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Supporting interaction and collaboration in the language classroom through computer mediated communication

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Abstract: This paper describes the design and implementation of a technology supported learning environment that enabled interaction and collaboration between a group of sixteen intermediate and advanced level university students of Italian and a group of seven Italian native speakers facilitators. For one semester students and facilitators worked together to complete two authentic tasks and interacted with each other through the communication tools and resources of an online learning management system. These resources included both asynchronous and synchronous communication tools such as an online threaded class discussion forum, a group discussion forum, chat and email. This paper discusses the theoretical underpinnings of the collaborative learning environment and the use of the different computer mediated communication tools throughout the duration of the project.

Theoretical perspectives on Second Language Acquisition

Over the last 40 years, the field of second language acquisition (SLA) has gradually moved its focus from the cognitively oriented approaches that have traditionally dominated the field, which focus their attention on the formal aspects of language and language learning, to socioculturally informed perspectives, which consider language and second language acquisition as contextually and socially situated, and are concerned with the meaningful use of language in collaborative social interaction and communication with others (Mitchell & Miles, 2004; Gass & Selinker, 2008).

Cognitive perspectives

In the early 1960s the American linguist Noam Chomsky (1959, 1965) proposed a theory of generative grammar and argued that the development of an individual's grammatical system was guided by innate cognitive structures, which were located within the brain. According to Chomsky, language was an aspect of individual cognition and the process of language acquisition was an internalised, cognitive process, which was mentally constructed by the individual.

Chomsky's theory of a transformational-generative grammar and his conceptualisation of language acquisition as an individual phenomenon located in the mind of the learner, had a powerful impact on linguistics and influenced the work of SLA researchers for several decades. Among those researchers, one of the most significant has been Krashen (1985), who developed the Input Hypothesis, a theory which claims that SLA depends on the amount of grammatically comprehensible input a learner receives in the second language. This input should be understandable, provided in sufficient quantities and at a level a little more advanced than the learners' current linguistic competence. In other words, in order to acquire a language, learners need to receive messages they can understand but that are also a little beyond their current level of competence.

Krashen's Input Hypothesis prompted other researchers to elaborate on it and explore different aspects of the language acquisition process. One of the most relevant theoretical models developed out of Krashen's Hypothesis was the interaction approach (Long, 1985, 1996; Pica, 1994). While Krashen's Input Hypothesis postulates that only one-way comprehensible input is needed for acquisition to take place, interaction theory suggests that two-way communication and oral interaction with other speakers of the target language are crucial elements in SLA (Pica, 1994; Long, 1996; Long & Robinson, 1998; Gass, 2003; Gass & Mackey, 2007). According to the interaction theory, second language development is facilitated by one particular type of

interaction, which has been described as *negotiation of meaning* (Long, 1996; 2007). Engaging in interpersonal oral interaction in which communication problems arise and are negotiated among learners creates the internal processes responsible for interlanguage development because it requires learners to focus their attention on specific features of the language and encourages them to gain information about the language in use (Mackey & Gass, 2006).

Swain (1985, 1995) argued that, in addition to comprehensible input, also comprehensible and meaningful output, which has been defined as learners' meaningful production of language (Swain, 1995), plays a significant role in second language development. According to Swain, when learners use a second language, they might notice a linguistic problem, either through external feedback or internal feedback, and might be pushed to modify their output. Comprehensible output can therefore assist learners in conveying meaning while providing important opportunities to construct linguistic knowledge by allowing learners to experiment with language forms and structures (Swain, 2005).

According to the interaction hypothesis, the comprehensible input provided to the learners, the learner's internal capacities and the learner's manipulation of the input received in the form of modified output form a basis of language development.

Sociocultural perspective

In the last 20 years, several researchers have started to apply Vygotsky's sociocultural theory to second and foreign language learning and teaching (Frawley & Lantolf, 1985; Donato, 1994, 2000; Lantolf & Appel, 1994; Lantolf, 2004, 2006; Lantolf & Thorne, 2006; Swain, Kinnear & Steinman, 2010). These researchers have argued that language learning goes beyond the development of linguistic competence as an internalised mental process (Chomsky, 1959, 1965) or the interactive negotiation of meaning through individual input (Krashen, 1985, Long, 1996) and output modifications (Swain, 1985, 1995), and have emphasised the crucial role that the social and cultural context play in the process of second language development and the importance of participating in concrete and meaningful communicative activities with other members of a speaking community.

From a sociocultural perspective, the limitation of the cognitively oriented models that have been developed following Chomsky's theories, lies in the fact that they focus exclusively on the psycholinguistic dimension, the formal properties of the language abstracted from the context, rather than the meaningful use of language in collaborative social interaction with others. For example, for Krashen, the purpose of providing comprehensible input is not to foster authentic social interaction but rather to give learners the opportunity to mentally construct the grammar of the language from natural data. For the interactionists, the purpose of negotiating meaning and producing modified output is to promote fluency and automaticity (Swain, 1995; Gass, 1997, 2003; McDonough & Mackey, 2006) and to promote awareness of gaps in knowledge of the second language (Swain, 1995, 2005).

Researchers in the sociocultural framework do not deny that it is important to study the cognitive aspects of SLA, as they relate to communicative development (Thorne, 2005). However, they argue that it is crucial to study those internal cognitive processes in relation to the social and cultural context in which second language development naturally takes place (Thorne, 2005; Lantolf, 2006; Lantolf & Thorne, 2006; Zuengler & Miller, 2006). In the sociocultural framework, language learning is viewed as a developmental process that occurs through meaningful social interaction and participation in socially mediated activities and the learners are viewed as active participants in the meaning-making process through which they develop their linguistic competence (Newman & Holzman, 1993; Lantolf, 2006).

The Zone of Proximal Development

A core aspect of Vygotskian theory is the concept of *zone of proximal development* (ZPD). According to Vygotsky (1978) there are two developmental levels in a child's mental development. The first level is the *actual developmental level*, which is the level of development of a child's mental functions that is determined as a result of independent problem solving. The second level is the *potential developmental level*, which is the level of development that a child can reach with the assistance of others. The distance between those two levels of development is what has been defined as the *zone of proximal development*: 'the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers'

(Vygotsky, 1978, p. 86). As Vygotsky proposed with his general law of cultural development, the skills that children can develop with the assistance and guidance of an adult, teacher or more capable peers exceed what they can achieve by themselves. Therefore, in order to help them appropriate the higher mental functions and skills from the experts and advance through their ZPD, it is necessary to provide them with opportunities to interact and cooperate with others. In other words, social interaction and collaborative learning, either between teacher and learners or among learners, are essential in assisting learners advance through their ZPD.

While the notion of ZPD was developed by Vygotsky to explain the cognitive and social development in children by measuring their potential age as compared to their actual age in terms of mental development, this concept has also been directly applied to second language teaching and research. In SLA research the ZPD has been defined as: 'the difference between the second language (L2) learner's development level as determined by independent language use, and the higher level of potential development as determined by how language is used in collaboration with a more capable interlocutor' (Otha, 1995, p. 96). This definition implies that the linguistic skills that second language learners can develop with the assistance of a teacher or more proficient user of the target language exceed what they can achieve independently. Therefore, in order to assist learners develop their language skills and advance through their ZPD it is essential to provide them with opportunities to interact and collaborate with more advanced speakers of the target language such as teachers, peers and native speakers (Donato, 1994; Otha, 2000; Lightbown & Spada, 2006; Thorne & Lantolf, 2007).

Vygotsky's sociocultural theory and the notion of ZPD applied to second language learning provided a useful framework for designing an online language learning environment that supported learners' meaningful interaction and collaboration with more advanced speakers of the target language and the development of social relations.

Computer mediated communication and second language learning

Several studies into the integration of computer mediated communication (CMC) in the teaching and learning of language subjects have discussed its numerous benefits. Some of these benefits include increased opportunities for social interaction and communication in the target language (Thorne and Payne, 2005; Levy & Stockwell, 2006; Thorne, 2008; Levy, 2009), increased interaction and linguistic production (Lee, 2009), the development of linguistic and pragmatic competence (Belz & Kinginger, 2002, 2003; Kramsch & Thorne, 2002), the development of significant social relationships with other interlocutors (Belz, 2002), greater opportunities to express ideas compared to face-to-face discussions and increased participation and engagement by students who do not participate frequently in face-to-face discussions (Kern & Warschauer, 2000; Kern, Ware & Warschauer, 2004). Thorne and Black (2007) argue that another important benefit of CMC involves the opportunity to transform the traditional teacher-centred communication typical of face-to-face contexts into more multidirectional interaction in computer-mediated contexts to foster more language-centred approaches to language learning.

In the context of this previous research, the study described in this paper focussed on the design development and implementation of an online learning environment intended to:

- 1) Promote meaningful social interaction and collaboration with other students and native speakers
- 2) Connect students with native speakers and provide opportunities for authentic target language practice
- 3) Assist students develop their target language skills
- 4) Promote the development of social relations and a sense of community among participants
- 5) Support active engagement of the students and the facilitators
- 6) Foster authentic, language-centred approaches to language learning.

The methodology of the study is described in more detail below.

The participants

The participants in this study were thirteen second-year and three third-year students of Italian at an Australian university, seven Italian native speaker facilitators and the researcher who was also the class teacher.

The learning environment

The intervention consisted of the design and implementation of an online community of learners to enable students to interact and collaborate with each other and with the native speaker facilitators with the aim of completing two authentic tasks, which incorporated the defining characteristics of authentic learning environments as described in Herrington and Oliver (2000). The research adopted a design-based research approach, employing iterations of the intervention, with modifications and improvements made between implementations (Reeves, 2006).

The first of the two tasks, which was completed during the first six weeks of the university semester, required students to plan and organise a trip to Australia for a group of visiting Italian students and to develop a comprehensive travel guide. The second task, completed in the last six weeks of the semester, required students to organise a trip to Italy for the whole class.

In order to complete the two tasks, which had to be carried out entirely in the target language, students divided themselves into small collaborative groups of three or four students. Each group was assigned to a native speaker facilitator who assisted students for the duration of the tasks by providing them with feedback and support as required. At the end of each task, students were required to present the final product of their work to the rest of the class. The final product was decided by the students, and could have taken the form of a web site, a video segment, a power point presentation, a guidebook or brochure or a combination of any of these options.

The interaction and collaboration within each of the groups and within the whole class took place through the communication tools and resources provided in the course learning management system (LMS) website, which included both asynchronous and synchronous tools. The asynchronous tools were email, a class threaded discussion forum and an individual discussion forum for each of the groups. The synchronous tool was the synchronous chat. Table 1 below summarises the CMC tool usage for each of the groups during the collaboration on the two tasks.

Table 1: CMC tool use for group tasks

Summary of CMC tools used during the first task				
Group travel destination	Class Discussion Forum	Group Discussion Forum	Email	Chat
Victoria	4	4	4	4
Northern Territory	4	4	4	
New South Wales	4	4		
Queensland		4		

Summary of CMC tools used during the second task				
Group travel destination	Class Discussion Forum	Group Discussion Forum	Email	Chat
Lombardia- Veneto		4		
Toscana		4		4
Lazio-Umbria	4	4	4	4
Campania	4	4		
Sicilia	4	4		

Data were collected, analysed and evaluated during and after each of the two collaborative tasks. A triangulation of data was used to determine the success of the design and the viability of the technology adopted to support students' interaction and collaboration. Recording, note taking and class observation were the primary techniques. Focus group interviews with the students and individual interviews with the students and the facilitators were also conducted. Several documents and artefacts were collected such as a questionnaire to obtain background information from the students, messages posted to the class discussion forum and the individual group discussion forum, email messages between participants and transcripts of the synchronous chat. Students' learning portfolio assignments and the final products of the tasks were also collected and analysed.

Discussion

The use of the synchronous and asynchronous CMC tools in the learning environment were investigated for their potential to support meaningful social interaction and the development of social relations between the participating students and the native speaker facilitators and to assist students develop their language skills through collaboration with more proficient speakers of the target language. The different tools and their use are described below.

Class Discussion Forum

Not all of the collaborative groups made use of the class discussion forum beyond the initial personal introduction posted by each of the students to the whole class before starting their work on the tasks. During the first task, three of the four groups contributed to the forum. During the second task, three of the five groups posted their messages to the class forum. When asked to comment on the reasons for not contributing to the class forum, some of the students from these groups said that, after posting their initial introduction and after having determined the composition of the groups, they were able to carry out the work on their section of the task both independently and within their own group without having to engage in online discussion with the rest of the class. Some students mentioned that they did not feel the need to use the class forum because they had the opportunity to meet the other students in class each week and they were able to use part of the allocated class time to update the others on their work and solve the issues and problems that arose in relation to the tasks.

All of the other contributing groups used the class discussion forum mainly to inform the rest of the class about the progresses of their work and to post information related to practical details of their itineraries. However, there was little or no discussion about the information itself or how to use it for the purpose of completing the tasks. Some students posted messages to ask other groups specific information such as dates and times of arrival or departure from a particular destination included in the itinerary. These questions only required a brief reply from the other students and did not lead to the type of dialogue required for students to engage in a deeper level of discussion with other participants.

Group Discussion Forum

All of the collaborative groups made extensive use of their individual group discussion forum during both the first and the second task. Within each of the groups, all but two of the participating students used the forum on a regular basis to communicate with the facilitators and the other students, negotiate the division of the work and the development of the tasks, share their ideas about the tasks, discuss any issues related to development of the itineraries and organise face-to-face meetings with other group members outside of regular class time. An analysis of students' contributions to their individual group discussion forum demonstrates that the students engaged in a deeper level of discussion compared to the class discussion forum. The main reasons for this was that the number of the contributing students in each group was smaller than the number of students contributing to the class forum and it was therefore easier for the students to engage in discussion and dialogue with three or four other students and one facilitator, as opposed to a larger group of participants, which also included the other groups' facilitators. Students also commented that they felt less anxious about communicating to a smaller and less dispersed audience with whom they were able to establish a relationship or a friendship.

Synchronous Chat

The synchronous chat allowed participants to interact simultaneously. This tool was used by only three of the collaborative groups. These groups were the Victoria group for the first task and the Toscana and Lazio-Umbria groups for the second task. All of the three students in the Victoria group, who used the chat tool during the first tasks, also used it in their second groups.

Some of the students who did not make use of the synchronous tool commented that the differing study and work commitments of the other students and the time-zone difference between Australia and Italy, where the majority of the facilitators resided, made it difficult to synchronise online meetings with the other participants. Other students mentioned the fact that, as they were regularly meeting in class and held regular face-to-face meetings outside of class, they did not feel the pressing need to communicate simultaneously through the chat tool provided. Some of the students with less developed language skills said that they felt anxious about using the chat as it required them to interact and compose their speech in real time.

An analysis of students' synchronous online discussion thread shows that during the chat sessions the students discussed a number of topics in the target language, but there was very little task focus.

Email

Students of only three groups used email to communicate with other students during the collaborative work on the tasks. Students from those groups commented that email was the preferred communication tool only for more practical aspects of the task, such as for the purpose of organising meetings and posting documents as attachments when it was difficult to do it through the course website.

Face-to-face meetings

Apart from communicating through the online communication tools of the course website, students also had the opportunity to meet face-to-face with the other students during two of the four allocated hours of class time, as well as outside of normal class time. All of the students took advantage of these face-to-face meetings with the other students in the class to plan their work and discuss various issues related to the tasks in the target language. For the groups that were less active online, the interactions occurred predominantly in face-to-face mode both in class and outside of regular class time.

Other uses of the technology

Students did not utilise the CMC tools solely to interact and collaborate with the other participants, but also made use of the Internet to access Italian web sites and online resources for the purpose of searching information and developing their own itineraries. Students also made use of the technology to produce their own materials and documents in the form of PowerPoint presentations, video segments and websites.

Conclusion

The majority of the participating students took advantage of the communication resources provided through the course LMS website and acknowledged that the online tools provided them with greater opportunities to interact and collaborate with the other students and with the native speaker facilitators in the target language. These increased opportunities for interaction impacted positively on the development of students' linguistic competence as it encouraged them to regularly apply and practice the target language structures that they had learned in class while communicating online.

In particular, the opportunity to communicate with more advanced speakers of the target language, who modelled correct and appropriate language use and provided students with specific linguistic assistance, had a positive effect on the development of students' productive and receptive language skills. Students' analysis of the other participants' contributions to the threaded discussions and the specific linguistic feedback provided to the students by the facilitators and the teacher greatly assisted learners in the task of constructing correct sentences and composing clear and well-structured messages. The interaction and collaboration with more proficient users of the target language assisted students develop their language skills above their current level of competence and therefore advance through their ZPD.

An analysis of students' contributions to the online discussions also revealed that the use the CMC resources greatly contributed to increase students' level of participation and involvement in the tasks. This was particularly noticeable in the case of students who tended to be less active during the time allocated to oral communication in class. These normally more reserved students took full advantage of the opportunity to communicate online with other fellow students and with the facilitators and ended up composing longer messages which covered a wide range of topics, in a way that had not been possible during oral face-to-face interaction.

Finally, an analysis of students' comments during the focus group and individual interviews that took place at the conclusion of each of the two tasks, revealed that the online communication and collaboration enabled students to develop significant social relationships and friendships with the other participants in the same groups. The establishment of social relations with other group members had a positive impact on students' motivation and commitment to complete the assigned tasks, as students felt part of a team and were determined to arrive at a positive collective outcome.

While this paper discusses the implementation of a technology supported learning environment with a particular group of students, aspects of this approach could be applied to similar educational contexts in which language students could be encouraged to interact and collaborate with each other and with native speakers of the target language through a number of online communication tools. The tools provided students with the opportunity to use the target language in meaningful and authentic contexts that challenged their language skills above their current level of competence and assisted them advance through their ZPD.

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