Dynamics of Computer-Mediated Communication in Pair Interactions: ESL Pre-Writing Collaboration

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Iona Sarieva. DYNAMICS OF COMPUTER-MEDIATED COMMUNICATION IN PAIR INTERACTIONS: ESL PRE-WRITING COLLABORATION

Abstract. The active use of technologies for communication in educational settings calls for a better understanding of the way learners engage in computer-mediated tasks. The current study aims to analyze the dynamics of pre-writing discussions in English as a Second language settings. The pre-writing discussions of 60 learners of intermediate level of proficiency were analyzed. The results of the study show that the students participate in the same task completion in a different manner depending on the mode of communication. These differences suggest that while the discussions completed in synchronous environments tend to be more collaborative, the posts were shorter and did not comprise complete sentences, in the asynchronous discussion on the other hand, the posts tended to share characteristics of outlines or drafts and students used longer strings of words often organized in complete sentences.
Keywords: computer-mediated communication, English as a second language, writing process, collaboration.

Йона Сариева. ДИНАМИКА НА КОМПЮТЪРНО БАЗИРАНАТА КОМУНИКАЦИЯ ВЪВ ВЗАИМОДЕЙСТВИЕТО ПО ДВОЙКИ: СЪВМЕСТНАТА РАБОТА ПРЕДИ ПИСАНЕТО В АНГЛИЙСКИЯ КАТО ЧУЖД ЕЗИК

Резюме. Активното използване на технологиите за повече комуникативност в обучителните среди изисква едно по-добро разбиране на начините, по които учащите вземат участие в компютърно базирани задачи. Настоящото изследване има за цел да анализира динамиката в дискусиите, които възникват преди акта на писане в средата на английския като чужд език. Анализът на дискусиите включва 60 учащи от ниво средно напреднали. Резултатите от изследването показват, че учащите се представят в една и съща задача по различен начин, в зависимост от метода на комуникация. Тези разлики изказват предположението, че докато дискусиите, извършвани в синхронни среди, са по-съвместни, отговорите на учащите са по-кратки и не образуват завършени изречения, а в асинхронните среди отговорите се характеризират със схематичност и планиране, като учащите залагат на по-разгърнато езиково изразяване, което често се съдържа в завършени изречения.
Ключови думи: компютърно базирана комуникация, английски като чужд език, процес на писане, съвместна работа.

Introduction

The active use of technologies for communication in the educational enterprise motivates educators and researchers to look into the specifics of text-based computer-mediated communication (CMC) in educational settings. Furthermore, the increasing use of CMC for the completion of collaborative learning tasks calls for a careful examination of learner interactions in distance-learning environments that would lead to establishing a better understanding of the way learners engage in such tasks. A closer examination of student CMC exchange would allow for gaining more insights about the specifics of the learning process in distance and blended learning environments. This article presents a study which investigated the dynamics of dyadic computer-mediated interactions in English as a second language (ESL) student pre-writing discussion activities. The goal of the study is to interpret the patterns of interactions as evident in student collaborative pre-writing task completion in synchronous and asynchronous CMC environments.

On Collaboration and Second Language Writing

In the writing-as-a-process approach literature, writing is understood as a process of text construction in which the composition abilities and expertise are in constant development (Faigley; Grabe & Kaplan; Reither). The Post-process theory further extends the perception of writing: while "the fundamental observations that an individual produces text by means of a writing process has not been discarded" (Petraglia, 53), the text composition is perceived as a complex phenomenon grounded in a rich social context which incorporates various elements – writers, genres, audiences, cultural practices, and social interactions (Kent, Petraglia, Reither). Therefore, following Grabe and Kaplan (1996), it is perceived that in educational settings instructors should strive to promote the creation of writing communities as well as student collaborative engagement. Furthermore, this view on writing as a socially embedded process motivates the recognition of learner collaboration as an essential component that needs to be accounted for.

In the context of second language (L2) writing instruction, collaboration is recognized as a key element that promotes student language and writing skills development (e.g., Neumann & McDonough; Storch); the L2 writing research has examined the benefits of student collaboration for text construction including student attention to language form, accuracy, and text complexity and organization (e.g., Fernandez-Dobao; Shehadeh; Storch; Wigglesworth & Storch). While multiple studies have examined student collaboration during the writing process and the connection between collaboration and text production in face-to-face settings (e.g., Fernandez-Dobao; Shehadeh; Storch; Wigglesworth & Storch), today's active inclusion of technologies in education affords further opportunities for student collaboration and has prompted a new line of research which centers on the analysis of the CMC interactions as related to language and writing skills development (e.g., Elola & Oskoz; Li & Zhu; Loewen & Wolff).

The presented study aims to contribute to the better understanding of student collaboration in the initial stages of writing; the goal is to provide insights on the dynamics of students' early engagement with text construction in CMC environments. Taking a closer look at the dynamics of these interactions accounting to the mode of communication, asynchronous (discussion forums) and synchronous (text-based chats), would reveal the potentials of the CMC pre-writing collaborative tasks to positively influence the overall writing process. It is believed that such more detailed analysis of the pre-writing student interaction dynamics in the context of the writing process, can inform the more effective CMC discussion task design, choice of communication mode, as well as teacher's moderation of pre-writing discussions in blended and distance L2 writing classrooms.

Study Framework and Design

In the presented study, the model of pair interaction types presented in Storch's 2002 study has been adopted. Storch studied the patterns of face-to-face interactions of 10 pairs of ESL adult learners in an advanced university-level ESL class. Analyzing students' dyadic interaction, she accounted for the way learners approached the assigned task, the roles they adopted in the process of interaction, as well as the involvement and contribution of each learner. The patterns of dyad interaction that were depicted by Storch were the following: *collaborative, dominant/dominant, dominant/passive,* and *expert/novice*.

Two indexes were used to describe the specifics of each pattern: *mutuality* and *equality*. *Mutuality* was described by Storch as the level of engagement of each participant, while *equality* referred to the degree of control over the interaction. The dyads that demonstrated *collaborative* interaction patterns, worked in "joint problem space" (128) offering alternative views on the discussed problems, looking for mutual agreements and resolutions while demonstrating interaction of high mutuality and equality. When adopting *dominant/dominant* patterns of interactions, students expressed an inability to reach consensus or employed a high division of labor, which resulted in low level of mutuality. In *dominant/passive* dyads, the dominant participant demonstrated an authoritarian stance appropriating the task while the other participant took a more passive role; thus, the levels of *mutuality* and *equality* were fairly low, which resulted in less negotiation. Finally, when *expert/novice* patterns were observed, the expert participant, although taking control over the task, encouraged the novice to contribute to the collaborative process, which resulted in higher mutuality with lower equality level. Storch suggested that there were more evidences of knowledge transfer when *collaborative* and *expert/novice* patterns were observed.

In the current study, the CMC interactions of the participants during the completion of the pre-writing CMC discussion task served as a primary data source for answering of the following research question: *What patterns of dyadic interaction do participants manifest during the asynchronous and synchronous CMC interaction process?*

Data Collection

The data were collected at the intensive English language program (IEP) of a large urban state university in the Southeast United States. The pre-writing discussions of 60 intermediate English as a second language adult learners were analyzed. The students engaged in CMC interactions while preparing for writing their first drafts of an expository essay. The synchronous computer-mediated interactions (SCMC) took place during a 50-minute class session, while the asynchronous computer-mediated (ACMC) data were generated during a discussion which was assigned to be completed within a week.

Data Analysis

A total of 30 CMC interaction logs (17 ACMC and 13 SCMC) were analyzed in order to identify the pair interaction dynamics for each case. The analysis was performed line by line for each log. The evidences for stances of interaction that would specify each participant's pattern of interaction were identified. The stances of interaction considered in the data analysis are presented in Table 1.

Dyad Pattern Type	Dyad Interaction Stance
Expert/ Novice	- more control; encourages the novice; offers assistance - confirms experts' position, repeats after Expert, little contribution
Collaborative/ Collaborative	- work together on all parts; joined problem space; alternative views offered and discussed; willing to engage with each other's ideas; leading resolutions acceptable for both partners; cohesion of interaction (repeat & extend); negative & positive feedback
Dominant/ Passive	- authoritarian; appropriates the task; long monologues; little attention to the other's contribution; speech directed to the self; little assistance offered - passive and/or subservient; fewer contributions or challenges; does not propose challenges; little assistance sought
Dominant/ Dominant	- both contribute to the discussion; inability to engage with each other's contribution; inability to reach consensus; division of labor; few requests or collaborative completions

Table 1. Stances of Interaction

In order to reveal the specifics of the interactions, the CMC discussions were examined and the outcomes of the discussions carried out in the two modes of CMC were compared in terms of language produced and patterns of interactions used in these discussions. The following descriptive characteristics of language specifics were examined: (1) number of turns, (2) mean length of turns, (3) length of discussions measured with average number of total words, (4) number of distinct lexical items (DLIs), (5) mean length of word strings between end-of-sentence punctuation.

Findings

Descriptive Characteristics of the CMC Interactions

When examining the CMC discussions, it was noted that the interactions differed in several ways depending on the CMC mode. It could be inferred that the synchronous communication in general was more interactive than the asynchronous. The SCMC discussions were more dynamic and involved the generation of more language with a higher number of partner turns and distinct lexical items used by the partners.

The texts produced during the SCMC discussions were generally longer: the mean length of a SCMC discussion was 410.46 words, while the mean length for ACMC was 272.76 words. In the SCMC discussions, students used more DLIs – the mean number of DLIs was 92.15 as compared to 66.24 DLIs for the ACMC discussions. However, the sentences produced during the ACMC discussions were easier to detect due to more consistent use of end of sentence punctuation and complete syntactical structures, while the SCMC group used more utterances consisting of phrases or incomplete sentences and the punctuation was often irregular.

The computation of the average length of word strings between end-of-sentence punctuation marks or end-of-posting revealed that the ACMC group used longer strings of words between end-of-sentence punctuation marks or end of posting, with an average of 12.66 words, whereas the number of words in the SCMC discussion utterances, signified by end-of-sentence punctuation (period, exclamation or question mark, three dots) or end-of-posting (without a punctuation mark), was 6.92 words. In addition, the exchange of students who participated in ACMC and SCMC discussions differed significantly by the number of postings. For the ACMC discussion, the mean number of postings was 5 per dyadic interaction while in the SCMC discussion it was much higher – 46.46.

As compared to the SCMC, ACMC postings used longer chunks of text. The average length of ACMC postings was 54.98 words per turn, whereas the average length of the SCMC postings per turn was 8.85 words. The sentences in the ACMC postings were mostly organized in short sequences that sometimes resembled paragraphs presenting a topic sentence and supporting ideas and other times were ideas outlines often formulated in complete sentences and presenting the topic, the controlling idea, and supporting ideas for the paragraph, while the SCMC participants did not organize their ideas in a paragraph-like or outline formats.

Thus, the pre-writing discussions, when carried out in ACMC mode, shared characteristics of outlines or drafts, while the pre-writing discussions produced in an SCMC mode tended to concentrate on generation of ideas related to the writing topic. The descriptive statistics of ACMC and the SCMC discussions outlined above are presented in Table 2.

	n	Mean Number of Turns	Mean Length of Turns	Mean Number of Words	Mean Number of DLIs	Mean Length of Sentence
ACMC	17	5	54.98	272.76	66.23	12.66
SCMC	13	46.46	8.85	410.46	92.15	6.92

Table 2. Observed Descriptive Characteristics of CMC Interactions

Patterns of Pair Interaction

The interactions were examined in order to determine the specifics of the interaction patterns for each group following Storch's model. Some similarities as well as differences between the dyadic patterns of interaction in face-to-face environments as reported by Storch and the observed CMC interaction patterns were identified. The modified model along with the main indicators manifested in each pattern of interaction in the CMC environment is presented in Figure 1 and discussed further.

	High Mutuality			
Low Equality	**Expert** - more control - encourages the novice - offers assistance	**Novice** - confirms experts' position - repeats - little contribution	**Collaborative/Collaborative** - work together on all parts - joined problem space - alternative views offered and discussed - willing to engage with each other's ideas - leading resolutions acceptable for both partners - cohesion of interaction (repeat & extend) - Negative & positive feedback	**High Equality**
	Dominant - authoritarian - appropriates the task - long monologues - little attention to the other's contribution - speech directed to the self - little assistance offered	**Passive** - passive and/or subservient - fewer contributions or challenges - does not propose challenges - little assistance sought	**Dominant/Dominant** - both contribute - inability to engage with each other's contribution - inability to reach consensus - division of labor - few requests or collaborative completions	
	Low mutuality			

The most dominant trend of interaction observed was the *high mutuality* and *high equality* trend which led to a collaborative pattern of interaction. A total of 12 pairs demonstrated this trend as the main trend of interaction. Whilst this type of interaction was predominant in the SCMC discussion with nine out of 13 pairs using mainly collaborative interactions (69.23%), for the ACMC discussion it was a

much less prevalent type of interaction: only for three out of 17 pairs (17.65%) was this interaction pattern identified as prevailing. The interaction pattern observed with the highest number of ACMC dyads was *high equality* and *low mutuality* which led to *Dominant/Dominant* discussion – for eight dyads out of 17 (47.06%) this pattern of interaction was recognized as the prevailing one. Table 3 presents the patterns of interaction used in each CMC environment and the number of dyads for whom a specific pattern of interaction was prevailing.

Identified in	Pair Pattern	ACMC Pairs	SCMC Pairs
FTF (Storch, 2002) and CMC interactions	Collaborative/Collaborative	3	9
	Dominant/Dominant	8	0
	Dominant/Passive	1	1
	Expert/Novice	0	1
CMC interactions only	Expert/Dominant	0	1
	Collaborative/Dominant	5	1

Table 3. CMC patterns of interaction

It could be concluded that the distribution of dyadic patterns across the two environments was different. *Low mutuality* seems to be more prevalent in the ACMC environment – nine dyads demonstrated a type of interaction that had low mutuality. However, the majority of these dyads were highly equal in their discussion, thus demonstrating a pattern of interaction in which both participants dominated the discussion.

In both ACMC and SCMC interactions examined in the study, the collaborative pattern demonstrated communication during which learners were engaging in the task completion process by developing each other's ideas. The flow of this progress seemed to be acceptable for both members of the collaborative dyads. The participants were creating and working within a "joined problem space" (Teasley & Roschelle) by approaching together each part of the task and engaging with each other's ideas. Their interactions were cohesive and flowed logically. Although in the ACMC discussions the postings were longer as compared to the SCMC and sometimes one posting would address several aspects of the task, the participants clearly indicated consideration of their partner's contribution. Further, they progressed through the task developing each other's postings. Thus, when positioning these interactions within the quadrants defined by the two continuums of the dyadic interaction model, *Mutuality* and *Equality* (Storch, 2002), the collaborative dyads demonstrated high mutuality and high equality.

There were eight pairs that demonstrated *low mutuality* and *high equality patterns* in their interactions. Following Storch's model, both of the participants in these pairs were identified as dominant. The high equality/low mutuality pattern was the predominant pattern in the ACMC interaction – eight out of 17 pairs completed the pre-writing task demonstrating a *Dominant/Dominant* pattern. Thus, 47% of the pairs who communicated via ACMC demonstrated this type of interaction pattern.

In the examined discussions, only one pair (SCMC) demonstrated a communication pattern of a *high mutuality* but *low equality*. Although the mutuality in this pair work was clearly visible, the equality was low, with one of the participants taking the role of the expert and the other – the role of the novice.

During the pre-writing discussion, two pairs demonstrated *low mutuality* and *low equality patterns*. One of these two pairs completed the pre-writing task in an asynchronous and the other in a synchronous CMC environment. Thus, this pattern of interaction comprised 5.88% of the ACMC discussions and 7.69% of the SCMC. While these discussions were situated within the same level of mutuality and equality, the specific interaction patterns were somehow different. In the ACMC discussion, only one of the members participated in the task by publishing a post while the other remained silent, whereas both of the SCMC-pair members engaged in chatting during the pre-writing session.

CMC Emerging Patterns

Within the context of this study, it was expected to encounter emergent types of interaction patterns. These expectations were based on the fact that the model was created with a consideration of face-to-face interactions, whereas the interactions analyzed in the current study were carried out in a CMC environment. While most of the dyadic interaction patterns analyzed in this study would fall within the model's *Equality/Mutuality* continuum quadrants, two interaction trends which would not fit the model emerged from the data.

The *disengagement* pattern was evident in cases when one of the participants, after contributing to the discussion demonstrating the patterns specified by Storch, abandoned the discussion either temporary or permanently before it was completed. Thus, this pattern was identified as secondary to the main patterns as indicated in the model.

This pattern was differentiated from the *passive* or the *novice* ones because it was observed with participants who contributed substantially to the discussion but at their disengagement strongly influenced discussion dynamic. Interestingly, this pattern was observed in 12 (71%) of the ACMC dyads, whereas only one dyad (7.7%) of the SCMC group demonstrated it.

As it was stated earlier, in Storch's model, both members of the dyads were assumed to occupy the same quadrant of the *Mutuality/Equality* continuum; this assumption was further confirmed by the pair face-to-face interaction data analysis reported in the model construction. When applying the model to the presented

CMC interaction data, it was noted that in some of the cases, the two members did not occupy the same quadrant of the *Mutuality/Equality* continuum demonstrating interactions that did not match each other on the level of *Mutuality*.

A total of seven pairs demonstrated such *mutuality mismatch*. Six pairs comprised a collaborative (high mutuality) partner with a dominant (low mutuality) partner. In one dyad, a participant who demonstrated an expert (high mutuality) pattern of interaction worked with a partner who utilized a dominant (low mutuality) pattern. The ACMC group had the highest number of mutuality mismatch dyads – five (29.4%), whereas only two SCMC dyads (15.4%) demonstrated such mismatch.

Another emergent pattern was *collaborative/dominant*. With the ACMC pairs the trend was that one of the participants was approaching the task in a collaborative manner, whereas the other assumed a dominant role entirely or almost entirely ignoring the partner. In all five of the ACMC dyads with a *mutuality mismatch*, the secondary interaction pattern of disengagement was observed with one of the partners. In four out of the five ACMC dyads, the participant who abandoned the discussion was the one who demonstrated a dominant pattern of interaction. In the synchronous discussion, only two dyads demonstrated a mutuality mismatch. In one of the dyads, the participants demonstrated a dominant and an expert patterns and in the other – a collaborative and a dominant patterns.

The interaction of the SCMC pair that demonstrated *collaborative/dominant mutuality mismatch* was different from the ACMC ones. While for each of the ACMC dyads with a mutuality mismatch, the dominant participants simply ignored their partners disengaging from the task as soon as they perceived their contribution to the discussion to be completed, the dominant behavior of the SCMC participant was different. In this pair, one of the participants attempted to command his partner rather than to constructively contribute to the task completion by frequent posts of directions about how the task should be approached. The other partner commented on this behavior as rude but this remark ignored.

Finally one pair participating in an SCMC discussion demonstrated a *dominant/expert* pattern of interaction. One of the partners was the more active participant who not only posted on the topic but also encouraged the partner to stay on task while the other engaged by sharing personal experiences not related to the task on hand. The second participant used the discussion space one-sidedly – as a forum to chat about her own personal experience or general ideas about the topic without specifically referring to her partner's ideas. She ignored her partner's attempts to guide her through the task and show her the information sources required for task completion. It seemed that she was unable to engage with her partner's contribution. Her focus was on her own ideas and experiences and at times, it seemed that she did not read her partner's responses. Her interaction could be situated in the low end of the mutuality contin-

uum, whereas the interaction patterns of the more active partner who stayed on task correspond with the high end of the mutuality continuum.

Summary and Conclusions

This study focused on the patterns of pair interaction in a CMC environment as identified based on the analysis of the CMC pre-writing discussions. The interaction patterns observed in the CMC discussions partially corresponded with the model of pair interaction proposed by Storch based on face-to-face interaction data. The results of this study revealed that the CMC discussions were strongly influenced by the mode of CMC interaction.

The ACMC mode triggered postings that used longer strings of words often organized in complete sentences, whereas in the SCMC interactions, the electronic utterances were much shorter and did not always comprise complete sentences. However, the number of unique words in ACMC interactions was lower as compared to the SCMC interactions. Further, the SCMC interactions generated longer discussions, with higher number of posting, therefore the learners had more opportunities to generate and interact in the target language.

The patterns of dyadic interaction were influenced by the CMC environment as well. When the pre-writing task was completed in an SCMC mode, the interactions were more collaborative in nature, as compared to the ACMC interactions. When performing the pre-writing task in an SCMC environment, the participants tended to recognize their partners' presence and contribution to the discussion and attempted to interpret together the images related to the task. They were more likely to demonstrate high degree of mutuality and equality. There were more instances of dominant patterns when the pre-writing discussion took place in an ACMC environment; thus, the mutuality of the ACMC dyadic interactions was lower.

In addition, the CMC environment prompted a dyadic pattern mismatch when one of the participants would engage in the discussion assuming a high level of mutuality, while the other would assume a low level of mutuality. In other words, the latter would be concerned mainly with his or her own ideas while the former would show stronger intention to share and discuss ideas related to the task. Based on the data, it seems that the learners were more likely to demonstrate such a mismatch in an ACMC environment. Finally, some of the ACMC participants preliminarily disengaged from the task after completing their posting. They did not revisit the discussion space to post additional messages or reply to the ones posted by their partners. This suggests that they were focusing on task completion through posting and answering the task requirements rather than through the creation of collaborative development of the topic. Interestingly, no such disengagement was observed in the SCMC dyads.

These differences in the dyadic patterns of interaction reveal additional dimensions of the interactions performed in ACMC and SCMC environments. It could be argued that the dominance of the interactions, the mismatch, and task disengagement observed mainly in the ACMC interaction might have been caused by the text-based nature of the task and further enforced by the space- and time-independence of ACMC. In this environment, the participants engaged in a time-delayed interaction which may have caused them to neglect their partners' contributions at the expense of task completion. Thus, as Sotillo suggests, the ACMC mode prompted interactions that resembled more teacher request and student response type of communication exchange. In this study, due to the lack of explicit teacher's involvement in the CMC discussion task, the ACMC dynamics shifted to higher consideration of task requirements rather than peer response. Further, it could be argued that the immediacy of the SCMC interactions and their resemblance to face-to-face conversations pointed out in previous research (Jepson; Smith; Sotillo; Warschauer) may have promoted the higher collaboration and consistency of mutuality of the SCMC interactions.

It is important to point out that mutuality mismatch was not reported in Storch's research of face-to-face interactions (Storch). However, such mismatch was identified in seven of the dyads, two SCMC and five ACMC. These observations could be interpreted in the light of Jepson's findings that text-based discussion in SCMC mode promotes less negotiation of meaning and repair moves during the language-learning task as compared to voice chat. It seems that in ACMC the level of negotiation is even lower which resulted in more instances of mutuality mismatch. Similar results are reported in other studies (Cho; Madden, Jones, and Childers) suggesting that the CMC mode of interaction provide not only distinctly different opportunities for communication but it appears learners use them with different purposes in mind. However, considering that the research comparing the dyadic patterns of interaction in ACMC and SCMC environments is limited, it could be expected that future research would shed more light on pattern specifics in such environments and would provide further interpretation on the reported findings accounting for different learning task designs and various levels of student language proficiency.

In conclusion, while the use of computer mediated discussions in writing instruction has its place in the collaborative planning and idea generation during the pre-writing stage, the mode of the CMC interaction in the design of the pre-writing task should be taken into account. The study revealed that the students participate in the same task completion in a different manner depending on the mode of communication. The interactive nature of the SCMC discussion might be more appropriate when ideas related to the future writing project are generated, while later, when these ideas need to be refined, ordered, and organized, the ACMC mode of peer collaboration could be considered.

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