Navigating choppy discourses: a conceptual framework for understanding synchronous text-based computer-mediated communication

Abstract

In this article we discuss the results of an investigation into patterns of interaction in synchronous, text-based computer-mediated communication (SCMC) with a focus on participation. The data are from a corpus of 3,785 words from a series of online interactions between student teachers performing learning activities in a three-dimensional online learning environment. Drawing on a systemic functional grammar perspective of language, we aim to develop a conceptual framework for understanding participation as made up of interactional patterns in students' linguistic exchanges while performing learning activities. Our results show that verbal negotiation that creates a shared understanding of what the group should accomplish or a common view of how to perform the activity is more frequent than strictly activity organization and performance. We argue that there are features of CMC signaling higher levels of complexity than those ordinarily found in face to face or written communication. The frequent rejection of communicative roles assigned to respondent chatters, turn elasticity, and the three broad features of the participants' interaction, blending, turn-taking collaboration and delay endurance, corroborate that. This paper presents evidence that participation in text-based SCMC with learning purposes demands a disposition for collaboration and solidarity, a capacity to endure delay, and the ability to manage a conglomerate of information and communication tools without instructions on how-to processes.

Key words

Text-based communication; computer-mediated communication, synchronous communication; online learning environments; systemic functional grammar.

1. Introduction

This article is an investigation into patterns of interaction in synchronous, text-based computer-mediated communication (henceforth SCMC) with a focus on participation in online learning environments. We present a small-scale qualitative study of conversation, drawing on a systemic functional grammar perspective of language. We adopt a theoretical stance on text-based computer-mediated communication as interactive events in which participants adopt and assign complementary roles to each other (Halliday 1984; Martin 1992). This article is associated with a research project on the development of teacher digital competence through participation in online learning environments (coded EDU2014-4223-P), which has been the subject of a number of short reports, papers and presentations (Lázaro and Gisbert 2015; Gisbert et al. 2016; Lázaro-Cantabrana et al. 2016).

The aim of this research is to develop a conceptual framework for understanding participation as made up of interactional patterns in students' linguistic exchanges while performing learning activities in an online environment. In doing so, we hope to contribute to the field of SCMC research by helping to explain the discourse characteristics and dynamics involved in online learning environments.

2. Literature review

The term SCMC encompasses a variety of Computer-mediated Communication (CMC) system types, from Internet relay chat rooms (IRC) to local area networks (LANs) and multi-user domains (MUDs and MOOs). CMC can be broadly defined as human communication

via computers (Higgins 1991; Herring 1996). In SCMC, users are geographically dispersed but still connected and participating at the same time.

Researchers on CMC for educational purposes explore the regulation of student online discursive behavior by assigning specific roles and protocols for course participation (Jiang 2017). They have also analyze how students interact and learn in informal microblogging learning communities (Gao and Li 2016), how they use language to construct group affiliations and social identities (Clarke 2009; Doering and Beach 2002; Lapadat 2003; Sengupta 2001), how students' discursive practice construes pedagogic positions while performing learning activities online in the absence of a teacher (de Oliveira et al 2013; Jung-Ivannikova 2014), and how virtual worlds may be platforms for delivering simulation-based educational experiences to students (Chodos et al 2012).

Kern (1995) studies the effect of language students' synchronous interaction via a local computer network. Ligorio (2001) explores collaborative knowledge building, using text-based via chat (synchronous), discussion forum (asynchronous) and visual elements in a virtual world. Ho (2004) reviews the field of CMC with a focus on work in instructional settings and finds that a substantial proportion of studies explore the potential of CMC for educational purposes. Studies like that of Teng et al (2012) show how computer-mediated communication has been successfully utilized in learning and instruction using various learning management systems such as WebCT, Blackboard and Moodle. Biasutti (2017) presents a comparative analysis of forums and wikis as tools for online collaborative learning in an asynchronous e-learning environment. Chua and Chua (2017) investigate e-leadership practices among users of a school virtual learning environment. Robinson (2010) analyses the socio-emotional experience that student learning in text based online environments encounter. These studies

broadly aim at investigating the potential effect of synchronous and asynchronous text-based computer-mediated communication (CMC) on learning.

Fewer studies, however, have made detailed analyses of the processes involved in participant interaction or examined specific discourse features and strategies drawn from electronic messages generated through CMC. Examples of that would be Fu et al (2016), who develops a classification made up of nine discourse patterns that occur in text-based asynchronous discussion forums, and Freiermuth (2011), who compares political online chats, political discussion and editorial writing.

Coffing (2013) finds linguistic and multimodal evidence suggesting the emergence of differences in power and status among students and between students and tutor in online learning environments. Nguyen (2017) finds that the interactional practices that participants employed to handle timing discrepancy serve to maintain the pedagogical and interpersonal purposes of the encounter in online learning environments. Sauro (2011) reviews 20 years of research on SCMC for second-language acquisition from 1990 to 2010 and found that discourse is still the least investigated competence. Mei Lin Ho (2004) identifies an overemphasis in projects on the final products generated from CMC tasks/activities involving participants in various settings and contexts. The author argues the need for attention to the processes involved, namely, with regard to the nature of interactivity and the dynamics involved in participating in an online environment. There is, therefore, a need for studies that help to explain the discourse characteristics and dynamics involved in online learning environments.

Participation provides the setting in which participants construct and shape identities as members of a group (Wenger 1998). Because of technological advances, much of today's participation occurs in the form of daily conversations which have become digitalized. We now live and learn in online settings, expressing different levels of solidarity and commitment through our information consumption and distribution practices (de Oliveira et al 2015). Online communication has opened up new horizons for discourse analysis research, not only multiplying the amount of data but also, and above all, adding complexity to the already complex understanding of interaction.

The literature on the characteristics of the discourse in online environments agrees that "certain and prominent features that allow online chat communication to occur and proceed make it different from spoken or written language" (Freiermuth 2011: 130). Specifically, several researchers identify dissimilarities between turn-taking patterns in SCMC and spoken discourse, tending to consider that patterns of turn-taking in SCMC are affected by disrupted turn adjacency (Murray 1988; Cherny 1999; Herring 1999; Kitade 2000; Simpson 2005). For example, drawing a comparison between written and spoken conversation, Simpson (2005) views turn juxtaposition and non-sequentiality as a lack of fine tuning and lower sensitivity to coordination of transfer in turn-taking in written conversation. This is what Herring (1999) calls the lack of sequential coherence. Cherny (1999: 149) asserted "it is clear that text-based computer communication does not offer the same rich communication channels available in face-to-face conversation".

Additionally, some research into CMC in educational environments questions its value since conversations do not seem to reflect levels of what researchers and educators consider to be 'deep' discussions, with evidence of meaningful learning (Lester and Paulus 2011). Strømsø

et al (2007) concluded that, compared to face-to-face communication, CMC may be a poorer medium in terms of the coordination of the learning activity.

In our understanding, the tendency in some of the literature to label CMC discursive characteristics as "being affected", "disrupted", having "reduced sensitivity to coordination", "lacking sequence" or being a "poorer medium than face-to-face communication" implies that some researchers consider that CMC does not offer the necessary conditions of orderly distribution of opportunities to participate in social interaction (Schegloff 2000). Freiermuth (2011), nevertheless, considers that the "chaotic amalgamation of unrelated strings of words chatters have to follow" is only chaotic at first glance. In line with the author, we take a step forward, acknowledging caos, or, the way we prefer to put it, complexity, at higher levels than those born acceptable in oral and written communication, as an intrinsic feature of online chat communication. This is because text-based CMC subverts at least three default values of speakership in talk-in-interaction: i) one party talking at a time; ii) turn adjacency expectation; and iii) interlocutor competition for the floor. There are many characteristics intrinsic to any given interaction in online environments that perform important communicative functions and provide information that is not available to speakers in offline conversational contexts (Giles 2016). This is because, as Cherny (1999) notes, discourse patterns are related to the technical affordances of a system as well as to the contexts of use. As Kress (2003) points out that, through their affordances, the new media change the potential for representation and communicational action by their users.

3. Theoretical assumptions

In the qualitative study of conversation we present here, we draw on a systemic functional grammar perspective of language. As we construct sequences of discourse, organize the discursive flow of interaction, and create cohesion and continuity in oral and written communication through the computer, we enact interpersonal relationships (Halliday and Matthiessen 2004). Our focus here is on the interpersonal metafunction because, as our interest is in participation in an online learning environment, we will first look at the clause as exchange, that is, as a transaction between or among participants in the interaction. Participation in text-based SCMC is taken here as an instantiation of a "proposition, or a proposal, whereby we inform or question, give an order or make an offer, and express our appraisal of an attitude towards whoever we are addressing and what we are talking about" (Halliday and Matthiessen 2004: 29).

In the act of speaking, the speaker adopts a particular role for himself and in so doing assigns to the listener a complementary role which he wishes him to adopt in his turn (Halliday 1984; Martin 1992). "Giving" or "demanding" are the most fundamental speech roles and relate to the nature of the commodity being exchanged: "goods-&-services" or "information" (see Table 1). Our theoretical framework of speech acts and conversation analysis is simplified for this paper, and limited to a Systemic Functional approach, not touching more subtle approaches of standard pragmatics here.

Table 1: Giving or demanding goods-&-services or information

Role in exchange	Commodity exchanged	
	Goods-&-services	Information
Giving	Offer	Statement
Demanding	Command	Question

4. Study aims

As stated before, our objective is to develop a conceptual framework for understanding participation as made up of interactional patterns in students' linguistic exchanges while performing learning activities in a virtual environment.

5. Context and particiants

The contextual background to the conversations that make up the corpus of this research study is a learning activity in which the participants were required to interact in a virtual world without the presence of a mentor. This virtual world was created as part of the research activities of the SIMUL@B project (coded EDU2014-4223-P) for simulating learning spaces and situations. Through case-based teaching to develop their digital competence, students can develop skills in analytical thinking and reflective judgment. In the specific conversations that make up the study corpus, the students worked in groups to conduct a learning activity in which they were required to create a Personal Learning Environment (PLE) (Mikroyannidis 2016) for a fictitious teacher called Pau. The students received information on Pau's professional and personal interests as well as a list of links to online tools. Taking Pau's profile into account, the students had to discuss which were the most relevant links for configuring his PLE. The group's selection of web-based tools for Pau's PLE was the learning activity outcome. The study corpus represents the learning activity process.

The participants were four student teachers, three of whom were female and one of whom was male, with a mean age of 20.25 years. The students participating in the research were informed of how their chats would be used and gave their permission for their conversation to be used for research purposes.

6. Data collection

The participants were able to interact with other group members through text-based chat in the OpenSim platform. OpenSim is a multi-user virtual environment that can be integrated with a Moodle learning-management system via the Simulation Linked Object Oriented Dynamic Learning Environment (SLOODLE) (Kemp et al. 2009). SLOODLE enables the communication process between objects in the virtual world and assignments in Moodle.

The data which form the corpus comprise five logs of text chat sessions in Moodle and the logs of participation using the chat software OpenSim. These logs were originally saved and archived by the authors. Participation in OpenSim is typical of any standard text-based synchronous chat program. It is not two-way channeled, so interruptions cannot occur in the form of overlap. Participants are able to scroll back up the text box on the screen to re-read previous parts of the interaction. The corpus comprises a series of chats held between 21:34 and 23:59 on December 13th, 2016 and between 00:00 and 01:11 on December 14th, 2016. It contains 3,785 words in total.

6.1 Data coding

We used Atlas.ti™ (Muhr 2004) to organize the data and systematize the analysis process. Using the program's coding features, the corpus was initially annotated using the systemic functional categories of "role in exchange" and "commodity exchanged" (see Table 1), in order to obtain quantitative information. Annotation was done manually.

To better explain annotation procedures and data analysis, let us examine the following excerpts from our corpus. A translation into English (done by us) is provided after each example. Please note that the participants' highly informal register is marked by misspelling, mispunctuation, frequent absence of the capital letter at the beginning of the sentences, occasional repetitions and neologisms. Such features are not considered "errors" here, but choices. Some of them could be time saving devices or emphasis resources. In our translations we have tried to maintain the essence of the message and its various features but not misspellings. The names of the participants have been changed to protect their identities.

21:34 St1: Holis

Hi

21:36 St2: hola!

hello!

21:36 St1: esperem a la St4?

shall we wait for St4?

21:36 St1: 'o comencem a paralr-ho i ja s'afegira

or shall we start talking and she can join in later

21:38 St2: l'esperem dos minuts i ens posem si no ve

let's wait for her a couple of minutes and get down to business if she doesn't come

In this first excerpt, St1 and St2 are online in the learning environment. After initial phatic expressions that serve to establish contact between chatters, we see how St1 asks two questions about whether they should wait for another member of the group or start working. In so doing, the student assumes the speech role of requesting information, while also assigning St2 a complementary role. A response is expected from St2 that could be either an expected response such as "let's wait for her" or a discretionary one such as "I don't mind" or "you decide". Notice that St2 could have given a negative response, such as "No, let's not wait for her" or "No, let's not begin work", and those would still have been expected responses.

22:53 St1: la St4 m'ha dit que es connecta en uns minuts que acaba d'arribar a casa

St4 just told me that she just got home and will connect in a few minutes

22:53 St1: pero podem començar ja una mica

but we can get started a little

22:54 St2: sii

yees

22:54 St2: sino es fara massa tard

otherwise it'll get too late

In this excerpt, we find St1 making a statement, "St4 just told me that she just got home and will connect in a few minutes…", i.e. she is giving information to St2. In turn, the expected response from St2 would be an acknowledgment, such as the one she receives, "yees", or a discretionary one, which would be a contradiction of St1's statement, such as "No, let's wait" or "No, she's not coming". St2's acknowledgment functions as a backchannel, signaling that she is attentive to St1's utterances. Cherny (1999: 182) maintained that, beyond conversation cooperation and monitoring, back channels may occur "for determining the attention state of an interlocutor, as well as establishing whether speaker intentions have been understood". This is definitely the case in this last example. It is also worth noting "yees" is not a mis-spelling, adding emphasis to St2' reply.

In the next excerpt, we find two offers and a command. When we make an offer, we give goods-&-services, i.e. we volunteer to do something. An offer may receive an acceptance as the expected response or a rejection as a discretionary one. A command, on the other hand, demands goods-&-services or, in other words, assigns someone the task of doing something.

Here, the students are making decisions about how to complete the learning activity. There are different tools for the group to analyze and decide whether they should be included in the personal learning environment they are supposed to create. The group decided to split the work but, as there are more tools than students, some of them have to analyze more than one tool. St1, St4 and St2 give goods-&-services, since they volunteer to analyze two tools. St4 also offers to upload the list of agreements to Drive, the popular cloud storage space by Google. The offers are accepted with “oks” and “yees”. St2 goes on to organize the group work, demanding goods-&-services from St4 and St3 with a command. St1’s “ok perfect” could be a response to the previous offers, to St2’s command, or a positive evaluation of the whole conversation.

23:39 St1: jo si voleu ja en faig dos

If you want, I can do two.

23:39 St1: no em fa res

I don’t mind.

23:40 St4: així que si voleu ho poso al drive i a partir d'aquí partim. si us sembla bé.

if you like I can upload it to drive and we can start from there. if that’s ok with you.

23:40 St4: jo si voleu també

me too, if you like.

23:40 St4: d'acord merci.

ok thanks.

23:40 St2: siii St4

Yeees St4

23:41 St2: Jo també puc fer 2

I can do 2 too.

23:42 St2: i que el St3 i la St4 facin 1

and St3 and St4, you do one

23:42 St1: vale perfecte

ok perfect

From the above excerpts and explanations we hope to have made clear how we have approached the data from this study.

In a second stage, analysis of the patterns in the occurrence of systemic functional categories allowed the qualitative observation of three new broad categories, or memos, associated with certain discourse features that could be identified in the students' interactions. The three categories superior in hierarchy to the initial annotation system were:

- Turn-taking collaboration, of which there are two types. With the first type, the participants assume the role assigned to them in the exchange; for example, answering a question or acknowledging a statement. For the second type, students co-construct a turn, which may be initiated by one and complemented by another. In this case, both students share a role in exchange – giving or demanding information or goods-&-services in unison.
- Delay endurance. Responses to turn initiations may be and frequently are interleaved with other turn initiations and responses without presenting difficulties for participants to understand the discourse.
- Blending. The students' discourse when performing the learning activity reveals signs of interaction that is conducted outside the online learning environment or that brings together a variety of technological tools that are beyond the instructors' control.

7. Major findings

In this section we present information on quantitative and qualitative discourse features of the corpus under study with respect to characteristics and patterns of interaction. Table 2 shows the different roles in exchange assumed by participants as they gave or requested information from their companions.

Table 2: Giving or demanding goods-&-services or information

Role in exchange	Commodity exchanged			
	Goods-&-services	21	Information	124
Giving	Offer	13	Statement	78
Demanding	Command	8	Question	46

Our results show that "Information" was the most frequently exchanged commodity, with 124 occurrences (85.51%), 78 of which were "Statements" and 46 were "Questions". "Goods-&-services" had 21 occurrences (14.48%), 13 of which were "Offer" occurrences and 8 were "Commands".

Table 3 (below) shows the quantitative relationship between turn initiation and responses, with the latter divided into *expected* and *discretionary*. We have identified a mean responsiveness level of 60.68%, i.e. 88 responses to 145 initiated turns. In terms of the qualitative relationship, however, note that some initiations are not met by a response, while occasionally different participants respond to a single initiation. Though in our corpus we find the same number of questions as responses, this should not be interpreted as a one-to-one match. It is also worth noting that responses were annotated as such when they were either expected or discretionary. Occasionally, however, an initiation turn received a different initiation turn as a reply, as can be seen in the following excerpt where the students are discussing whether to include a wiki in their PLE:

23:19 St2: o pagines web seria millor que wikis?

or maybe a web would be better than a wiki?

23:19 St1: web es mes "innovador" no?

a web is more innovative, isn’t it?

23:20 St1: osigui les wikis ho veig molt poc modern i es un jaleo

I mean I think wikis are out of date and fuzzy

23:20 St2: si i pot estar en constant canvi

yes and it can be constantly changing

In the above example, St2 asks a question about whether it would be better to include a web or a wiki in their PLE. In reply, instead of a “yes”, “no” or “I don’t know” type of answer, St1 replies with a tag question, which is both a statement and a question, and another complete statement, which is acknowledged by St2. This excerpt shows that, at least in the corpus under study, not having a response does not imply broken discourse or a lack of coordination among the chat participants. Actually, no initiation in the corpus was left deserted. We can see that the role assigned by a speaker to his or her potential respondents is not always assumed by them. A mean responsiveness level of 60.68% does not mean that the remaining

initiations were not answered but that in those cases the speakers adopted a particular role for themselves and assigned a complementary one to the listener that was rejected. It is important to note that, although chat participants in the corpus under analysis do not know each other in person, they share learning objetives, what heightens communicative solidarity. That, nevertheless, does not always mean assuming the communicative roles assigned to each other. Again, rejection of communicative roles in the corpus analyzed does not imply broken discourse or a lack of coordination among chat participants. It signs complexity characteristic of CMC.

In the previous table we found that "Information" was the most frequently exchanged commodity. In Table 3 we also find that, in the "Information" system, "Statements" are the most frequent type of initiations, followed by "Questions". Additionally, 86% of the responses can be classified as expected. In the "Goods-&-services" system, there are a few more "Offers" than "Commands" but the latter have a higher level of responsiveness – 50% "Undertakings" of "Commands" compared with 38,46% "Acceptances" of "Offers".

Table 3: Speech functions and responses

	Initiation	145	Response	88		
			Expected	76	Discretionary	12
Goods-&-services	Offer	13	Acceptance	5	Rejection	3
	Command	8	Undertaking	4	Refusal	1
Information	Statement	78	Acknowledgement	21	Contradiction	5
	Question	46	Answer	46	Disclaimer	3

Beyond quantitative analysis of the data, annotating the corpus using systemic functional categories allowed the qualitative observation of three new broad features of the participants' interaction. These were briefly introduced in the previous section and are illustrated below.

7.1 Turn-taking collaboration

We found two types of turn-taking collaboration. With the first type, the speaker took on a particular role and assigned a complementary role to the listener that was accepted by him or her. In such cases, questions are met by answers and commands are met by, for example, undertakings. The following excerpts illustrate this type of collaboration.

23:05 St3: vale, pregunta un tant estupida pero ara no hi dono

Ok, that is a rather stupid question and I don't get it

23:05 St3: symbaloo que és?

What's symbaloo?

23:06 St1: es una web on pots penjar de tot

It's a web where you can bookmark anything

23:06 St1: osigui tot el que creem ho penjarem alli

so everything we create we will bookmark there

23:06 St1: ja sigui un blog, un mapa o el que sigui

it could be a blog, a map or anything

23:06 St3: ah ostras vale vale

ah, wow, ok ok

23:06 St3: sisisi ja està

yesyesyes I get it

Symbaloo is one of the tools the learning activity suggests the students should analyze to find the most suitable ones for the PLE they are creating. The above example shows how St3 asks a question openly expressing the expectation that another participant in the group will help him understand what Symbaloo is. By answering the question, St1 takes on the role of information supplier proposed by St3. Similarly, in the following example, St1 justifies why blogs were classified as “difficult” in a list the group created for work division. St1 makes two statements, which are met with an acknowledgment from St2. St1’s utterance does not require information since it is itself a piece of information. In agreeing to perform a complementary role to St1’s, St2 could acknowledge or contradict her colleague’s statement. She also initiates a different turn by asking a question or giving a command. Her choice, however, is to collaborate with St1 by acting out the verbal role assigned to her.

00:02 St1: osigui crear un blog no es lo mateix que una linea del temps

So creating a blog is not the same thing as creating a timeline

00:02 St1: per això esta a dificil

That's why it's classified as difficult

00:02 St2: sii, el blog si es fa bé es tardarà molt més en fer-lo

Yees, if you do the blog well it'll take a lot more time to do it

00:02 St2: a ok, doncs, em sembla acertat

Ah, ok then, I think it's fine

In the second type of collaboration we found in the corpus, the participants co-construct turns. This means that a participant initiates a turn and another participant, instead of acting out his or her expected complementary role or rejecting it, chooses to complement the turn. As previously stated, in such cases, both students share a role in exchange, giving or requesting information or goods-&-services in unison. This type of collaboration is found throughout the corpus. In the following example, St2 complements St1's statement by adding information to it. The character for whom they are creating a PLE enjoys creative writing, not just any form of writing.

23:10 St1: vale diu que el pau li agrada l'escriptura

ok it says that pau enjoys writing

23:10 St2: creativa

creative writing

In the following example, when still choosing tools to make up the PLE the group is required to create, St1 acknowledges St2's statement but also adds information to it. By beginning her turn with a proposition, St1 complements St2's turn, stating that she would include virtual environments and gamification. In fact, that was St2's intention (she sent her statement before she had finished typing it).

23:34 St2: els entorns virtuals si que els possaria

I would include virtual environments

23:34 St1: siii, jo tambe

yeees, me too

23:34 St1: i gamificació jo tambe

And gamification too

23:34 St2: i la gamificació, ja que es important donar-li un enfoc lúdic a l'educacio

and gamification, 'cause it's important to include a recreational element in education

In both examples above we see how the participants, far from competing for the floor, collaborate with one another, either acting out the speech role assigned to them by other conversation participants or complementing the initiations of others.

7.2 Delay endurance

A strong characteristic of the corpus is participants' delay endurance. Given the interactive requirements and the affordances of text-based synchronous computer-mediated communication, the participants are connected and communicating at the same time. They also read each other's utterances so that they can type their replies. Interruptions in the form of overlap, as in face-to-face conversation, cannot occur. Participants often write at the same time and send responses to turn initiations that are interrupted by other utterances. An outsider who reads the text but who did not take part in the conversation may experience discourse disorientation. However, our participants did not find it difficult to follow the flow of discourse since no other-initiated repair turns were identified in the corpus. Interestingly, some utterances were replied to up to a few minutes later and there were many other turns exchanged in between. In our corpus we found that turn adjacency, which is characteristic of face-to-face turn-taking, is replaced by turn elasticity. While Simpson (2005) views turn non-sequentiality as a lack of fine tuning, we prefer to call it turn elasticity and consider it a feature of CMC which highlights its additional complexity.

In the following example, St1 is providing instructions on how to conduct the activity at the same time that St2 is talking about work division. St1 makes a statement that is not acknowledged or contradicted by the other participants. Instead, she receives a question as a reply from St2, after St2 herself has made another statement.

23:01 St1: igualment, crec que no cal que ens ho mirem tot

even so, I don't think we have to check it all

23:01 St2: doncs seria tres pdfs per persona, menys una que fa 4

then it would be three pdfs per person, less one, which makes 4

23:01 St1: ja que sol hem de fer les que corresponguin al perfil del profe

since we only have to do those that match the teacher's profile

23:01 St2: pero per fer-les hem de mirar els links no?

but to do them we have to check the links, don't we?

Often when a student utters an initiation, the response comes after other initiations have been uttered. The time lapse between initiations and responses varies between one and several minutes. In such cases the discourse is choppy as the communication comes in waves. Turn-

taking here is elastic. The participants talk about parallel things, apparently waiting patiently for a response to their own utterances. In the following example, St2 asks a question about a geolocation tool that did not receive an immediate response from the other participants. The question was asked at 23:13.

23:13 St2: i lo de geolocalització?

no se ni el que és

and what about this geolocation thing?

I don't know what it is

It was not until 23:22 that St1 replied to St2's turn, recovering the geolocation theme with a new question on it.

23:22 St1: i el que havies dit St2 de geolocalitzacio?

and what about what you said St2 about geolocation?

The conversation continues until two minutes later when St1 herself returns to the topic. As we can see in the following excerpt, having been introduced 12 minutes earlier, the geolocation tool is finally discarded by St1 and St2. In between, many other topics have been discussed, including, as we can see in the example, St1's question about a Webquest. This is answered two minutes later, after St3 has asked what an inphography is and received an answer from both St1 and St2.

23:24 St1: jo no se quina es la diferencia entre webquest i pagina web

I don’t know the difference between a webquest and a web page

23:24 St2: a veure acabo d'entrar en un dels links de la geolocalització aquesta i és per buscar llocs per menjar... osigui que no no?

hold on I’ve just visited one of the links on geolocation and this one is for looking for places to eat… better not right?

23:24 St1: jajajjajjajajaja millor no

hahahahahahaha better not

23:24 St3: infografia què és?

what’s an inphography?

23:25 St1: nidea St3

no idea St3

23:25 St2: és que d'un dibuix s'extreu tota la informació

it’s a drawing that synthesizes all the information

23:25 St1: eines per publicar tambe ho podem treure

we can delete tools for publishing too

23:25 St1: que es slide share i similars

such as slide share and the like

23:25 St2: més o menys vindria a ser el que vam fer a infancia, de llegir-nos uns articles i fer un dibuix amb la info essencial transformada en un dibuix

It'll be something like what we did when we were kids, reading articles and drawing a picture with the essential info changed into a drawing

23:25 St1: no?

right?

23:26 St2: "Una WebQuest és una proposta didàctica de recerca guiada, que utilitza principalment recursos d'Internet. Té en compte el desenvolupament de les competències bàsiques, contempla el treball cooperatiu i la responsabilitat individual, prioritza la construcció del coneixement mitjançant la transformació de la informació en la creació d'un producte i conté una avaluació directa del procés i dels resultats."

"A WebQuest is a didactic proposal for guided research that primarily uses Internet resources. It takes into account the development of basic skills, promotes cooperative work and individual responsibility, prioritizes the construction of knowledge by transforming information into the creation of a product, and contains a direct evaluation of the process and results."

23:26 St3: crec que potser no seria del tot necessari no ho sé

I don't think it's that necessary I don't know

23:26 St2: aixo es el que es una webquest

That's what a webquest is

7.3 Blending

It is striking how the participants interacting in the corpus under study amass such a complex conglomerate of learning and communication media that is not envisaged by the design of the learning activity. Their discourse interaction signals Internet navigation practices that occur while they are holding the conversation. This is seen in St2's comment from our previous example:

23:24 St2: a veure acabo d'entrar en un dels links de la geolocalització aquesta i és per buscar llocs per menjar... osigui que no no?

Hold on I have just visited one of the links on geolocation and this one is for looking for places to eat… better not right?

Still on the previous example, St2 brings to the group conversation a complete definition of a webquest which, though she does not mention it, appears to be from an Internet source. Interestingly, while no participant found it important to find a better definition of an inphography, St2 did think the webquest definition was relevant to the discussion and performance of the learning activity. Hypertextuality affordances are clearly allowing choices to be made at the level of the participants' discursive practices.

Moreover, some activities, like agreeing on the date and time to meet online to perform an activity or informing colleagues of a delay in the start of a meeting, occur outside the online learning environment but leave discourse traces in the verbal interaction. This is seen in the following excerpt:

22:53 St2: la St4 m'ha dit que es connecta en uns minuts que acaba d'arribar a casa

St4 just told me she that she just got home and will connect in a few minutes

Since St2 and St4 do not share the same geographical location, they must have spoken through some other means of communication outside the learning environment. Additionally, as we can see in the following example that was introduced earlier in section 3, the participants also bring together cloud-based services to organize or perform a learning activity. Drive is a synchronization and storage tool run by Google whose use was neither suggested nor foreseen in the design of the learning activity.

23:40 St4: així que si voleu ho poso al drive i a partir d'aquí partim. si us sembla bé.

if you like I can upload it to drive and we can start from there. if that's ok with you.

In the next section we discuss the implications of the data presented.

8. Discussion

This study fills the niche created by CMC and SCMC research that has analyzed student or teacher perceptions, applied statistical data analysis or performed content analysis but has not conducted qualitative analysis of discursive practices. As a summary of our study's major discussion points, we wold like to highlight we found features of CMC signaling higher levels of complexity than those ordinarily found in face to face or written communication. The frequent rejection of communicative roles assigned to respondent chatters, turn elasticity, and the three broad features of the participants' interaction, blending, turn-taking collaboration and delay endurance, corroborate that. We consider these features together a conceptual framework for understanding discourse in a virtual environment while chatters perform learning activities. Precisely for high levels of complexity identified in this form of CMC, we call this discourse choppy. This is definitely not to say that face to face or written communication mean "calm sea navigation", but rather to acknowledge that CMC for learning purposes ordinarily present tougher weather conditions, to follow the metaphor.

The data we have analyzed allowed us to observe a rich information exchange between participants intensively involved in the organization and performance of an activity in an online learning environment. We must therefore disagree with Strømsø et al. (2007), who stated that, compared with face-to-face communication, CMC may be a poorer medium with regard to the coordination of the learning activity. We found that there was good coordination between the students, who, through their verbal interactions, negotiated a variety of speech roles, taking turns to provide or request information from one another. They understood each other and were able to perform the learning activity. However, they often sent messages more than one party at a time and turn-taking was found to be elastic and collaborative. This definitely implies the use of sophisticated aspects of communicative competence relevant for SCMC that are not exercised in ordinary face-to-face interactions.

The most frequently exchanged commodity in the corpus studied was “Information”. Though the students were required to create a PLE together and we could therefore expect a lot more action being offered or required from participants, we noticed that language was largely the aim as well as the means. Verbal negotiation that creates a shared understanding of what the group should accomplish or generates a common view of how to perform the activity is generally more frequent than strict activity organization and performance.

As we mentioned before, qualitative analysis of the corpus enabled us to observe three broad new features of the participants’ interaction: i) turn-taking collaboration, which may refer either to participants assigning speech roles to each other and acting them out in complementary ways or to the solidary construction of a single turn by more than one participant; ii) delay endurance, which refers to turn-taking elasticity, with initiations and responses that vary

from one minute to 12 minutes; and (iii) blending, which refers to discourse signs of interaction or hypertextual reading/writing practices conducted outside the online learning environment that extrapolate instructors' control and the processes envisaged in the design of the learning activity. In a nut sell, turn taking in text-based SCMC with learning purposes may be collaborative and elastic. The leaning environment itself is blended with tools and discourses beyond instructional control. Interaction in its choppy discourses requires endurance to delay.

We assert that "turn collaboration", "delay endurance" and "blending" can be understood as patterns of interaction in synchronous, text-based computer-mediated communication in online learning environments. As such, these patterns are aspects of the communicative competence specific of text-based SCMC with learning purposes.

9. Conclusion

Text-based SCMC confounds at least two important elements in conversation analysis: first, the importance of one person speaking at a time and second, the need to minimize the pause space between conversationalists. Paradoxically, however, text-based SCMC teaches us to wait or to endure delay, because the communication flow comes in waves, in the form of choppy discourse. Part of the communicative competence required to participate in online learning environments involves being able to navigate the waters of these choppy discourses. In other words, the analysis of the data we have performed here suggests that participation in text-based SCMC with learning purposes demands a disposition for collaboration and solidarity, a capacity to endure delay, and the ability to manage a conglomerate of information and communication tools without instructions on how-to processes.

These conclusions have implications for the field of educational technology and show how close observation of discursive practices can contribute to the understanding of learning processes and outcomes. In line with what is argued by Coffin (2013), one important educational implication here is that digital divides seem less to do with access to hardware, the usual focus of institutional and government policies, and more to do with differences in patterns of engagement and the communicative abilities required to manage discourse in online learning settings. It is up to researchers and educators to consider how the communicative ability to navigate the waters of choppy discourses in CMC can be nurtured so that more people may benefit from the potential knowledge democracy of the digital society.

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References

Biasutti, Michele. 2017. A comparative analysis of forums and wikis as tools for online collaborative learning. *Computers & Education* 111. 158-171. http://dx.doi.org/10.1016/j.compedu.2017.04.006

Cherny, Lynn. 1999. *Conversation and community: chat in a virtual world*. Stanford, Calif: CSLI Publications.

Chodos, David, Eleni Stroulia, Sharla King & Mike Carbonaro. 2014. A framework for monitoring instructional environments in a virtual world. *British Journal Of Educational Technology 45*(1). 24-35. http://dx.doi.org/10.1111/j.1467-8535.2012.01370.x

Chua, Yan Piaw & Yee Pei Chua. 2017. How are e-leadership practices in implementing a school virtual learning environment enhanced? A grounded model study. *Computers & Education 109.* 109-121. http://dx.doi.org/10.1016/j.compedu.2017.02.012

Clarke, Linda. 2009. The POD model: Using communities of practice theory to conceptualise student teachers' professional learning online. *Computers & Education 52*(3). 521-529. http://dx.doi.org/10.1016/j.compedu.2008.10.006

Coffing, Caroline. 2013. Using systemic functional linguistics to explore digital technologies in educational contexts. *Text & Talk* 33(4–5). 497 – 522.

de Oliveira, Janaina, Vanessa Esteve-González & Mar Camacho. 2013. Interaction in the virtual world: an analysis of students' construal of pedagogic subject positions in a 3D virtual learning environment. *Text & Talk 33*(3). 353-375. https://doi.org/10.1515/text-2013-0016

de Oliveira, Janaina, Danah Henriksen, Linda Castañeda, Marta Marimon, Elena Barberà, Carles Monereo, César Coll, Jabari Mahiri & Punya Mishra. 2015. The educational landscape of the digital age: Communication practices pushing (us) forward. *RUSC. Universities And Knowledge Society Journal 12*(2). 14-29. http://dx.doi.org/10.7238/rusc.v12i2.2440

Doering, Aaron, & Richard Beach. 2002. Preservice English teachers acquiring literacy practices through technology tools. *Language Learning & Technology 6*(3). 127-146.

Freiermuth, Mark. 2011. Debating in an online world: a comparative analysis of speaking, writing, and online chat. *Text & Talk* 31(2). 127–151.

Fu, Ella, Jan van Aalst & Carol Chan. 2016. Toward a classification of discourse patterns in asynchronous online discussions. *International Journal Of Computer-Supported Collaborative Learning 11*(4). 441-478. http://dx.doi.org/10.1007/s11412-016-9245-3

Gao, Fei, & Lan Li. 2016. Examining a one-hour synchronous chat in a microblogging-based professional development community. *British Journal Of Educational Technology 48*(2). 332-347. http://dx.doi.org/10.1111/bjet.12384

Giles, David. 2016. Observing real-world groups in the virtual field: The analysis of online discussion. *British Journal Oof Social Psychology 55*(3). 484-498. http://dx.doi.org/10.1111/bjso.12139

Gisbert, Mercè, & José Luis Lázaro. 2015. Professional development in teacher digital competence and improving school quality from the teachers' perspective: a case study. *Journal oOf New Approaches In Educational Research* 4(2). 115-122. Doi: http://dx.doi.org/10.7821/naer.2015.7.123

Gisbert, Mercè.; Vanessa Esteve-González, & José Luis Lázaro. 2016. Improving digital competence in teacher training: the design and implementation of learning tasks in 3D virtual learning environments. EdMedia 2016, in Vancouver, Canada.

Herring, Susan. 1996. *Computer-mediated communication: Linguistic, social, and cross-cultural perspectives*. Amterdam/Philadelphia: John Benjamins Publishing.

Herring, Susan. 1999. Interactional Coherence in CMC. *Journal Of Computer-Mediated Communication 4*(4). 0-0. http://dx.doi.org/10.1111/j.1083-6101.1999.tb00106.x

Higgins, Robert. 1991. *Computer-mediated cooperative learning: Synchronous and asynchronous communication between students learning nursing diagnosis.* Unpublished doctoral dissertation. University of Toronto. http://www.cybercorp.net/rhiggins/thesis/

Jiang, Wenting. 2017. Interdependence of roles, role rotation, and sense of community in an online course. *Distance Education 38*(1). 84-105. http://dx.doi.org/10.1080/01587919.2017.1299564

Jung-Ivannikova, Liubov. 2014. Communication challenges learners face online: Why addressing CMC and language proficiency will not solve learners' problems. *British Journal oOf Educational Technology 47*(2). 239-247. http://dx.doi.org/10.1111/bjet.12219

Kern, Richard. 1995. Restructuring Classroom Interaction with Networked Computers: Effects on Quantity and Characteristics of Language Production. *The Modern Language Journal 79*(4). 457-476. http://dx.doi.org/10.2307/329999

Kitade, Keiko. 2000. L2 Learners' Discourse and SLA Theories in CMC: Collaborative Interaction in Internet Chat. *Computer Assisted Language Learning 13*(2). 143-166. http://dx.doi.org/10.1076/0958-8221(200004)13:2;1-d;ft143

Lapadat, Judit. 2003. Teachers in an Online Seminar Talking About Talk: Classroom Discourse and School Change. *Language And Education 17*(1). 21-41. http://dx.doi.org/10.1080/09500780308666836

Lázaro-Cantabrana, José Luis, Vanessa Esteve-González, Mònica Sanromà-Giménez & Mercè Gisbert-Cervera. 2016. El desarrollo de la competencia digital docente en los estudiantes del grado de educación mediante un entorno de simulación 3D: diseño y validación de actividades. Edutec 2016. Alacant, Spain.

Lester, Jessica, & Trena Paulus. 2011. Accountability and public displays of knowing in an undergraduate computer-mediated communication context. *Discourse Studies 13*(6). 671-686. http://dx.doi.org/10.1177/1461445611421361

Ligorio, Beatrice. 2001. Integrating communication formats: synchronous versus asynchronous and text-based versus visual. *Computers & Education 37*(2). 103-125. http://dx.doi.org/10.1016/s0360-1315(01)00039-2

Ho, Caroline Mei Lin. 2004. Computer-mediated Communication: Practice, Projects and Purposes. *Teaching English with Technology 4*(1).

Mikroyannidis, Alexander, Alexandra Okada, André Corrêa & Peter Scott. 2016. Inquiry-Based Learning on the Cloud. In *Handbook of Research on Cloud-Based STEM Education for Improved Learning Outcomes*. 291-310. Information Science Reference.

Muhr, Thomas. 2004. *User Manual for ATLAS. ti 5.0*. Berlin: ATLAS. ti Scientific Software Development GmbH.

Murray, Denise. 1988. Computer-mediated communication: Implications for ESP. *English for Specific Purposes 7*(1). 3-18. https://doi.org/10.1016/0889-4906(88)90003-8

Robinson, Kathy. 2010. Students' appraisal of emotional and relational experience whilst collaborating online using text based communication. *Computers & Education 54*(3). 799-807. doi:10.1016/j.compedu.2009.10.004

Sauro, Shanon. 2011. SCMC for SLA: A Research Synthesis. *CALICO Journal 28*(2). 369-391. http://dx.doi.org/10.11139/cj.28.2.369-391

Schegloff, Emanuel. 2000. Overlapping talk and the organization of turn-taking for conversation. *Language In Society 29*(01). 1-63. http://dx.doi.org/10.1017/s0047404500001019

Sengupta, Sima. 2001. Exchanging ideas with peers in network-based classrooms: An aid or a pain. *Language Learning & Technology 5*(1). 103-134.

Simpson, James. 2005. Conversational floors in synchronous text-based CMC discourse. *Discourse Studies 7*(3). 337-361. http://dx.doi.org/10.1177/1461445605052190

Strømsø, Helge, P. Grøttum & Kirsten Hofgaard Lycke. 2007. Content and processes in problem-based learning: a comparison of computer-mediated and face-to-face communication. *Journal Of Computer Assisted Learning 23*(3). 271-282. http://dx.doi.org/10.1111/j.1365-2729.2007.00221.x

Teng, Daniel, Nian-Shing Chen & Ommaso Leo. 2012. Exploring students' learning experience in an international online research seminar in the Synchronous Cyber Classroom. *Computers & Education 58*(3). 918-930. https://doi.org/10.1016/j.compedu.2011.10.018

Nguyen, H. 2017. The sequential organization of text and speech in multimodal synchronous computer-mediated communication. *Text & Talk*, 37(1). 93–116.

Wenger, Etienne. 1998. *Communities of practice: Learning, meaning, and identity*. Cambridge: Cambridge University press.