Students' Use of Semiotic Structures in Synchronous Computer-Mediated Communication - An Inter-Scandinavian Study

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Abstract

Synchronous computer-mediated communication is often used as a means to achieve active learning through collaboration. This paper is based on an ethnographic case study of synchronous communication. The synchronous communication is carried out between students in lower secondary school collaborating in a cross-border project involving the native language subjects Danish, Norwegian and Swedish. The project is aimed at promoting the students` Scandinavian inter-comprehension skills. The objective is for the students to use their own native languages in their communication whilst trying to understand the neighbouring languages used by their interlocutors. The aim of this paper is to analyse the students` use of situated semiotic structures in order to solve comprehension difficulties as well as emergent technical problems. In the emergent situations where the students face technical or language-based problems they use an interplay of different semiotic structures. They creatively and spontaneously use oral and written communication in different ways by using smileys, colours, gestures, grimaces, talking slowly and by sending smartphone pictures. Furthermore, they make use of different conversational forms such as online chats, Google Translate, and webcams. Synchronous communication is vulnerable because of the dependency relationship arising between the connected classrooms in different schools and countries. The multiple forms of conversation are dependent on the emergent situation and are dominated by the written mode.

Keywords: e-learning and collaborative learning, Integrating e-learning in classroom based language teaching

Introduction

Social environments and interactive situations are prerequisites for learning through collaboration. Most research has so far focused on asynchronous computer-mediated communication (CMC), such as discussion boards and e-mail (Hrastinski, Keller & Carlsson, 2010). Synchronous CMC offers the opportunity to engage students in collaborative learning activities and is often used as a means to achieve active learning and authentic knowledge sharing (Schullo et al., 2005). Especially when the teaching subject is culture or language, synchronous communication seems to have a high learning potential. The situated character of the communicative process encourages students to apply the communicative strategies they use in their everyday social life. Students can make use of all four linguistic activities: speaking, listening, reading and writing in the computer-mediated communication. Different semiotic resources other than language can also be used within synchronous CMC. Hence, new information and communication technologies have implied changes in the meaning making across different conversational forms (Coffin, 2009). However, most synchronous activities need structures such as task assignments and discussion frameworks that support individuals participating in the interactive collaborations (Garrison & Anderson, 2003).

This paper is based on a study included in the GNU project (Gränsöverskridande Nordisk Undervisning/Utdannelse) [Cross Border Nordic/Scandinavian Education] initiated in August 2011 and funded by the European Regional Development Fund *Interreg IVA Öresund-Kattegat-Skagerrak*. The aim of the GNU-project in general is to develop innovative cross-border teaching models by the means of *user-driven* and *co-design* processes between practitioners and researchers. The focus on the subjects' pedagogical approaches using ICT and digital technology involves students and teachers in collaborative teaching practices.

In the GNU project, the lower secondary school students and teachers are organized in so called Nordic class-match groups, whereby each group consists of students and teachers from one class within each country. The groups use a variety of synchronous and asynchronous ICT-tools for the communication, as for example wikis, Skype, Adobe Connect, Google Documents and VoiceThread. The three languages Danish, Norwegian and Swedish are linguistically close; the communication in the project is thus presumed to be held in the participants' native languages. Inter-comprehension and semi-communication are terms used to describe communicative situations where the participants speak their own native languages whilst at the same time try to understand the languages spoken by the other speakers to the best of their ability (Zeevart 2007; Doyé 2005).

The focus of this paper lies on synchronous communication between students collaborating in cross-border projects involving Danish, Norwegian and Swedish students and teachers.

We have observed that problems related to the ICT-tools tend to occur especially when synchronous communication is taking place. Therefore different situated solutions must be developed. The aim of this paper is to analyse the semiotic structures that the students employ during synchronous communication in order to solve both emergent technical problems as well as comprehension difficulties due to linguistic barriers. The central research question is thus: What conversational forms emerge and which semiotic resources are used by the students to

make linguistic meaning and resolve emergent problems within the synchronous computer-mediated communication?

Theoretical framework

Our theoretical framework is based on the methodology of conversational analysis (CA) and social semiotics. CA has been used since the mid-1960s in the study of everyday life social interaction. According to CA social interaction can be understood as a sense-making activity where the participants collaborate to make their communication work. From the perspective of CA, belonging to a particular culture implies knowing and employing certain communicative rules, routines and actions (Pomerantz & Fehr 2011). Inter-Scandinavian communication can be conceived as a special instance of a communicative culture, where the participants adhere to certain social rules. The most important rule is that participants use their own native language when expressing themselves, whilst attempting to understand the neighboring languages of their interlocutors to the best of their ability. The important concepts within conversational analysis used in this paper is talk, turn taking, action and understanding, sequence, back channel response as well as opening and closing, related to the interaction in the synchronous meeting.

One central study in the field of inter-Scandinavian interaction was conducted by the sociolinguist Ulla Börestam Uhlmann in her thesis from 1994 (Börestam 1994). Börestam's aim was to find out how interaction actually takes places when speakers from different Scandinavian countries communicate using their native languages. A central finding in her study was that inter-Scandinavian communication is characterised by a relatively high level of conversational repair, extended use of gestures, accommodation strategies and attempts to adjust ways of expression to the lowest common denominator. These findings and analytic concepts are expected to be of central relevance to our study. There is, however, an important difference between our case and Börestams study that must be taken into account. In our case, the participating students communicate through a videoconference system (Adobe Connect). Videoconference tools offers different semiotic resources in addition to face-to-face communication and this must be expected to influence the students` conversations in a number of ways.

Studies of inter-comprehension between related languages have already shown that the communicating participants do not only rely on their formal linguistic competences but also use all additional semiotic resources available (Doyé, 2004). In an attempt to understand the interplay of conversational strategies and the use of semiotic resources we seek to combine the central analytic concepts from conversational analysis with social semiotics. Seen from the point of social semiotics verbal expression is just one possible way to represent meaning. The representational and communicational resources of images, action, sounds, etc. also contribute to the construction of meaning in different ways (Kress & Leeuwen, 2001; Jewitt, 2008). Modes "as organised sets of semiotic resources for meaning making" (Jewitt, 2008:246) and their material, physical, and environmental affordances provide often complex ways in which image, gesture, gaze, interaction with objects, writing, and speech interrelate. Applying new communicative arenas in the teaching practice also has an impact on the form of meaning making. Cope & Kalantzis (2000) discuss *a transformed practice* in the ways students recreate

and recontextualise meaning across contexts. Moreover, as Clark and Brennan (1991) have pointed out, different media offer different possibilities for back-channel responses. Back-channel responses are verbal and nonverbal signs of understanding, and they are of central importance for the establishment of inter-subjective understanding, especially in inter-Scandinavian communication. Video conferences share central features such as co-presence, visibility and audibility with ordinary face-to-face communication (Clark & Brennan, 1991). Moreover, video conferences offer in addition the possibility of chatting and screen sharing.

The Empirical Setting

The paper is based on a study of four different cross-border class-matches involving Danish, Norwegian and Swedish students and teachers who perform collaborative projects within the course subject native language. The collaboration between the students in each of the cross-border class-matches has been studied during the period October 2012 to January 2013. The projects have been structured as learning activities in a cross-border setting within each native course subject. All of the collaborative projects have had different themes and have consisted of short stories, prose, newspaper and comic series. The students have co-produced texts, exchanged and discussed text analyses, performed recitals as well as peer critique. In the synchronous activities the students have both communicated orally via Skype and Adobe Connect as well as in written form via chats. The collaborative projects have generally had a high subject-related quality. The added value of the cross-border collaboration has been evident based on the students oral mediation of texts to each other, as the students have been used the interplay between texts and speech in order to understand their neighboring languages.

Students received instructions in advance on the topic planned for each specific synchronous class-match meeting. Between two and four students at each site shared one laptop. Each student had the opportunity to contribute more or less depending on the setting. The students sat beside each other in front of the laptop, or one or two students were sitting or standing behind the others. Sometimes the students were not using a microphone, sometimes only one student at one site had a microphone, and sometimes they were using a conference microphone.

A general problem within the synchronous communication was the use of the communication technology. The software Adobe Connect was causing different problems. The most severe problems were related to the sound quality, since unexpected disruptions frequently occurred. The sound quality also suffered from lags and echoes, and sometimes no sound could be detected from one of the sites. Furthermore, Adobe Connect requires sound setting adjustments each time it is connected from a computer or laptop. It also requires the use of one or more headset or conference microphones. The problem in this case, however, is even worse, since the communicating participants are children trying to comprehend a neighboring language. The combination of sub-optimal technical solutions and the use of semi-communication make the whole situation vulnerable to disturbances.

Methodology

Our methodological approach is founded in classroom ethnography. Central to the ethnography approach is the ambition to get as close to the student`s perspective as possible. In this sense, classroom research shares the ontological foundation with conversational analysis, which also has roots in ethnomethodology and European phenomenology.

The empirical material collected includes video uptakes, classroom observations and photos from students' real-time interaction. The synchronous activities took place on the web conferencing system Adobe Connect. In addition, written documents from the observations by the researchers as well as from the interviews with students and teachers participating in the synchronous learning activities were used in the analysis. The empirical material was collaboratively analyzed by the Danish, Norwegian and Swedish researchers. Content analysis was conducted based on the recorded interactions on Adobe Connect and the researchers' written material, by using the analytical concepts of CA and social semiotics.

In our analysis we specifically focus on one of the synchronous communication activities in one of the cross-border class-matches. Twelve groups consisting of students from Denmark, Norway and Sweden evaluate self-produced comic series using Adobe Connect as a video conferencing system. This activity will represent some of the obvious challenges found within the different synchronous communication activities performed within the project.

Evaluating comics

The project of special focus in this paper is the self-produced comic series within the cross-border class-matches in the project. The conference system Adobe Connect was used during the activities. This project will represent some of the obvious challenges found within the different synchronous activities studied within the project.

Students in grades 4-6 (between 10 and 12 years old) were introduced to the genre of comics by creating comic series online in the context of the cross-border collaboration. During a two-weeks period the classes read comic series, shared their experiences and examined the forms of expression (colour, images, perspectives). They created comics of their own in the match-groups in the program Pixton, a piece of interactive software enabling the production of comic strips online (www.pixton.com). During the synchronous meetings the students together agreed on a main character for their story as well as a plot and a setting. They then created comic strips separately in each country and posted their final series on a shared wiki space. Feedback took place in synchronous match group-meetings on Adobe Connect and afterwards also at the wiki where they had to give constructive criticism in relation to the task.

In this specific project, with regards to the synchronous meetings in Adobe Connect, the following preparatory work and instructions were given to the students:

1. Read and listen carefully to the series
2. Note the words you do not understand. Find out what they mean and make a word list

3. Answer the following questions:
    - Has the group remembered to include all the agreed elements (characters, setting, plot)?
    - Find at least three characteristics of a comics.
    - Find at least three differences between the other group's comic strips and yours.
    - What works well in comics?

Placed in front of a computer (see Figure 1), the students log on to the three-part conversational environment country by country, set up their cameras and sound, and greet each other. When it is clear that the students at all three sites can hear each other they start to ask questions in accordance with the instructions.

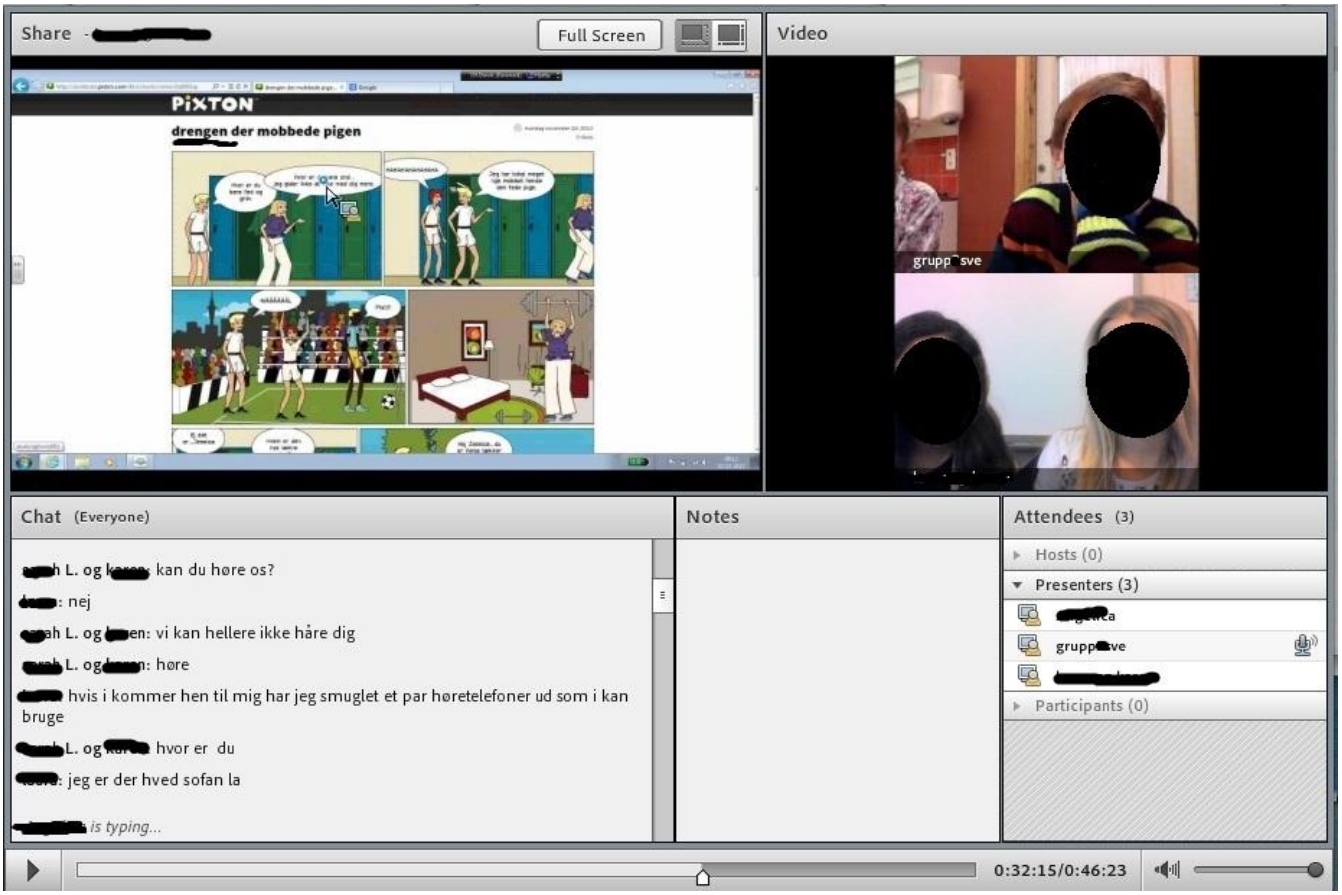

Figure 1: Peer feedback in synchronous meeting.

TIME	SPEECH	CHAT	NOTES	ACTION
09:06	- Hi - Hi, Hi - Where were you? - Why did you hang up? - Could we talk about comics?			Norwegian group comes back Lots of talk and laughter in the local groups Noise (high frequency)
10:05	- Why did you kill a cat? - Now we can not talk to you anymore	➢ Why did you kill a icat ➢ cat		Talk in local groups
10:36	- Will you listen now - Now we will tell you what we think about your comics - Can you be quiet - They do not listen - Can you be quiet - We'll tell you what we think about your comics	➢ no ➢ she was evil	have you seen our comics	Swedish group calls several times to the others to be quiet Showing with finger in front of mouth

Figure 2: Transcript of conversation: Dk – orange, Sw – blue, No – green.

In the excerpt above from a conversation in one of the match-groups in Figure 2, the Norwegian students had previously left the scene and now returned. Greeting takes place and questions are raised about their absence, before a quickly turning to the assignment regarding questions about the comics. The Norwegian students ask for attention to their comics but, since they arrive in the middle of the conversation, the Swedish students continue to question the Danish students. Questions are raised orally and clarified by typing in the chat- or note-windows. Answers are given in the chat in this excerpt. The students thus have to pay attention to several channels for answers, which often make them frustrated. Moreover, students talk noisily in the background in each country about what they understood from the other groups and their strategies for their next moves in the conversation (not transcribed here). Acoustic disturbance are present as well. At a first glance, the transcript shows that speech is the primary communication channel and that the chat is used to complement and/or clarify the talk. Nevertheless, as will be shown in our analysis below, a closer look at the conversational structures indicate that in many cases only the written communication seems to be understood by the recipients. Seen from the perspective of understanding in the actual communication, the chat can therefore be said to be the main channel of interaction. In some of the groups, though not in all, the students clearly rely on verbal communication to begin with, but as the conversation develops, they seem to rely more and more on other semiotic modes. This apparent shift in modality shows how the students seek meaning and are able to adjust their communicative strategies to the demands of the setting.

The synchronous meetings were about 20 minutes long and followed the structure of a short greeting followed by a sound and video check, which usually took a substantial part of the conversation. Then the actual assignment concerning the students' view on their produced comics on Pixton took place. The answers were in general positive and were both simple and more developed as exemplified in the paragraph below.

Negative feedback was also raised, and the students asked specific questions regarding the storyline. The closing of each session was quite short, consisting of a simple greeting followed by departure from the conferencing room.

Summary and examples of the general progress in the synchronous conversations:

1. Mutual greeting, sound and video check
2. Asks for views on their series
   Simple answers such as:
   - *Den var bra*
     [It was good]

   or more developed:
   - *Den var god, med mange forskellige virkemidler og mange gode effekter*
     [It was good, with many different actions and many good effects]
   - *Jeres tegneserie manglede sammen hæng og var kedelig*
     [Your cartoon lacked coherence and was boring]
3. Asks specific questions to the comics and answers:
   Varför döda ni en katt? – Den var ond…
   [Why you kill a cat? - It was evil …]
4. Closing – *Good bye*

As previously mentioned, all of the twelve collaborating cross-border match-groups chose to use the chat function in addition to, or instead of, oral communication and other available semiotic resources of meaning making. The number of chat comments in each group ranged from 36 to 173. The chat messages show simple syntactic structures consisting of short sentences, phrases or words, single letters and icons. Different categories of speech acts appear: questions, statements and short answers, many of them directed towards concrete action and technological problems such as: *Varför stängde ni av kameran* [Why did you close the camera], *okay har i slået mikrofonen til* [OK have you activated the microphone?] or: *ok konstigt tästa att kobla bort head sättet* [OK strange test it by deactivating the headset]. Many of the back-channel responses indicate that utterances have not been fully comprehended or that further explanations is required: *vi hører dere ikke* [We do not hear you], or *vad betyder det?* [what does that mean]. However, positive comments can also be found, as *Okey bra! :)* [Okey, good! :)].

In the chat, the most common adjacency pair is question and answer. The syntax of the questions is often minimised to shorten phrases and mostly no question marks are used. The answers are often very short, formed in just a few words without nexus such as “yes”, “no” or “ok”. Exclamation marks are used creatively in an attempt to establish contact and catch the attention of the addressee. Some exclamation marks can be understood as expressions of impatience *kan i høre mig???/Hör ni oss!! hallå!!!!!!!!!!* [Do you hear us!! Hello!!!!!!!], others as an amplification of a statement *jeg kan virkelig ikke høre jer!!!!!!!!!!* [I can really not hear you!!!!!!!!!!]. Punctuation, icons, short follow-up questions and clarifying words or phrases can be seen as examples of spontaneous and improvised communication.The possibility of receiving input prompt is seen when the students present themselves *skriv vad ni heter??* [Write down

your names??] and in questions like *vad brukar ni göra på fritiden?* [What do you do in your spare time?] and *ok var kommer ni ifrån?* [ok where do you come from?].

As concerns the semiotic resources and communicative channels used, the speech is enhanced by typing a repetition of the phrases and words in the chat or in the notes window. Here, sometimes English is used, and sometimes the students merely cry out keywords (e.g. Pixton). Occasionally the students even make signs in front of the camera (e.g. OK). Smileys and CMC-abbreviations occur (e.g. LOL - *laughing out loud)*. Colour is used in the chat, signalling the different speakers (see Figure 3):

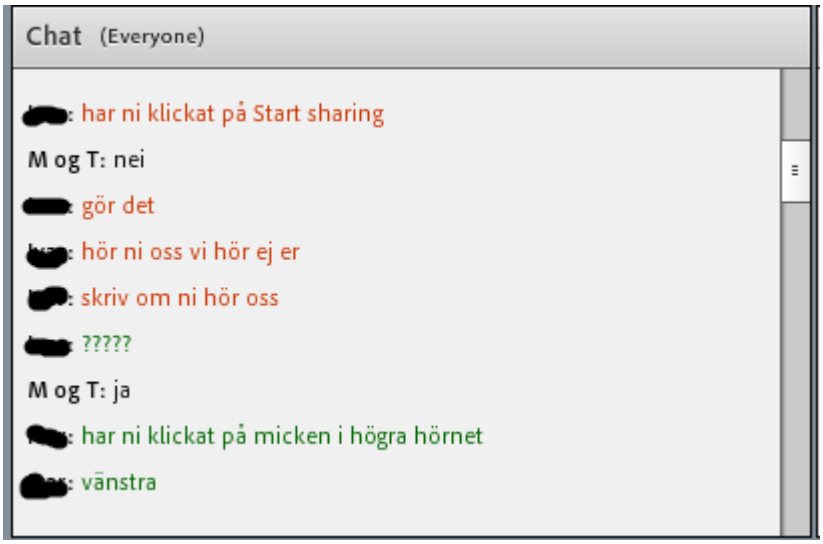

Figure 3: Excerpt from chat and application of colour.

As regards how the students manage to complete the assignment, the students` main task was to evaluate each other`s comics. A closer look at the synchronous interactions shows that they had severe problems reaching this goal. Three out of the twelve groups did not mention the comics at all in their interactions. Another three groups only referred briefly to the comics during their conversations. The remaining six groups more or less managed to solve the task by giving each other short comments of assessment such as *eran pixton var bra* [Your pixton comic was fine], *men inte färdig* [but not finished] or *det var ikke det vi havde avtalt* [this was not what we had agreed].

A likely explanation of the lack of communicative success may be that the assignment was too abstract and difficult for the students, when taking the linguistic resources of the students and the communicative barriers into consideration. Furthermore, the three-part setup is technically challenging because all three participating groups have to present at the same time and have to manage the camera and sound in order for the communication to work properly. As shown in the transcript above, the students in the three countries did not always appear simultaneously in the

conference room due to technical problems. This resulted in the establishment of two-part conversations, which seems to have made it difficult for the later arriving third part group to contribute on equal terms. Moreover, the conversations were often disrupted by acoustic disturbances and distractions in the conversational flow, e.g. when the students found it necessary to explain the addressee of a particular question.

Other factors of importance, which are not the main focus of this article, however, might be matters of power relations between the students. The students from Denmark and Sweden were a couple of years older that the Norwegians, and this age difference could explain some of the asymmetry found in the conversational patterns, especially in some of the groups. Another factor is the issue of politeness. In the recorded conversations one can find examples of what appears to be both intended and unintended instances of rude behaviour or lack of politeness. In part, the students` deliberate violation of social rules may emanate from boredom with or frustration over the assigned task, comprehension problems and technical disturbances. Other experiences of lacking politeness might stem from cultural differences, e.g. differences in school culture and classroom behaviour. The overall picture is, however, that most students strived to establish meaning, solve the assignment and communicate even if the framework conditions were less than optimal.

Discussion

Certain practical arrangements had to be prepared in advance before a synchronous communication could take place. Some coordination activities have been carried out in order to plan what computer-mediated tools to use, to agree on a specific time slot for all students and teachers involved and to prepare a communication structure. All these activities make up the framework for the communication and collaboration between the students. However, when the use of the computer-mediated tool, such as Adobe Connect, suffers from an unsatisfactory functionality in this case, the students will find themselves in an unexpected situation. This is an emergent situation based on the co-production between the learner and the learning environment. The findings in this case show that the synchronous chat seems to affect the participation in the synchronous communication positively, as it make the learners contribute even more. The perceived participation is considered as stronger and the learners contribute more within synchronous chat discussions. The learning continues as a dialogue, through the use of different semiotic structures and by social negotiation (Hrastinski, Keller & Carlsson, 2010). Thus, the students' adaptation to the technical problems faced within the synchronous communication is in different ways facilitating the multilingual inter-comprehension when different semiotic structures come into play in an ad hoc-based manner, together with the multimodal use of the technological facilities available. There are, however, also a number of students who are more likely to give up or misbehave when the assignment is too hard or there are too many obstacles reducing the chances of communicative success.

Synchronous communication is characterised by a situation where there is a connection between the perceived situation and the situated actions. The students are tightly coupled to the real-time situation where the synchronous communication is being carried out. The patterns and the progress of the situated actions will be decided on by the students based on the contextualised

occasion of the on-going synchronous communication (Säljö, 2003). In this way, it is unpredictable to a certain extent what students may learn in a specific situation. In any case, synchronous communication is of particular interest in language teaching, since the students are given an opportunity to develop and try out real-time communication strategies, as shown in this case. However, this is somewhat contrary to Palloff and Pratt (1999, p. 47) as they argue that synchronous IT-tools "rarely provides for productive discussion or participation". Synchronous communication is more vulnerable than e.g. the use of asynchronous communication tools because of the dependency relationship arising between the connected classrooms. A particular problem is that both linguistic and technical communication systems automatically adjust to the lowest common denominator (Börestam 1994), meaning that if there is a problem with e.g. Adobe Connect or language understanding in one classroom then all participants will experience the same problem.

The communicative forms that the students apply in the synchronous meetings are dominated by the written mode. The students speak and negotiate in their national groups but mostly prefer to address their partners through the chat function. That could be to compensate for an actual or perceived lack in the mode of oral communication, due to comprehension problems and poor sound quality. Moreover, the students seem to prefer the chat, as a more stable way of communicating in this setting. However, other visual forms of semiotic resources in a video conferencing setting such as facial expressions and gesticulating, or using colours in the chat to distinguish turns and speakers also play a significant role. The potential for collaborative learning seems to lie in offering the students multiple forms of conversation forms for making meaning, forms that can be used simultaneously for strengthening the learning (Hampel & Stickler, 2012).

Conclusions

It can be concluded from this study that synchronous communication within a learning activity is challenging. The nature and the content of the interaction cannot be taken for granted, since the students must find alternative semiotic structures to communicate if the ICT-tool used fails. The study shows that most students are capable of finding alternatives in order to reach the goal of the learning activities and seem motivated to overcome linguistic and technical barriers. A variety of semiotic resources, as images, gestures, smileys, colours, CMC-abbreviations and making signs, are used simultaneously within the synchronous communication. However, the multiple forms of conversation are dependent on the emergent situation and are dominated by the written mode in favour of the oral mode, due to comprehension problems and poor sound quality offered within the ICT-tool.

The study also shows that the use of synchronous communication in three-part teaching demands quite a lot of planning from the teachers involved. Even though problems in synchronous communication can be annoying to both teachers and students, the students' experience of being able to repair communication and find alternative solutions can be useful in the development of their communicative competencies, for example in the domain of inter-Scandinavian communication as in this case. This is because the problems experienced in synchronous

computer-mediated interaction in many ways resemble the problems the students are likely to meet when they use foreign languages outside the classroom.

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