

# A Qualitative Study of Insults in Collaborative Learning

David N. Prata, Patrick Letouze, Stefano Cerri, and Evandro Costa

**Abstract**—In computer-supported collaborative learning, automatic coding procedure strategies are necessary for teaching because of the large amount of dialogue acts that must be evaluated. In addition, the characterization of a student's social identification for collaborative and learning behaviors might affect a student's learning outcomes in a variety of ways. An effective learning analysis of the interactive processes cannot dissociate cognitive from social factors. We present a qualitative study of social behavior for insults (flaming) in an anonymous, text-based, collaborative learning dialogue protocol. The application of a nuanced framework of miscommunication for 'flaming' conveys new outcomes for social behavior, as the effect of insults, in collaborative learning processes. This study reinforces the importance of conflict as a variable to understand what, when, and how agents can intervene in collaborative learning dialogues in order to monitor and mediate when necessary, thus keeping the conversation progressing in a productive direction.

**Index Terms**—Computer-supported collaborative learning, flaming, insults, interpersonal conflict.

## I. INTRODUCTION

The emergence of technology in science educational applications promotes the proliferation of substantial content to be pedagogically and effectively managed. Today, this teaching challenge calls for the adoption of epistemological innovation of learning beyond conventional instruction grounded in the context of the traditional class. One pedagogical approach to this challenge is computer-supported collaborative learning (CSCL). CSCL encourages interaction among students as a means of implementing constructivist and sociocultural educational theories.

These models of collaborative learning highlight meaning-making and active participation in social contexts. A dialogue setting allows for collaborative activities — such as problem solving — supporting negotiation, meaning construction, and understanding. However, the integration of technology and pedagogical epistemology alone does not guarantee successful teaching. We must comprehensively evaluate CSCL to understand how to use it for collaborative learning.

This study examined social factors through restricted affordances to the social relationship in a CSCL environment. Likewise, it was developed anonymously in a CSCL environment focusing on supporting cognitive or task-related

processes in collaboration with limiting possibilities for social or non-task-related processes [1]. In other words, this is a text-based, computer-mediated communication system using chat alone, which therefore cannot convey visual or non-verbal cues [2].

This study was based on Piagetian theories. Piaget claimed that one source of progress in the development of knowledge is found in the imbalance that forces a subject to seek new equilibriums through assimilation and accommodation. The coding scheme utilized focused on an investigation of individuals' knowledge gains based on the students' collaborative behavior through their beliefs' and negotiation of their meaning [3]. This coding scheme allows for an investigation of the use of cognitive knowledge misconceptions (lacking and misunderstanding) in a dialogue protocol, and students' cooperative and competitive roles.

These misconceptions and the categorization of their types can also provide agents with cues for what, when, and how to intervene in collaborative learning dialogues. For example, the task of a group-learning facilitator is to monitor a large number of ongoing collaborative learning discussions and to mediate when necessary to keep the conversation moving in a productive direction.

This study aimed to evaluate how social behavior can influence student's learning. Previous studies (e.g., [3]) have found insults to be associated with positive learning. In this study, we describe complementary findings for the role of insults in collaborative learning. Further, by applying a qualitative framework, we suggest new outcomes for social behavior in CSCL environments.

## II. METHODS

Thirty-two sixth-grade students from a suburban elementary school participated in this study. The students were arranged by the experimenter into pairs with a mixture of mixed-ability and homogeneous ability pairs.

The materials for the experimental were the following: a) a mathematics tutoring program covering problems on fraction addition, subtraction, multiplication, and division; and b) two extensive isomorphic tests designed for pre-test and post-test use. The pre-test and post-test versions consisted of 49 and 47 questions, respectively.

The experimental procedure spanned four school days. On the first day, a pre-test was completed individually by each student. The pre-test lasted for approximately 30 minutes with the aim of assessing how much the students knew about the subject matter. A short collaboration training manual was also provided to teach students about good collaborative dialogue. On the second and third days, the students worked together in labs for approximately 45 minutes per day. The post-test was administered on the fourth day and was separated from the

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third day by a weekend. This two-day lag between the last lab day and the post-test day allowed for a measure of retention. Each student performed the post-test alone. Teams remained the same throughout the experiment.

The students were encouraged to work in cooperation by offering a small prize for the teams at the end of the study based on how much they learned the subject matter and how many problems they solved correctly while working together.

This experiment allowed us to investigate students' knowledge gains based on the pre- and post-tests and to analyze the chat and the math tutoring program contributions based on students' pairs and the students alone. A total of 24 students participated in all of the experimental days. Because one student did not participate in the chat interface during two of the lab days, we reduced the sample to 23 students.

### III. QUALITATIVE ANALYSIS OF INSULTS

Hamel [4] distinguished between top-down and bottom-up approaches for task analysis. The top-down strategy requires an initial model from which to begin, based on psychological and educational theories and it is usually obtained from some holistic impression of a set of protocols. The bottom-up approach involves finding abstract descriptions through the visualization of parts of the protocol. The insult speech act was conceptually grounded in the bottom-up approach.

The insult categories are shown in Table I. The original coding scheme has a total of 32 categories. Reference [5] provides a more complete taxonomy of speech acts.

TABLE I: DESCRIPTION OF SOCIAL COMMUNICATIVE CATEGORIES

Intention	Player Role	Speech Act	Description	Sketch	Example
Persuade	Competition	Insult	The speaker insults his or her partner by calling them an obscene or offensive word.	"You are ..." an offensive word	"you loser" (Student 20)
Persuade	Competition	Divergent reasoning	The speaker approaches his partner's solution to the problem expressing a negative sentence and identifying the concept that s/he has incorrectly expressed.	"This concept is wrong!"	"It's not 1!!!" (Student 6)
Convince	Cooperation	Contradiction	The speaker approaches his/her partner's solution to the problem by noting a logical inconsistency in his/her partner's reasoning.	"You did this, but the right way is that"	"Well it looks like you multiplied 6 by 5 so I bet if you multiplied 5 by 5 you would get the numerator" (Student 1)

As we can see in Table I, the codification of the insult category seems to reflect an interpersonal conflict between students. The dialogue analysis methodology used did not consider the individuals' intentions and interpretations of speech acts, nor did it consider contextual factors. It was a quantitative classification for each individual chat turn and was independent of the discourse context. To qualitatively analyze the dialogue protocol, we used the taxonomy of problematic messages from [6], as summarized in Table II.

TABLE II: TAXONOMY OF MESSAGES BASED ON INTERACTIONAL NORMS (APPROPRIATE OR TRANSGRESSION)

Norm	Perspective			Context interpretation
	Speaker	Hearer	Third party	
1	Appr	Appr	Appr	Mutual interpretation
2	Appr	Appr	Transgr	Mutual interpretation, but violate norms
3	Appr	Transgr	Appr	Hearer misinterprets to flame
4	Appr	Transgr	Transgr	Speaker's unintentional incompatible behavior
5	Transgr	Appr	Appr	Speaker fails to communicate flame
6	Transgr	Appr	Transgr	Hearer's misinterpretation, missed flame
7	Transgr	Transgr	Appr	Covert mutual flaming
8	Transgr	Transgr	Transgr	Mutual flaming

Note. Appropriate (Appr), Transgression (Transgr)

The taxonomy is structured based on interactional, appropriate, or transgressional, communicative norms. Typically, the communicative norms were grounded in sociocultural language [7], [8], for example, etiquette rules for appropriate and inappropriate social behaviors [9]. Computer-based interactions are classified by "netiquette" [10], [11]. Moreover, sociolinguistics has investigated the effect of aspects of various cultural norms on social behavior (e.g., gender, age, socioeconomic classes, religion, and education; [12]). In the background, the norms communication success (unambiguous) depends on the efficiency of the transmission of the communication channel [13], [14], the sender's intention, the receiver's interpretation, and the message (un)ambiguity [15].

Our goal was to determine whether the insults studied in [16] actually lead to interpersonal conflicts (antisocial behavior) or, instead, whether it is a sort of socialization language based on cultural norms established within the groups being studied. For this study, we adapted a specialized framework suited to our needs, adopting a slightly differently approach from that of [6], as the purpose of their framework was to emphasize the essential role of the message creator's intention. Nonetheless, in this study, we aimed to investigate the social relation context of each pair; therefore, we also considered the hearer's interpretation of the message. We also changed the role of the third party (mediator) because, in this study, we considered sociocultural norms that could help the mediator keep the students' conversation moving in a productive direction. We constructed the norms from the third-party observation. Therefore, the third party could have ambiguous interpretations of the parties' relational social context. The results of our classification are shown in Table III.

TABLE III: COMMUNICATIVE NORMS IN ANTI-SOCIAL BEHAVIOR CONTEXT BASED ON TABLE II

Norm	Social relational context	Communication ambiguity	Player ambiguity	Interpersonal conflict
1	Socialization	None	None	None
2	Socialization	Interpretation	Third Party	None
3	Antisocial	Interpretation	Hearer	Signaling
4	Antisocial	Intention	Speaker	Signaling
5	Antisocial	Intention	Speaker	Signaling
6	Antisocial	Interpretation	Hearer	Signaling
7	Antisocial	Interpretation	Thirty Party	Emerge
8	Antisocial	None	None	Emerge

From the social relational context column, we could determine whether antisocial behavior was present for the speaker, hearer, or both in the dialogue protocol. Using this approach, we classified the insult speech act as either interpersonal conflict or not. Based on the ambiguity communication column, we clarified deficiencies in the communication based on the intention and interpretation of the messages, regardless of whether the ambiguity was caused by inefficient transmission in the communication channel or actual message ambiguity. In the interpersonal conflict column, we observed whether there was a true interpersonal conflict and whether it signaled an interpersonal conflict emergency. The elucidation of miscommunications and misinterpretations of the message content communication and the detailed and accurate identification of interpersonal conflicts can provide agents with cues of what, when, and how to intervene in collaborative learning dialogues. In this way, agents can monitor a large number of ongoing collaborative learning discussions and mediate when necessary to keep the conversation moving in a productive direction.

IV. RESULTS

We analyzed the correlations between pre- and post-test learning gains and the frequency of each category of our coding scheme in each pair’s dialogue. Interestingly, student insults were associated with significantly higher learning gains,  $r = 0.70$ ,  $t(22) = 4.53$ ,  $p < .001$ . In Figure 1, we provide evidence that the four students who made learning gains of upwards of 20% were involved with insults.

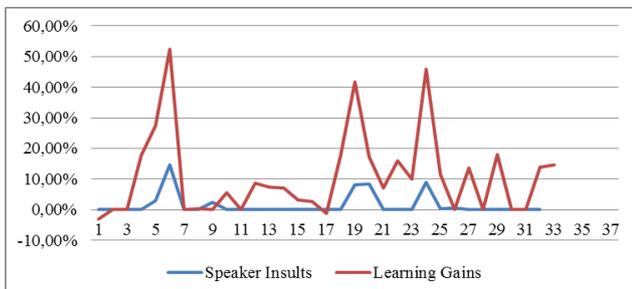


Fig. 1. Learning gains by speakers’ insults. Pairs are composed by former number odd and later number even, e.g., 29–30 is a pair.

Fig. 2 demonstrates that the three students with the greatest learning gains are far separated from the median of the whole group, where the standard deviation was 0, 14.

To qualitatively analyze the dialogue protocol, we concentrated on these four students and their partners who showed greater and disproportional learning gains. These

students were in three different pairs, 5-6, 19-20, 23-24, and uttered a total of 25 insults. We classified these insults in Table III and Table IV.

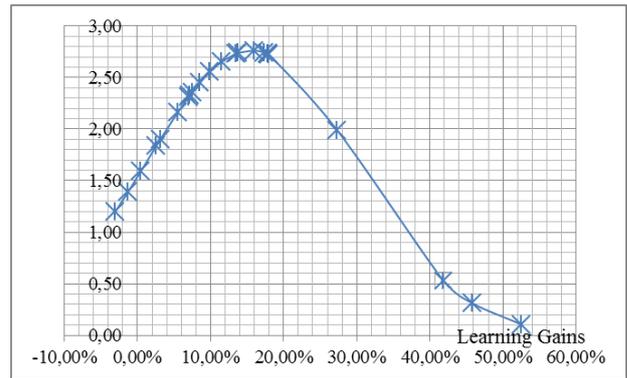


Fig. 2. Normal distribution of the learning gains.

TABLE IV: COMMUNICATIVE NORMS IN ANTI-SOCIAL BEHAVIOR CONTEXT INSTANTIATED BY INSULTS FROM THE DIALOGUE PROTOCOL

Norm	Social Relational Context	Ambiguity Communication	Ambiguity Player	Interpersonal Conflict	Insults from Dialogue Protocol
1	Socialization	None	None	None	-
2	Socialization	Interpretation	Third Party	None	4
3	Antisocial	Interpretation	Hearer	Signaling	-
4	Antisocial	Intention	Speaker	Signaling	-
5	Antisocial	Intention	Speaker	Signaling	-
6	Antisocial	Interpretation	Hearer	Signaling	4
7	Antisocial	Interpretation	Thirty Party	Emerge	-
8	Antisocial	None	None	Emerge	17

The 25 utterances were classified in three different norms according to the framework of [6].

Here is an example of dialogue exchanged between the student pair 5-6, in sequence, from the second day:

“Student 6: will you talk!  
 After a while...  
 Student 6: yousa cwazy  
 Student 5: uuuuuuuuggggggghhhhhhhhh  
 Student 6: Mesa not Dumb!!!!  
 Student 5: what is your problem u star wars psychopath  
 Student 6: I have n0o prob”

Student 5 had a learning gain of 27.36%, improving from 21 hits in the pre-test to 33 hits in the post-test. Student 6 had a learning gain of 52.54%, increasing from 17 hits in the pre-test to 41 in post-test. The student pair 5-6 exchanged a total of three insults. We classified these three insults as norm 8, a true flame. Perceiving the utterances in their dialogue, we could detect that the students insulted each other in a competition manner, a true flaming that might be observed by a third party.

In the next example, we extracted some lines from the dialogue exchanged between the student pair 19-20, in sequence. The first dialogue is from the first day, and the second from the second day.

“Student 19: i win  
 Student 20: ya! You lose

Student 19: u slow typer

Student 20: be quite

Student 20: I win!

Student 20: loser

6 minutes of silence...

After the return of the conversation, in the same section, humor

Student 19: =)

Student 20: =]"

"Student 20: HI!!!!!!!!!!!!!!!!!!!!!!

Student 19: hi

Student 20: loser

Student 19: u the noob

Student 20: finally you get it

Student 19: shut up

Student 20: no!!!! Loser!!

Student 19: loser stops gessing

Student 19: (^)>

Student 20: ()>

Student 20: mine is better

Student 20: loser

Student 19: noob"

Student 19 had a learning gain of 41.82%, increasing from 16 hits in the pre-test to 35 hits in the post-test. Student 20 had a learning gain of 17.33%, increasing from 28 hits in the pre-test to 35 in post-test. Here, we saw a distortion in knowledge between students 19 and 20 for the pre-tests, 16 and 28 hits, respectively. However, student 20 had a slightly greater learning gain (17.33%) compared to the median (14.82%).

This student pair exchanged a total of 18 insults. We classified four of these insults as socialization and misinterpretation of the third party. Fourteen insults were classified as true flaming. Observing the sequence of the utterances in the dialogue, we could establish that the students, in a certain moment, start to offend each other in a competitive manner. However, after a while, they began to use this profane language in a joking, sarcastic, and playful manner. In this case, without access to the contextual factors of the discourse, the third party could have misinterpreted some of the sarcastic insults as true flaming.

In the next example, some passes of the dialogue exchanged between the student pair 23-24 are shown, on the first and second days, in sequence.

"Student 24: this is easy fool

Student 23: help"

"Student 24: STOP It FOOL

Student 23: don't now

Student 24: What did I say fool

Student 23: omg"

Student 23 had a learning gain of 9.90%, increasing from 16 hits in the pre-test to 20 in the post-test. Student 24 had a learning gain of 45.81%, increasing from 13 hits in the pre-test to 34 in the post-test. Here, we observed that the learning gain for student 23 was below the median (14.82%). For this pair, four insults were counted in the dialogue protocol. However, only student 24 insulted his/her partner. Student 23 did not insult his/her partner, misinterpreting the

message and missing the flame.

## V. CONCLUSION

We observed that student 23 had the potential for learning growth, as s/he correctly achieved only 16 hits out of 49 possible hits in the pre-test. However, s/he correctly answered only 20 hits of the available 47 on the post-test. Remarkably, student 23 received insults, but did not fire back at his/her partner. Instead, his/her partner, who did the insulting, showed a learning gain of 45.81%. These insult analyses were classified as norm 6 (see Table IV).

Certainly, the insults that student 23 received without reacting to his/her partner were linked to lesser learning gains, as the learning gain (9.90%) for student 23 was below the median (14.82%). This was also the case for student 9, who received insults but did not respond. Student 9 had a learning gain of 5.51%, well below the median. We excluded Student 9 in this qualitative analysis because his/her partner did not participate in the entire experiment. Moreover, we could not find another student who received insults but failed to respond. Because of the scarcity of this sort of data, we could not determine from our results whether this was a case in which one student greater learning has had no positive impact on the other student. Reference [17] found that the usage of insults led students to abandonment of online learning environments. Studying this issue in greater depth will require another corpus of data in order to determine effects on learning for the receivers of insults.

Student pairs 5-6 and 23-24 had their insults classified as norm 8. In these cases, their performances were both linked to greater learning gains, and they insulted each other. Reference [16] found that students who insulted their partners achieved greater learning gains, but insult reception was not associated with such gains. Reference [6] framework is in accordance with [16]. Moreover, the use of the framework can allow for a differentiation of more nuanced insults, which can help agents to decide what, when, and how to intervene in the collaborative learning dialogues to keep the conversation moving in a productive direction.

Pair 5-6 emerged with flaming in the final section of the second day. Observing their dialogue, we noted a lack of conversational richness between them on both the first and second days. However, a disagreement arose on the second day in spite of their infrequent turn taking. Perhaps these turns on the first and second days, before the insults, should be classified as norm 7. According to [18], disputing behaviors can be expressed with silence. Meanwhile, the third party misinterpreted the covert flame of pair 5-6, which only arose in the final second day lab task.

CSCL is, by nature, a collaborative problem-solving set. Hence, this study supports the arguments of [19] and [20] that the conceptualization of cognitive change as either a process of conflict or a process of cooperation is a false dichotomy. We conclude that interpersonal conflict is an important variable for evaluating CSCL performance teams. Moreover, the detection of flaming and its qualitatively nuanced identification and classification (e.g., speaker's intention and hearer's interpretation), can help agents toward facilitating

group learning, thereby improving the monitoring of a large number of ongoing collaborative learning discussions and in on-demand mediation. For future studies, the study of a game theoretic model to reflect collaborative learning would be valuable.

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