and implementation of collaborative strategies, etc, focusing on one CMC tool. There is not much comparative work on several CMC tools (e.g. Kim, 2008), used for the exact same purpose. In this project, the CMC tool is the main variable. When asked to grade the functionality of their assigned tool, most of the students (95.89%) replied that it was very easy, easy or not difficult to use. Regarding the CMC tools of the other groups, 70% of the students found the discussion forum and 71.42% found the blog easy. Regarding the wiki, 57.44% of the students found it to be rather difficult and 23.4% easy to use.

Also, students were asked: "What was the effect of the technological tool on the group's collaboration?" Most of them (60.86%) replied that their assigned tool had a positive effect on their collaboration, whereas similar percentages were recorded when the students expressed their estimation on the tools of the other groups (46.15% Forum, 48.83% Wiki, 52.5% Blog). Then the students were asked to describe the most important positive and negative aspect of the three CMC tools. Regarding the blog, the commenting facility that allows dialogic discussion was the most important positive aspect (36.2%), followed by its usability (27.58%). For the latter, it is important to mention that most of the students are more familiar with blogs. On the other hand, the chronological order of the posts and consequently the discussions was recognized as a negative aspect (32.58%). Being influenced by the discussion forum, students mentioned that they wanted to organize their discussions in a more logical way. Regarding the wiki, the main positive aspect was that they students were able to manipulate the manuscript through the edit page (21.42%), followed by the versioning facility (17.85%) and the editing facility (16.07%). The fact that they could create more than one page, thus allowing them to split into subgroups was recognized as an important facility as well (16.07%). It is interesting that the first positive aspect was recognized as the most negative one too (62%), as it was harder to distinguish each participant's contribution. Finally, the separate topics facility of the discussion forum was the most important positive aspect (58.06%), allowing Group C to better organize their discussions and split into independent subgroups. Overall, the students seemed to prefer the discussion splitting of the Forum, the ease of use of the blog and the fact that they didn't have to go through all the information exchange in order to produce the final manuscript in the wiki. On the other hand, they found the wiki to be more difficult to use and monitor (as the discussions are not actually visible), the blog harder when trying to produce the final manuscript (they had to go over all the posts and comments) and the forum more difficult for handling collaboration. These answers, correlated with an in-class discussion revealed that they preferred blogs for information exchange, wikis for producing collaborative texts and forums for dialogues (Table 3).

Table 3

Students' Overall Evaluation of the CMC Tools

	Blog	Wiki	Forum
Advantage	Discussion handling Easy to use	Editing	Discussion splitting
Disadvantage	Summing up	More difficult	Handling collaboration

Sections C and D of the questionnaire aimed at examining the understanding of the group activity by the students and the projection of their individual activity within the group performance. As this part of the analysis is still ongoing, some draft results are only presented in this paper. Most of the students were satisfied with their performance individually (84.93%) and compared with their collaborators (77.77%). They consider the quality of participation as the most important evaluation factor (82.19%). When asked to describe criteria that they considered to be qualitative or quantitative, they failed to do so (expect 2-3 students). Half of them claimed to be unable to quantify their collaborators contribution. Before completing Section D, they were introduced to Interaction Analysis indicators, some of which visualized qualitative aspects of collaboration. A contradictory observation was that although the students claimed that the qualitative aspects are more important in collaboration, most of them preferred to have quantitative Indicators available during the collaborative process, especially those that visualize individual performance (e.g., number of messages/postings per day). Also, in the final question, "What would you do differently if you and/or the teacher could see the Indicators?" almost all of the students who answered stated that they would be more active, quantitatively (participate and write more).

Discussion

This paper attempted to address the issue of collaborating users via CMC tools being able to evaluate themselves and their collaborators. It is documented in the literature that often students have significant difficulties in understanding complex aspects of collaboration, elaborating social queues and uploaded information, as well as assimilating tasks in order to improve their participation, both qualitatively and quantitatively (Dimitracopoulou, 2008; Bratitsis, 2007). This is confirmed by the findings in the current research too. Indeed, students fail to distinguish roles within collaboration, by considering as such only those that lead to something tangible (e.g., a Word or a PowerPoint file), or those that can be undoubtedly recognized by the teacher, (e.g., the person who makes the final presentation). The majority of the students failed to recognize the information provider or a simple peer, as a legitimate role. Furthermore, students faced problems in understanding how their group-mates activity and how was their own participation and performance in comparison with the group's overall activity.

Also, when evaluating CMC tools, students preferred blogs slightly more, mainly because they were more familiar to them. On the other hand, their evaluations indicate that they preferred different tools for different tasks. It became obvious they liked the blog's usability and discussion facilitation, but found it to be very difficult in summing up a communication cue. They liked the topic separation in the discussion forum and the dialogic visualization of the threaded discussions, but found it more difficult to understand as a concept. Finally, the fact that all the information is on one page in the wiki was considered both an advantage (for collaborative text construction) and a disadvantage (regarding communication). This project was aimed at provoking students to reflect upon their activity and behavior through guided questions. Students were forced to consider their actions in order to better understand the concept of collaboration, within a CSCL context.

Overall the data indicates that this approach can be very useful, as students were introduced to aspects they obviously never considered. Nevertheless, more work is needed, as it was obvious that their misconceptions were not corrected through the project. Students did not use the proper criteria for evaluating individual and group performance and participation. Moreover they could not distinguish roles and tasks within the overall collaboration. Although they came to realize that this was a problem, they failed to realize what the proper evaluation criteria should be and exactly what a undertaking a role means, within a collaborative activity, especially a non-structured one. Similar research projects should focus on finding ways of facilitating the understanding of such concepts by students, thus improving and enhancing collaboration.

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