UNIVERSITY OF SOUTHAMPTON

FACULTY OF LAW, ARTS & SOCIAL SCIENCES

School of Humanities

The Processes of Collaborative Activity in Computer-Mediated Tasks: in Search of Microgenesis

by

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ABSTRACT

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THE PROCESSES OF COLLABORATIVE ACTIVITY IN COMPUTER-MEDIATED TASKS: IN SEARCH OF MICROGENESIS

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This study in the field of Second Language Acquisition (SLA) was conducted in a Spanish as a foreign language classroom. The study investigates dyadic collaborative activity in computer-mediated tasks from a Sociocultural perspective on Second Language Learning (SLL). From this theoretical perspective interaction is an enabling process that becomes essential for individuals to achieve development.

The purpose of this study was to gain a better understanding of the kind of tasks that might promote higher levels of collaboration and high quality collaboration in terms of microgenetic activity opportunities. The investigation was operationalised by means of the following research questions:

1. To what degree do the three different tasks in the two mediums of implementation –computer and non-computer based- support collaborative work in the classroom?
    a) How do learners deploy semiotic mediational mechanisms such as repetition, L1, and reading aloud in the context of collaborative activity?
    b) To what degree do participants engage in High Quality Collaboration (HQC)?
    c) What is the significance of HQC in the processes of second language learning?
2. What is the importance of the computer as a mediational tool in the processes of collaborative activity?

Protocols for analysis were obtained by the transcription of audio recordings of (12) dyads/ triads completing the tasks. Other instruments of data collection were pre and post task implementation questionnaires, and pre and post linguistic tests to provide evidence of interlanguage change. Results confirm 1) the three tasks support high degrees of collaborative activity - albeit qualitatively different; 2) language can - sometimes simultaneously- be deployed by learners both as a means of communication and as a cognitive tool to achieve linguistic development; 3) the presence of the computer seems to change the nature of collaborative activity. The computer seems to offer specific benefits, e.g. immediate feedback that supports interlanguage stretching in different forms (see Kowal and Swain, 1997). However, it may hinder creativity in the case of text reconstruction tasks, for instance. This investigation highlights the importance of looking at learners' activity holistically –as emphasised by the Sociocultural notion of Activity Theory – in order to understand collaboration as a mediational process for language learning.

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1 Introduction

The study of interaction has, for some time, been the focus of attention for researchers who study second language learning within a social context. A prominent approach along these lines is the Interactionist perspective rooted in Second Language Acquisition theory, which sees learners' interactions both as a source of target language input as well as an enabling activity that provides learners with opportunities for negotiation of meaning. Breakdowns in communication are seen as potential opportunities for students to negotiate their linguistic production in order to re-establish communication and this process is seen as driving development of the system (*cf.* Long, 1985; Long & Crookes, 1993; Pica, 1994). However, this socially based strand of research ultimately sees the learner as an autonomous individual whose main benefit from the environment is to "absorb" linguistic data for the restructuring of internal mechanisms, so that in this respect it is not unlike linguistic and cognitive approaches to language learning. Interactionist research has deepened our understanding about the characteristics of interactions both between NNS-NNS (non-native speakers) and NS-NNS, and about some specific features that might influence the interactions' outcomes, e.g. type of task, type of feedback, etc. However, communication is seen as the ultimate goal of interaction (for a comprehensive review of *Second Language Learning Theories* refer to Mitchell and Myles, 2004).

Unlike the view of interaction described above, which can be portrayed by the 'conduit metaphor' where messages are created intra-mentally and then transmitted to the interlocutor for decoding in order to achieve the goal of communication (*cf.* Thorne, 2000:227), the Sociocultural approach informing this study, sees interaction as an enabling process that becomes essential for the individual to achieve development. A fundamental premise from this approach to language learning is the notion of knowledge being social and created in interaction. According to Vygotsky (1978), cognitive development appears first in the inter-psychological plane and it is then appropriated by the individual. The processes undergone in inter-psychological activity are mediated by tools, either physical and/or symbolic, language being the most pervasive of these. Social interaction is a means to achieve development that enables

appropriation/internalisation "through a dynamic transformative process called *microgenesis*" (Wertsch, 1985a in Ohta, 2000:54). The learning process we are referring to as microgenesis can sometimes be observed while learners engage in dialogic communication, and can thus be studied within the situated activity in which it occurs.

This study set out to investigate pair/group collaboration and its relevance to foreign language learning, as well as the impact of the computer as a mediational tool during interaction. This second area of interest -computer-assisted language learning (CALL)- reflects a need in the field to determine what task characteristics and features contribute to learners' interaction either while working at the computer with other learners or learner-computer interaction as such. The specificity of the computer and computer-based tasks in the language classroom needs to be systematically studied since there is a clear lack of such work. The activity generated by the learners' interaction with the task is a unique event defined by the processes that develop as a result of that interaction in combination with the learners' own goals and perceptions of the task (Coughlan and Duff, 1994). In other words, we need to study tasks as generic events that will provide opportunities for unique activity that could lead to the co-construction of knowledge in the classroom. By studying the processes that result from a task and the activity it promotes we should find ourselves, as teachers, researchers, and materials designers, in a better position to design, implement, and use tasks that will promote fruitful collaboration in the language classroom. The data studied comprised the recorded interaction of twelve pairs/trios of students working on three different tasks. Six dyads/triads worked on the tasks delivered via the computer, and six worked on alternative versions delivered on paper, for comparative purposes.

Throughout the study I use the term *interaction* generically and neutrally to "refer to the situation in which people act upon each other...consciously or unconsciously interpreting (i.e. giving meaning to) those actions" (Oxford, 1997:444). In using the term *collaboration* I draw attention to interaction "as a willingness to listen to others' ideas, suggestions and opinions so that they can be discussed and integrated into further actions" (Beatty and Nunan, 2004:166) and distinguish it from *cooperation* which implies working together to complete a task for instance, but where learners might assign a part of the task to each other rather than engaging mutually "in a coordinated effort to solve the problem together" (Roschelle and Teasley, 1995:70).

The following chapter (2) introduces Sociocultural theory as the framework within which this study is embedded and provides an overview of concepts associated with this approach, and which inform the investigation. Secondly, significant Sociocultural research on second language learning is reviewed; thirdly the chapter outlines the historical background of CALL and discusses relevant CALL research. The chapter finishes by establishing the theoretical framework for the investigation of (computer-mediated) tasks. Chapter 3 explains the methodological design of the project and presents the research questions in relation to the context and participants in the study, and the methods and instrumentation believed to best support our inquiry. Chapters 4 and 5 present and discuss the results of the investigation. The final chapter (6) concludes the dissertation by discussing the theoretical and pedagogical implications of the study, some of its limitations, and looks at future directions for research in the field.

2 Sociocultural Theory: Theoretical and Empirical Background of the Study

2.1 Introduction

The literature review consists of three main parts. The first one, Sociocultural Theory, introduces the theoretical framework upon which this investigation has been based as well as the fundamental concepts associated with it which will be called upon throughout the study. After considering current Sociocultural research on second language learning in section 2.2.8, section 2.2.8.3 highlights some knowledge gaps and how this study hopes to contribute to the field. The second part of the review focuses on CALL; it provides a brief historical background and a research overview. Section 2.3.4.3 outlines how a Sociocultural approach to the study of CALL can contribute to the study of computer-mediated activity. The final part of this chapter, section 2.4, establishes the theoretical framework for the investigation of computer-mediated tasks.

2.2 Sociocultural Theory

The premature death of Lev Semeonovich Vygotsky in 1934 as well as academic and political factors of the time meant that much of the work of this Russian psychologist was left unfinished, and inaccessible to the West until the 1970s. Since then, however, increasing interest in his work and that of his followers has given birth to what we now know in the field of Second Language Acquisition as the Sociocultural Approach to language learning. Seminal to this approach is the "Vygotskian argument that knowledge is social and is created in interaction" (Daniels, 1993). As a framework for our investigation of collaborative activity, this chapter provides an account of the fundamental concepts of Sociocultural theory and their implications as they have been interpreted and applied in the field of Second Language Acquisition.

2.2.1 The Nature of Knowledge

For Vygotsky, knowledge is not created in the individual mind, it is essentially created in the social realm, through interaction. The importance of knowledge and how it is socially co-constructed is stressed by Wells by means of three principles. First of all, knowledge is inter-psychologicaly created by knowledgeable individuals, therefore it is not conceived as a pre-existent product waiting to be exchanged; secondly, this knowledge co-construction is both social and cultural; and finally, its construction is always mediated by cultural processes and tools, either physical or psychological (Wells, 1992:286-287; see also Mercer and Scrimshaw, 1993).

Vygotsky conceived of the mind as a system consisting of both natural/ biological functions and, importantly, cultural –higher- mental functions, such as voluntary attention, problem-solving capacity, planning, learning, and intentional memory. His primary interest lay in the study of these higher mental capacities and he proposed four *genetic* domains to do so. The *phylogenetic* domain is related to how the human mind evolved differently from other life forms, by means of culturally mediated means. The *sociocultural* domain is concerned with mediation and the different kinds of mediational tools adopted and valued by society. The *ontogenetic* domain studies the appropriation of these mediational means and how they are integrated into cognitive activity during the processes of development. Finally, the *microgenetic* domain focuses on the overt, in flight, instance of learning as it happens during interpsychological activity.

2.2.2 The Nature of Learning

The Sociocultural approach to learning differs from other cognitive approaches in that it does not accept that knowledge originates and develops exclusively inside the individual mind by means of biological mechanisms and internal processes. Vygotsky accorded learning a fundamentally social nature. Thus learning is a mediated process that originates in societal activity. There are three important issues to be considered in relation to learning, specifically in the classroom, from a Sociocultural perspective: instruction, agency, and situatedness. The role of instruction is at the core of this approach. Instruction is essentially a collaborative act where zones of proximal

development (see 2.2.5) are created by the participants, that is agents with their own social perspectives and histories, goals, attitudes, etc. The situated quality of learning means that circumstance is a pervasive aspect that has to be carefully considered since "learning unfolds in different ways under different circumstances" (Donato, 2000:47).

2.2.3 Activity Theory

Activity Theory, a concept proposed by Leontiev (1978), provides a theoretical framework for the systematic investigation of collaborative activity in the classroom. According to Wertsch (Wertsch, 1985a cited in Lantolf and Appel, 1994), Activity Theory raises the fundamental question of what the individual or group is doing in a particular setting. In order to find this out, it is necessary to investigate what the motivation behind the activity is. Motivation can be either a biological need or a cultural one. Once that need is directed to a specific object, Leontiev considers it a motive.

Activity Theory is conceptualised into three different levels: the level of activity, the level of actions, and the level of operations. It is possible to think of these levels as a series of concentric circles that progress from a general, wider one, to a smaller, more focused one. The level of Activity is the macro-social setting, for example education or work, that will directly influence participants' attitudes in relation to their goals, roles, and motives within the setting. However, the level of Activity is not consciously open to examination by the participants since it is embedded in their sociocultural assumptions. The second level, "the level of action is the level of an activity at which the process is subordinated by a concrete goal" (Leontiev, 1981cited in Lantolf and Appel, 1994:19). Not only do goals allow the individual to reflect and plan upon a process and/or task previous to its implementation, but they are also prone to modification, and change. Finally, the level of Operations allows for specific considerations as to the actual means that will be utilised to carry out an action. These means are inevitably linked to the circumstance in which the action takes place.

Due to the complexity of agency during activity and the pervasive influence of circumstance upon it, it is possible that activities change and evolve even in the span of a few moments. Furthermore, although a group of participants might be involved in

performing a particular task, this does not mean that they are all engaged in the same activities. This aspect of activity theory has major implications in the language classroom since it is students that shape both the goals and outcomes of tasks (see Lantolf and Appel,1994 and Donato, 2000). These theoretical insights have been corroborated by research work into SLA tasks carried out by researchers such as Coughlan and Duff who suggest that tasks are no more than "behavioural blueprints" (1994:175) for learners to engage in their own particular activity. Their protocols not only show how five different learners conceptualise the same task differently, but also how the same learner re-interprets the same task in a different way when asked to perform it again over a period of time. Their work leads them to conclude that on the one hand "a linguistic event never duplicates a past one, and can never be truly replicated in the future" and on the other hand, although "the task or blueprint may be the same, the activity it generates will be unique" (Coughlan and Duff, 1994:190).

Roebuck (2000) has also studied tasks within this theoretical framework to demonstrate how the activity of individuals cannot be controlled by a researcher, or a teacher, for that matter. He asked thirty-two learners of Spanish to read and recall three different texts immediately after having read them. Although the texts were the same, the participants approached them differently, according to their own "particular goals, motives, and Sociocultural histories" (Roebuck, 2000:94), thereby showing how activity is permeated by the self and by the particular mechanisms implemented by human beings in response to problem-solving requirements.

Activity theory has profound implications in second language learning pedagogy and research. Teachers and researchers must be aware of the fact that, ultimately, what matters when learners are performing tasks in the classroom, are the particular ways in which they interpret and tackle those tasks, transforming them into their own individual activity. To explain this activity it is necessary to "[uncover] the motive and the interrelationship of this motive with the selection of goal-directed actions and their operational composition" (Donato, 1994:36). It can be concluded from the above considerations that if learner activity is to be studied in the classroom, an effective way to do so is the investigation of the discourse of learners engaged in that activity since language is the most pervasive of the mediational tools (see Methodology chapter).

2.2.4 Mediated Activity

Lantolf identifies the concept of mediation as the most fundamental notion in Sociocultural theory (2000:2). Human activity is *mediated activity*; in the physical world, instruments such as hammers and computers are drawn upon in order to modify the environment and adapt it to our specific circumstances and needs. Mental activity is also mediated by symbolic tools, language being the most pervasive of them. An essential function of language as a tool for mediation is that of regulation; we use language to regulate and exercise control over other people and over ourselves. The two planes of intra-psychological (mental) and inter-psychological (social) activity that permeate cognitive development and human relationships respectively are mediated by language through the process of regulation. Activity is first regulated or mediated by others, when development is achieved, we come to appropriate the mediational tools themselves and therefore, become self-regulated.

The tools for mediation, however, do not just assist activity and development, as Cole and Wertsch (2002:3) point out quoting Vygotsky (1982), "the tool actually transforms the mental processes since it:

a) introduces several new functions connected with the use of the given tool and with its control;
b) abolishes and makes unnecessary several natural processes, whose work is accomplished by the tool; and alters the course and individual features (the intensity, duration, sequence, etc.) of all the mental processes that enter into the composition of the instrumental act, replacing some functions with others."

The transformative processes alluded to by Cole and Wertsch can be seen in the work of the researchers whose empirical work is reviewed in section 2.2.8.2 below. The use of language as a tool for mediation in the second language classroom brings about the simultaneous accomplishment of different levels of activity by performing one specific task. That is, learners build together on each other's linguistic tools by pursuing the task goals as defined by the teacher, by pursuing regulation over the task and over their linguistic performance, and, finally, by using dialogic communication to hopefully achieve language development. Language then mediates both socialization and cognitive and linguistic development. Conversation as a mediational mechanism conceptualises

the dualistic role of learning implicit in Sociocultural theory whereby learning is itself "a form of language socialization between individuals and not merely information processing carried out solo by an individual" (Donato, 2000:33).

2.2.5 The Zone of Proximal Development (ZPD)

The zone of proximal development (ZPD) is a metaphor for the "site where social forms of mediation develop...for observing and understanding how mediational means are appropriated and internalized" (Lantolf, 2000:16-17). For Vygotsky, instruction is at the heart of learning and it precedes and leads development (Lunt, 1993 in Daniels, 1993). There are several implications arising from this idea. Instruction necessarily involves the participation of, at least, two parties each of them carrying or embodying - in the case of the computer, see section 2.3 - the issues raised by Activity Theory. When the instructional act takes place, elements like goals, motives, and operations gain their specific importance. Instruction implies what Frawley (1997) calls the asymmetric, inter-subjective feature of the zone of proximal development. For effective instruction to occur there must be a more knowledgeable subject who would, among many other things, lead and organise the process towards development. However, neo-Vygotskian researchers studying collaborative activity in the classroom have suggested that one of the empowering characteristics of peer collaboration is precisely that of becoming together "experts" when individually they are "novices" (Donato, 1994) by co-constructing together what is known in the literature as "opportunities" (Lantolf, 2000), "occasions for learning" (Swain and Lapkin, 1998) or "affordances" (van Lier, 2000).

The second major implication of the idea that instruction precedes and leads development lies precisely in the fact that for development to occur, there must be a progressive modification of knowledge. This takes us into the second characteristic of the ZPD: there should be a difference between "actual and potential growth" (Frawley, 1997). In Vygotsky's words, the ZPD is "the discrepancy between a child's actual mental age and the level he reaches in solving problems with assistance indicates the zone of proximal development" (Vygotsky, 1986:187).

An example of interaction in the zone of proximal development, which illustrates the importance of even imitation, is provided by Lantolf (2000). Imitation here is used to transform the speech of experts and appropriate it as a result of a complex and creative activity whereby collaboration enhances the communicative and instructional exchange:

child	(opening cover of tape recorder) open, open, open
adult	Did you open it?
child	(watching tape recorder) open it
adult	Did you open the tape recorder?
child	(watching tape recorder) tape recorder

Newman and Holzman 1993:151

This example demonstrates how the child is able to develop his/her language by imitating the adult; the child creates something new from the language produced by the adult (*open* to open *it* and then *naming* the tape recorder).

Interacting and collaborating in joint activity, there are at least two beings whose asymmetric level of knowledge allows them to engage in a dialogical relationship using language as a tool for mediation. It is claimed that the outcome of this interaction is a process that reflects a cyclical route towards development and change from inter-mental activity to intra-mental activity. The goal of the novice or less knowledgeable participant is to achieve his/her next stage of cognitive independence by making use of his/her own, independent capacity for problem-solving, and that capacity -being temporarily lent- of his/her more expert partner. "Vygotsky insisted on the dialectic unity of learning-and-development- a unity in which learning lays down the pathway for development to move along and which in turn prepares ground work for further learning, and so on" (Dunn and Lantolf, 1998:422).

2.2.6 Appropriation

The process of transition from inter-mental activity to intra-mental is called appropriation (or internalisation). Frawley (1997) explores the literal translation of the Russian term "*vrashchivanie*" meaning 'ingrowing', and describes the concept as, "...the ingrowing of lived experience into personal meaning." The transformation and

appropriation of experience, once alienated from the self and now becoming a meaningful part of it, is what dialogic collaboration essentially entails.

The dialogic nature of interaction within the ZPD, allows the expert partner to exploit both feedback and observation in the present stage and facilitate the novice's learning/ development path by readjusting, reorganising, and leading interaction so that the next stage of development is reached. Internalisation is the process through which activity that is originally mediated/regulated by tools and other people is transferred from the social to the individual plane. This process is achieved by appropriating the means of regulation and manipulating them voluntarily (Lantolf, 2000).

2.2.6.1 Scaffolding

The neo-Vygotskian metaphor of scaffolding refers to those facilitating actions that the tutor or more expert peer brings into the interaction in order to help the novice through their process of internalisation. According to Wood *et al.* (1976 in Mitchell and Myles, 2004), scaffolded help has the following functions:

1. recruiting interest in the task;
2. simplifying the task;
3. maintaining pursuit of the goal;
4. marking critical features and discrepancies between what has been produced and the ideal solution;
5. controlling frustration during problem-solving;
6. demonstrating an idealized version of the act to be performed.

When learners are involved in dialogic events cognitive development might be witnessed. This learning process "...can sometimes be traced visibly in the course of talk between expert and novice. This local, contextualized learning process is labelled *microgenesis*" (Mitchell and Myles, 2004:198). The metaphor of scaffolding has originally been used to describe the specific work that the expert provides in order to help the novice progress from one stage of development to another. Wells supports Mercer's argument that a core feature of scaffolding behaviour "typically provided by someone acting in the role of teacher" is the removal of the scaffold when it is no longer required (Mercer, 1995 cited in Wells, 1998:346). However, it has been observed that

scaffolded help does not exclusively emerge in interaction between novice (student) and expert (teacher) in the classroom. Research work carried out by Donato (1994) illustrates what he calls "collective scaffolding" and the effects of collaborative activity in the co-construction of language knowledge. In the example below he demonstrates how peer collaboration empowers learners who are, individually, "novices", to become, collectively, "experts". That is to say, working collaboratively on a problem-solving activity, learners are able to focus on form and co-construct linguistic meaning by building on individual knowledge to achieve, together, language accuracy.

Example of collective scaffolding (Donato, 1994:44)

A1	S1	...and then I'll say...*tu as souvenu notre anniversaire de marriage*...or should I say *mon anniversaire*?
A2	S2	*Tu as*...
A3	S3	*Tu as*...
A4	S1	*Tu as souvenu*...'you remembered?'
A5	S3	Yea, but isn't that reflexive? *Tu t'as*...
A6	S1	Ah, *tu t'as souvenu.*
A7	S2	Oh, it's *tu es*
A7	S1	*Tu es*
A9	S3	*tu es, tu es, tu*...
A10	S1	*T'es, tu t'es*
A11	S3	*tu t'es*
A12	S1	*Tu t'es souvenu.*

This example shows how it is the collective endeavour that accomplishes the construction of the complex verb formation required to express "you remembered" in French. Donato argues that although each student seemed to posses a specific aspect of the construction, the accurate form was only produced as a result of the combined effort by the triad. Educational researchers such as Mercer also believe that the process of scaffolding might involve more than two people, however, for him an essential quality of this process "must be that... the provision of guidance and support... is increased or withdrawn in response to the developing competence of the learner" (Mercer, 1995:75).

2.2.6.2 Private Speech

Private Speech is another aid to achieve cognitive development and internalisation. It is self-directed language that can be observed when learners are experiencing cognitive

challenges and it is employed to gain self-regulation and control task performance (McCafferty, 1994; Donato, 1994, 2000). Although Private Speech has "social origins in the speech of others, [it] takes on a private cognitive function" (Lantolf, 2000:15) and often consists of self-directed questions and answers, and utterances that are not complete syntactically. Private Speech is believed to play an essential role in cognitive development (*cf.* Brooks and Donato, 1994; Brooks *et al.*, 1997; Ohta, 2001). The identification and subsequent analysis of private speech utterances presents, however, difficulties and even controversies (*cf.* Wells, 1998:349-350), not least because of the practicalities of "capturing" it during data collection. Private speech is often uttered in a low voice, and includes elliptical language.

2.2.7 The Sociocultural Approach to Second Language Learning

A Sociocultural approach to cognitive development should embrace the following concepts born from Vygotskian theory: Activity has to take place within the Zone of Proximal Development in asymmetric collaboration between expert and novice through scaffolded linguistic mediation. At the heart of mediated Activity lies the concept of Internalisation which involves the process whereby the novice achieves self-regulation, appropriating knowledge from an inter-psychological to an intra-psychological plane. The observable outcome of the learning process is what has been called *Microgenesis*.

Some caution, however, is necessary in applying a general learning theory to the study of SLL (*cf.* Mitchell and Myles, 2004:221-222). Second Language Acquisition (SLA) is a "complex multifaceted phenomenon" which requires the investigation of issues such as the identification of what second language learners acquire, how the L2 is acquired, the internal and external factors involved in SLA acquisition, and how these factors interact (Ellis, 1994:13-15 in Rule, 2001:6). Sociocultural theory applied to SLL research (see 2.2.8) has been primarily concerned with the description and study of interaction and collaboration as enabling means for "experts" to scaffold "novices" into the co-construction of new language forms and/or knowledge about language. From this perspective, little attention has been paid to core areas of SLA:

- (Subconscious) transfer of grammatical properties from the L1 mental grammar into the mental grammar that learners construct for L2.
- Staged development in second Language Acquisition: L2 learners do not acquire properties of the L2 immediately, but go through a series of 'transitional stages' towards the target language.
- Systematicity across L2 learners in the way that knowledge about the L2 being learned grows (i.e. the stages of development are common to many learners).
- Variability/Optionality in the intuitions about and productions of the L2 at various stages of development.
- Incompleteness for the majority of L2 learners in the grammatical knowledge about the L2 attained in relation to native speakers of that target language.

(Towell and Hawkins, 1994:5 in Rule, 2001:6)

In order to arrive at a complete model of the language learning process, the above issues need to be studied and accounted for. I believe that in order to achieve this, collaboration among researchers from various perspectives is needed. For instance from Universal Grammar approaches to explain the learners' interlanguage grammars, and from connectionism and other cognitive approaches to understand internal acquisition processes and their links to inter-psychological activity.

Having acknowledged some of the limitations of the Sociocultural approach as applied to SLL, we are endeavouring to explore the processes of collaborative activity as an aid for interlanguage development while students are performing computer-mediated tasks. Our study of mediated activity involves a systematic observation and analysis of both tools employed for collaboration, the computer and language, the latter with its two-dimensional investiture, a tool for mediation, as the computer is, and a development goal in itself. The following sections review key studies of second language learning from a Sociocultural perspective and provide an empirical framework for the present investigation.

2.2.8 Beyond interaction: collaborative dialogue and its empirical investigation

Interaction as embodied by the Vygotskian concept of inter-psychological activity is fundamentally different to the concept of interaction portrayed by the "conduit metaphor" in which messages are created intra-mentally and then, transmitted to the

interlocutor for decoding in order to achieve the goal of communication (*cf.* Platt and Brooks, 1994:498; Thorne, 2000:227). Interaction from a Sociocultural perspective is an enabling process that becomes essential for individuals to achieve development. By engaging in inter-psychological activity, participants are able to co-construct knowledge as well as create meaning. These conceptual differences can be observed in theoretical perspectives on second language acquisition and what they consider the benefits of interaction are in the language process.

Following Krashen's Input Hypothesis (1982,1985), researchers like Long (1985), Long and Crookes (1993), and Pica (1994) have studied interaction as an enabling activity to provide learners with opportunities for negotiation of meaning. The ultimate goal of negotiation of meaning in communicative interaction is seen as the modification of input into "comprehensible input", a necessary condition for learning to occur. From an Interactionist perspective, breakdowns in communication are seen as potential opportunities for participants to negotiate their linguistic production in order to re-establish that communication and this process is seen as driving development of the system, e.g. "through negotiation, comprehensibility is achieved as interlocutors repeat and rephrase for their conversational partners" (Swain, 2000:98). However, it has been noted that learners are often able to overcome their communication problems without necessarily negotiating for meaning (Skehan and Foster, 2001:187). Furthermore, researchers from this theoretical perspective have failed so far (although see Mackey, 1999) to provide convincing evidence that there might indeed be a link between negotiation for meaning and second language acquisition (*cf.* Swain, 2000:98 and Skehan and Foster, 2001). According to Wu (1998), other limitations of Interactionist research include the fact that negotiation exchanges in the classroom are normally too few to be substantially influential as the provision of comprehensible input, and methodologically, the framework fails to capture the nature of interplay between interaction, comprehension and acquisition.

Throughout her vast experience with French immersion education programmes in Canadian schools, Swain (1985) became convinced that the assumption, following Krashen's Input Hypothesis, that providing learners with comprehensible input should be a sufficient condition for the acquisition of the target language, was not entirely accurate. Students that had been under the programme for up to seven years and, therefore exposed

to an environment rich in comprehensible input, showed that "their grammatical performance (was) not equivalent to that of native speakers" (1985:252). These observations directed her attention to the study of output, and eventually, to the formulation of her "comprehensible output" hypothesis.

Swain argues that having to produce the target language helps learners in three main ways. First of all, by being "pushed to stretch their interlanguage" (*cf.* Swain, 1997:117), learners might notice discrepancies between their output and the target language. "Noticing" might occur at various levels (Swain, 2000:100), it can occur as a result of being salient or frequent in the target language, it can occur because learners 'notice a gap' between their interlanguage and the target language (Schmidt and Frota, 1986), or they may notice a 'hole' in their interlanguage, i.e. they cannot accurately express the desired meaning. Noticing can bring opportunities for learners to focus on form, and importantly, to focus on those aspects of their interlanguage which they regard as important to achieve their own goals. Secondly, the production of output can serve as the basis for hypothesis testing: "it has been argued that some errors which appear in learners' written and spoken production reveal hypotheses held by them about how the target language works. To test a hypothesis, learners need to do something and one way of doing this is to say or write something" (Swain: 1995:130-131). Finally, output, according to Swain, can have a metalinguistic function by allowing learners to reflect and talk about their language. In fact, a criticism of the construct of 'noticing' is that it can help learners acquire metalinguistic knowledge, but not necessarily "actual knowledge of language" (Truscott, 1998:119).

From a Sociocultural perspective, the cognitive processes involved in the production of output that might lead to language development -e.g. through focusing on form; by "pushing" learners to get involved in more mental efforts and so, process language at a deeper level; by moving from semantic to strategic levels in order to achieve accurate production, etc. (*cf.* Swain, 1995)- are first realised in the inter-mental plane and then internalised. It is through and by means of dialogue that noticing, hypothesis testing, and reflective metalinguistic talk can occur (Swain, 1997). However, not all dialogue is equally conducive to cognitive and linguistic development. Researchers like Donato (1994), Swain (1997), Swain and Lapkin (2001), and Roschelle and Teasley (1995) have identified *collaborative dialogue* that emerges from learners' interactions when engaged

in problem-solving activity as the kind of interaction that can potentially lead to the co-construction of linguistic development through the process of internalisation. In Swain's words, *collaborative dialogue* "is where language use and language learning can co-occur. It is language use mediating language learning. It is cognitive activity and social activity" (Swain, 2000:97). Crucially, engagement in collaborative dialogue does not necessarily take place because learners misunderstand each other and have to "negotiate for meaning", but because they notice a linguistic problem and try to find out solutions to solve it. Central to this perspective is the issue of agency, to be able to understand collaborative activity we also need to understand "how the learner relates himself to the learning task and how this relationship is based on the learner's self-constructed goals" (Donato, 1988:5).

What follows in this chapter is a review of the empirical journey that key researchers in this tradition have followed to attempt an understanding of collaborative activity and its relationship to second language learning. I have grouped the studies under consideration into two different sections: collaborative dialogue, and mediated activity and the ZPD, to reflect the researchers' main concerns. However, this should not undermine the fact that collaborative activity involves them all. The studies reviewed below have been selected because they are representative of the theoretical and methodological tenets that inform this study. Some of the studies have particular resonance because they either involve the study of Spanish as a foreign language, particular semiotic mediational mechanisms, or both. As a whole they outline the roots of our investigation, and some of the problems that need addressing in the future; in section 2.2.8.3, I summarise how this particular investigation hopes to contribute to the field.

2.2.8.1 Collaborative Dialogue and language learning

As highlighted in the previous section, researchers such as Swain (1985, 1993, 2000); Swain and Lapkin (1995, 2001); Kowal and Swain (1997); and Lapkin *et al.* (2002) have emphasised the importance of output, and later collaborative dialogue, to mobilise processes believed to be supportive of language learning. Output and collaborative dialogue, they believe, help learners move from the semantic processing needed for comprehension to the syntactic processing needed for production; they help learners:

- become aware of what they do not know or know only partially;
- reflect on language and/or existing internal resources to fill the knowledge gaps;
- extend L1 knowledge to second language contexts;
- extend second language knowledge to new target language contexts;
- formulate and test hypotheses; and,
- make inferences about the L2.

These researchers, who have specifically worked within the context of immersion education in Canada, have then endeavoured to provide empirical support to the value of collaboration for SLL, giving particular attention to the kind of tasks that might work better for such purposes.

In a case study of one 8 grade class immersion classroom, Kowal and Swain (1997) investigated task effects on the quality of students' interactions. They designed and compared two tasks, a dictogloss and a cloze activity, and studied their influence upon what they call development of syntactic processing skills (e.g. adjectival agreement, verb-subject agreement, word order, etc.) regarding the formation and use of the present tense, and the "passé composé" and the "imparfait" in French. The researchers were interested in whether pair / small group work could be used to encourage students to process language both semantically, and syntactically, and the extent to which the two tasks might promote or hinder this development, and they also wanted to investigate the importance of peer feedback during collaboration. The dictogloss was chosen because it is seen as a procedure that encourages learners to reflect on their own output whereby learners listen to a short text while taking notes, and then work together to reconstruct it (Kowal and Swain, 1997:295).

Kowal and Swain found that the dictogloss indeed supported linguistic awareness and hypothesis testing allowing students to go beyond the assigned grammatical feature and work on their own agenda, following their own needs (1997:299). They therefore concluded that this task was better suited to the promotion of syntactic skills in general rather than a particular grammatical point, although they recognised that the students focused on the semantic level to a high degree, as opposed to focusing on relationships

between words in a sentence, i.e. syntactic level (p. 300), which was a desired goal for the teacher/ researcher. The second task under investigation, a cloze, appeared to have helped students focus on the target structures to a higher degree than the dictogloss and seemed particularly helpful with the process of restructuring previous hypotheses in the light of new information. In terms of feedback, the researchers believe that corrective feedback provided by the teacher at the end of each activity was an essential step to ensure learners could clarify their areas of misunderstanding and realise which of their hypotheses had been correct (p.305). Although it is concluded that "both tasks helped to consolidate students' existing knowledge and generated new knowledge" (p.306), no account is provided as to how "new knowledge" was measured, nor as to the influence that the formal mini-lessons prior to task implementation might have had on the learners' performance. Importantly, a link between linguistic awareness, hypothesis testing, etc. and the promotion of "syntactic processing skills" is assumed rather than demonstrated; no detail is given as to what exactly the "processing" of syntactic skills entails.

In a subsequent study carried out by Swain and Lapkin (1998), these researchers studied dialogue as a provider of occasions for language learning while students carried out a jigsaw task. They analysed the talk of a pair of learners, which was part of a larger study of four grade 8 French immersion classes. Each learner was given a set of cards that, together, completed the story, they were asked to work out the story, and then write it out collaboratively. Their conversations were tape-recorded for data analysis. As in the study described above, before the students worked on the task, they were given a five minute mini-lesson, this time on French reflexive verbs. However, in this study learners took pre and post tests. The post-tests, which in addition to the pre-test items included items learners had worked on during task implementation, were given to the learners a week after they had worked on the task. The idea of developing tailor-made tests has emerged in an effort to incorporate the learners' own learning agendas and needs as reflected through collaborative dialogue. The recorded dialogue was transcribed and language related episodes (LREs), i.e. "any part of a dialogue where the students talk about the language they are producing, question their language use, or correct themselves or others" (Swain and Lapkin, 1995) were identified and categorised for analysis. Quantitative analysis of the data "suggests that... the number of LREs and the posttest scores are positively related. The qualitative analysis of individual LREs [also] suggests that the LREs may have positively influenced the posttest scores" (p. 328). Qualitative

analysis of eight LREs illustrates the researchers' argument that the learners' dialogue is an enactment of mental processes such as hypothesis generation and testing, and the application of rules to new L2 contexts, and that learners single out the L2 in order to monitor it, reflect upon it and manipulate it, making use of interaction as an occasion for language learning. Importantly, they point out the importance of the L1 as a mediational tool to regulate learner behaviour, focus attention on L2 structures, and generate and assess alternatives. The study clearly illustrates the value of collaboration to support language learning. It is, however, a small scale study, where data available to illustrate the researchers' points was limited, among other reasons, due to the technical difficulty in tracing students and their individual contributions when writing the story (p. 333).

Further work based on the dictogloss task has been carried out by Swain (1998). A pilot study forms the basis for the investigation of the third function of output, the metalinguistic or 'reflective' function (Swain, 1995). As described in the studies reviewed above, and recognised by Swain herself, "research to date has provided descriptive evidence of the existence of learning processes stimulated by output (Cumming, 1990; Swain and Lapkin, 1995). However, there is a paucity of research that demonstrates whether these output-oriented processes are facilitative of second language learning" (Swain, 1998:64). This pilot study was implemented to investigate the following questions: 1) "does modelling of metatalk by the teacher influence students' use of metatalk?, and 2) is there a relationship between metatalk and SLL?" (p. 71). To answer the questions, a comparative study between two classes (48 students) of grade 8 French immersion focusing on the 'passé composé' and the 'imparfait' was carried out. Before the dyads completed the dictogloss task, they were given a 5-10 minute mini-lesson focusing on the grammatical points in question, and some vocabulary included in the dictogloss text that the teacher thought might be difficult for students. The difference between the two groups was that one (29 students) received modelling of text reconstruction with metatalk that included the use of rules and metalinguistic terms, whereas the second one (22 students) received modelling of text reconstruction with metatalk, but without the use of rules and metalinguistic terms. One week after data collection, learners were given tailor-made dyad-specific post-tests "to measure linguistic knowledge that appeared to be co-constructed through the metatalk of individual pairs" (p.75). Results of data analysis report that learners who received modelling of metatalk using grammar rules and metalinguistic terms "succeeded to a

greater extent in capturing students' attention and focusing it on their own language use" (p.77).

In relation to Swain's (1998) second research question, the relationship between metatalk use and second language learning, first of all she concluded that "students rarely focused on [the target] aspect of grammar, 'passé composé' and 'imparfait'... students talked about what they needed to talk about according to the state of their own internalized knowledge" (Swain, 1998:77). Due to this finding, the researcher concentrated on the learning of items that had been the focus of LREs and had therefore been included in the dyad-specific post-tests given a week later. Results of this analysis, e.g. learners "tended to 'stick with' the knowledge they had constructed collaboratively the previous week" (p.79), led her to conclude that conscious reflection on language may be a source of language learning, and that giving learners opportunities to engage in LREs through appropriate modelling, etc., could be useful for the promotion of second language learning. In my opinion, there are however, methodological problems in that it is again difficult to know the pre task implementation knowledge state of the items included in dyad-specific tests, nor whether more proficient learners engaged in more metalinguistic talk, or what the effect of the formal instruction received by the students both during their previous lessons, and even just before data collection might have been, for instance. Although it is clear that linguistic awareness and collaborative work appear to support language learning, the direct relationships among these are still blurred.

In terms of Spanish as a foreign language, there have also been some attempts to find out relationships between Interlanguage development and interaction based on Sociocultural theory. For example, García and Asención (2001) set out to investigate "the effect of group interaction on interlanguage development, specifically listening comprehension and production of new grammar forms, [focused on reflexive pronouns, stem-changing verbs, and prepositions *antes de* and *después de* used with infinitives; as well as] the characteristics of the language used by L2 learners when interacting in a group activity" (p.382). Their experimental design compared two groups (39 English speakers) on a first-semester Spanish course at a university in the USA, whose independent variable was 'interaction'. Both experimental and control groups, took a pre-test (grammar and listening comprehension). Subsequently they received 3 hours of instruction in the target grammar forms, and then carried out a task, based on the

dictogloss format, where the experimental group engaged in small group interaction to compare their notes (recorded for data collection), whereas the control group did not. The text reconstruction was, however, completed individually. Learners also completed a post listening comprehension test, but not a post grammar test since the text reconstructions were used as a measure to establish grammatical progress (*cf.* Lapkin *et al.*, 2002). The researchers report that "interaction did not seem to have a positive effect on participants' production of the target grammar forms, ...[but in 3 out of 5 small groups it] may have had an effect on listening comprehension of the target forms" (p.394). To address their second research question, the researchers analysed the characteristics of small group interactions. Their results show great variability among interaction groups, both quantitatively and qualitatively, but report the use of language as a cognitive tool, for example for scaffolding, repair strategies, use of L1, among others, that have been reported in numerous studies (see section 2.2.8.2 below). The study makes use of innovative computer programmes to analyse dialogic data that might prove an effective way to overcome one of the main problems experienced in Sociocultural research, the difficulty to generalise findings due to the small data corpora that can be qualitatively examined. However, there were, in my view, some methodological problems, for example, recording learners while interacting to compare notes, rather than allowing them to reconstruct the texts collectively, deprived learners of opportunities for language co-construction. The researchers were very surprised at the lack of discussion of target grammar forms in 2 out of the 5 groups, but to me it appears natural that learners might have been more concerned at this stage to compare notes about the facts they had heard than about the syntactic requirements that they would have to attend during the actual reconstruction of the text, which took part individually.

Another study of Spanish L2 collaborative dialogue, Buckwalter (2001), uses the construct of "repair" to study L2 development when "learners confront and work through difficulties they encounter when trying to use the language" (p.380). Buckwalter collected data from 58 participants working on 6 different speaking activities classified as referential (e.g. role-plays, interviews, discussions, *cf.* Yule, 1997) carried out in pairs. The participants were at the "first through second year of university study" (p.391) and were video and/or audio taped while interacting. The researcher analysed the repair sequences throughout 20% of the corpus to investigate various aspects of interaction in the classroom, such as whether learners instruct each other, the role or private speech,

language as a tool for regulation, and whether or not the referential nature of the tasks constrained opportunities for work in the ZPD (*cf.* Donato, 1994). Buckwalter reports that most of the collaboration was related to the lexicon rather than to morphosyntactic difficulties, a finding that has also been reported by researchers working on an Interactionist approach (*cf.* Pica, 1994); this study highlights the importance of students' task perceptions, where referential communicative tasks might not be considered occasions to focus on form, but to communicate content.

An insightful and thorough examination of SLA processes in the language classroom has been carried out by Ohta (2001) by means of a longitudinal case study of seven adult students of Japanese. The corpus includes 34 classroom hours of transcribed data including peer-interactions, as well as teacher-fronted sessions, and focuses on language learning as a process of internalisation explored through careful analysis of different aspects of classroom activity. She demonstrates the role of private speech as a means to understanding attentional processes; learners deploy it to tackle pronunciation or grammatical problems, and to test hypotheses, presumably thus incorporating new data into their developing L2 systems. By analysing assisted performance during peer interactive tasks, Ohta demonstrates how learners not only help their classmates through the processes of scaffolding, but they also benefit themselves developmentally. In relation to corrective feedback, she shows its beneficial effects over time "as learners increase in accuracy over a class period" (p.177); importantly she demonstrates how learners do notice corrective feedback, and can even benefit from feedback addressed to others. Finally, the researcher explores the influence of task type in terms of quality of target language use from a holistic perspective that includes different aspects of pre and post task implementation, and factors that affect the use of L1 during task performance. It is not possible to do justice in this brief literature review to such a comprehensive empirical work. However, the study demonstrates how "internalisation proceeds as the language of social interaction is gradually appropriated as tool for thought" (Ohta, 2001:125). It provides strong evidence in relation to the Sociocultural claim that interaction is more accurately described as *constituting* learning rather than *causing* it, or in the words of Brooks *et al.*, "how forms of collaboration and social interaction unite the development of second-language orality with an individual's cognitive functioning" (Brooks *et al.*, 1997:534).

2.2.8.2 Mediated Activity and the ZPD

According to Roebuck, "one way to discover the features of human activity is through an examination of the linguistic forms which mediate it" (Roebuck, 2000:87). Following the more general characterisation of collaborative dialogue as a means for learners to engage in SLL processes explored in the previous section, here I shall review empirical studies that have investigated specific semiotic mechanisms (e.g. repetition, and use of L1) as mediational tools for enabling second language learning processes. These particular semiotic tools are being considered because of their importance in the creation and maintenance of intersubjectivity, as tools for regulation and scaffolding, etc. Analysis of semiotic mediation cannot be limited to isolated features, even when certain tools are more often deployed than others, and appear to be deployed for particular purposes thus suggesting certain patterns. A strength of Vygotskian microgenetic analysis is, precisely, the holistic consideration of inter-psychological activity as a development process.

Use of L1 studies

In an investigation of L1use by 10 students of L2 Spanish carrying out a writing task in pairs, Anton and DiCamilla (1998) found that English was a psychological tool for creating intersubjectivity, that is creating an atmosphere of cooperation and understanding that allowed them to implement the task; a tool for regulation in the form of private speech when facing cognitive difficulties; and also, a tool for providing scaffolded help during interaction. Swain and Lapkin (1998) reported similar results in terms of the functions of English in a study of the interaction between two French immersion students that focused on the role of dialogue both as a communicative and as a cognitive tool. Swain and Lapkin found that the learners deployed their L1 "to regulate their own behaviour, to focus attention on specific L2 structures, and to generate and assess alternatives" (Swain and Lapkin, 1998:333). In a subsequent study, they continued their investigation of the uses of L1 specifically, by focusing on 22 French immersion students working in pairs while completing one of two tasks: either a dictogloss or a jigsaw. They identified the functions of English as a tool for moving the task along; a tool to focus their attention on language; and a tool for interpersonal

interaction. Their study was comparative in nature to investigate task differences in amount of L1 used by learners, task performance variability across pairs, and the extent to which the amount of L1 related to quality of the final written pieces. They did not find "statistically significant differences" and concluded the reasons for this were the small size of their sample on the one hand, and the "high degree of variability observed in the data" on the other. Their investigation, however, stresses the importance of L1 for cognitive and social functions and substantiates the belief that "judicious use of the L1 can indeed support L2 learning and use" (Swain and Lapkin, 2000:268).

The degree of variability found in the study described above highlights the importance of studying interaction as situated activity. Learners approach similar tasks in different ways because as individuals they participate in classroom events from different perspectives, with individual goals and motivations, with individual cognitive and linguistic needs. What is evident from studies of interaction from a socio-cultural perspective is that in order to benefit from collaborative activity learners need to co-create a mutually supportive dialogic event. In her study of 7 learners of Japanese as a foreign language, Ohta (2001) also found that individual differences are an important factor to consider when studying the influence of tasks and task designs in the language classroom. Although her data reveal that use of L1 in a direct comparison between two of the learners is strongly influenced by individual styles and motivation, "L1 use is not haphazard, nor is it idiosyncratic" but related to instructional variables and task design and implementation (Ohta, 2001:249).

Brooks and Donato (1994) have also studied the influence of task over performance to "investigate how speaking during a two-way information-gap task collaboratively influences and builds a shared social reality between the participants" (Brooks and Donato, 1994:265). In this study of 8 pairs of learners of Spanish carrying out an information-gap task the researchers found - among other features of learner language being studied - the L1 to be a cognitive tool that facilitated L2 production and task implementation. Brooks *et al.* (1997) furthered their investigation into the relationship between task and verbal mediation during collaborative activity in a study that traced interaction of beginning learners of Spanish carrying out "similar kinds of problem-solving tasks over time" (Brooks *et al.*, 1997:527). They recorded the interaction of student dyads performing a similar task five times over a period of 24 to 78 hours.

Through their analysis of L1 use the researchers argue that learners have "a good psycholinguistic reason" (p.530) to use English sometimes. They showed that English facilitated the use of Spanish by being a tool for task management (*cf.* Swain and Lapkin, 1998; De Guerrero and Villamil, 2000; and Buckwalter, 2001) and that its deployment decreased across the five tasks when task management issues were better regulated. Using a similar jigsaw task, Platt and Brooks specifically refer to the L1 as a mediational tool for the activation of higher mental processes such as "volition (effort) and selective attention" (2002:386).

Repetition studies

Various studies report on the role of repetition as a mediational tool. Repetition has been claimed to help sustain interaction; act as a tool for problem-solving (Frawley, 1992; McCafferty, 1994; and Roebuck, 2000); act as an inter-mental linking device to link discourse and minds; aid as a regulatory tool for the appropriation of language (e.g. Spanish words in DiCamilla and Anton, 1997); as a tool for reasoning; to mediate the co-construction of a shared understanding; and as a psychological tool to trigger memory (Buckwalter, 2001). However, few of those studies provide detailed insights into how it is that repetition is actually deployed by learners as a mediational tool for successful collaboration or indeed as an aid in the processes of language learning. One of those studies is DiCamilla and Anton's (1997) which specifically investigates repetition in the collaborative discourse of L2 learners and demonstrates the paramount importance of this semiotic tool both to achieve intersubjectivity –which is essential for successful collaborative activity- and as a strategic aid for the co-construction and maintenance of scaffolding.

The studies considered in this section are seminal to gain a deeper understanding of mediated activity, however, they are all based on small-scale investigations. Furthermore, with the exception of Swain and Lapkin (2000), they concentrate on descriptive and functional analyses of the mediational mechanisms, but do not provide much information about their frequency as observed in the data so that we can also learn about the degree to which these semiotic tools are deployed during interaction.

Scaffolding studies and the ZPD

As De Guerrero and Villamil point out, "in their attempt to establish connections between classroom interaction and second language (L2) development, researchers have begun to look at the mechanisms of scaffolded help in the ZPD within L2 scenarios (De Guerrero and Villamil, 2000:53). The studies reviewed in this section help us understand the kind of processes emerging during collaborative activity that researchers in the field have identified as supportive of SLA.

Ohta (1995) conceptualises the ZPD in the field of SLA "as the difference between the L2 learner's developmental 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" (p.96). She reports on an investigation of peer collaboration in a second year university level Japanese class at an American university. In this study of collaborative interaction in the ZPD, she focuses on one single pair of students (one weaker and one stronger in terms of L2 proficiency) while they engaged in a role play task to practise "polite requests". Her data consists of transcription of video and audio recordings the peer interactive task including the pre and post teacher-fronted activities, a total of 30 minutes of data. Based on the qualitative analysis of six conversational excerpts, Ohta demonstrates the importance of pair work as "an environment" that facilitates L2 acquisition in the classroom. Some of the processes enabled by interaction include the testing of hypotheses through language play; experimentation with lexis; use of the target language for conversational management, including repair and role negotiation; and use of both L1 and L2 for regulatory functions. Learners empower each other through prompting and mutual correction; particularly important in relation to the latter is that the expert-novice roles do not necessarily reflect L2 proficiency since collaboration "draws upon the matured skills of each learner" (p.109). Repetition is an important mediational mechanism for scaffolding activity (see section 2.2.8.2). Ohta argues that learners "develop in the ZPD through the opportunity to use both matured and maturing language" (p.116). In my view, this is one of the methodological reasons why it is important to establish as accurately as possible the subjects' developmental level in relation to the linguistic foci researchers are studying, so that gains emerging from collaborative activity can be determined more specifically.

Throughout her more comprehensive work Ohta (2001) has been able to show in more detail the impact upon language learning of scaffolding or *assisted performance* as she calls it following Tharp and Gallimore (1991). She identified four methods deployed by the learners in her study to provide assisted performance: waiting, prompting, co-construction, and explaining (p.89). Furthermore, by contrasting the cognitive demands related to working memory and selective attention required by both listeners, and speakers, she was able to explain some of the reasons why listeners can sometimes assist other classmates with what they cannot yet do themselves. For example, speakers' cognitive resources are fully engaged in the act of production, while the listener "has resources available both to think about the immediate production and to think more broadly, beyond the local problem to the larger utterance and the task as a whole" (p.79). According to Ohta, 1) peer interaction in the ZPD enables learners to utilize and provide developmentally appropriate assistance; 2) key to scaffolding is that both learners benefit in the process; 3) collaborative participation is a precursor of independent performance; and 4) metacognitive skills stimulate individuals (pp.124-126). Further benefits of peer interaction in the classroom were the fact that learners sometimes overhear –and benefit from- other learners doing the same task, and being able to play and experiment with language without the pressures of teacher-fronted activity.

Similarly to Ohta (1995), De Guerrero and Villamil (2000) carefully selected one dyad's interaction to illustrate the processes of scaffolding. The two students' L1 was Spanish and their interaction -based on a writing activity in the ESL classroom- was selected because it showed a wide range of "behaviors that may occur during ZPD activation" (p.55). The authors also included for data analysis a first draft by one of the students "the writer", whose composition needed more revision and was the subject of the interaction, and the final draft handed in one week after the peer revision session. Microgenetic analysis was carried out on 16 *trouble-source* episodes in order to observe "a) moment-to-moment changes in behaviour that might signal development of revision skills through mediated assistance and b) the scaffolding mechanisms employed by the students in helping each other revise the composition" (p.56). Some of the supportive behaviours provided by "the reader" (supportive student) included pointing out problems in the text, providing grammar minilessons, and modelling; in other words, tutoring activity within an affective environment. De Guerrero and Villamil highlight, however, the importance of "the writer"s acceptance of help during the process. Their qualitative

analysis of what Swain would call LREs, provides evidence of behaviour believed to be conducive to language learning, for instance use of metalanguage to overcome linguistic problems, use of L1 as a regulatory mechanism, involvement in the kind of pedagogic routines mentioned above, etc. The authors also argue that evidence of "movement within the ZPD" is provided through the final draft written individually a week later since it "incorporated the majority of the changes discussed during the interaction" (p.65).

The strength of these -and other (see for example Nassaji and Swain, 2000)- monographic studies of scaffolding within the ZPD lies in the detailed depictions of dialogic behaviours that empower learners to capitalise on processes supportive of language development. The microgenetic analyses upon which they are based allow researchers to capture some of the essence of collaborative activity. However, the selectivity of the data –precisely to provide highlights of scaffolded performance- lacks contextualisation within the wider picture of the language classroom. In other words, it is difficult to see how representative these processes are in relation to other learners, conditions, and even in terms of "the other" activity that might be taking place within the particular session for the learners *selected* for data analysis since we only witness key moments.

2.2.8.3 Sociocultural research: a way forward

This literature review has revealed some of the strengths of a Sociocultural approach to studying peer interaction in the language classroom, but it has also identified some weaknesses. Previous studies based on the Interactionist perspective have focused on selected periods of interactional time to exclusively investigate negotiated modifications as the providers of comprehensible input (*cf.* Platt and Brooks, 2002:368; Wu, 1998) failing thus to provide a full account of the processes of collaborative activity. This in time has led to a fragmented view of language learning as the sum of various isolated traits, e.g. communication failures leading to negotiations of meaning, that result in comprehensible input decoded by individual minds, whose end product allegedly leads to the acquisition of language. A Sociocultural approach offers a view of interaction where input, output, and collaboration are seen as an integrated, dynamic situated process and

where knowledge and development are co-constructed by learners whose agency cannot be ignored.

The research construct of *collaborative dialogue* has proven an effective means to study the moment-to-moment co-creation of knowledge. However, we need to be careful not to fall into the methodological trap, described above, of isolating critical episodes at the expense of losing sight of the supportive infrastructure upon which development evolves. Furthermore, while detailed qualitative analysis of collaboration is essential to understand language learning enabling processes, we also need to have a general idea as to how often certain phenomena occur, under which circumstances, how semiotic and other tools such as the computer are deployed by learners, etc. As reflected throughout the review, the study - and comparison - of specific tasks, and tasks features represents an important way to investigate peer-interaction as situated activity that cannot be detached from the learners' goals, motives, and perceptions of tasks. Importantly, if claims are to be made about the relationship between collaborative dialogue and acquisition, rigorous measures have to be implemented; for example, pre and post test data has to be collected; formal instruction and other possible sources of language learning influence need to be accounted for; and –ideally- proof of long term learning sought. As seen above, Sociocultural researchers already acknowledge some of these problems and are already working to strengthen the methodology.

This study aims to contribute to Sociocultural research by studying peer interaction in full. In other words, although constructs such as language related episodes, microgenetic episodes, and high quality collaboration will be foregrounded for qualitative and quantitative analyses, this will be done in a contextualised way. A main objective of the investigation is precisely the identification of microgenesis in order to study the moment-to-moment co-construction of knowledge. However, our interest in overt language learning does not exclude other inter-mental activity that might contribute to development. Similarly, the investigation of semiotic mediational mechanisms will focus on their use and importance throughout collaborative activity, but will also provide an evaluation of their frequency. Although the direct link between collaborative dialogue and language acquisition is beyond the scope of this study, I will endeavour to interpret how collaborative activity might be aiding acquisition processes. Considering therefore, the nature of the research questions posed for investigation, I believe that

microgenetic analysis of whole protocols (complemented by the other tools used in the study, e.g. pre and post tests, see methodology chapter) provides a suitable means to study mediated activity in the language classroom. This methodological framework supports both the investigation of patterns emerging throughout peer interaction, as well as the incorporation of situated and contextual elements that have an effect upon the dynamic processes of language learning, particularly the study of the inter-relation between task and activity, and the influence of the computer as another mediational tool towards which we now turn our attention.

2.3 Computer Assisted Language Learning (CALL)

2.3.1 Introduction

The purpose of the present section is to provide a historical framework for the study of computer-assisted language learning (CALL). The first section offers a brief history of the field and outlines the three eras of CALL that are identified in the literature. An overview of research on computer-assisted interaction and collaboration is then presented and assessed; although the literature review focuses on CALL studies, some relevant studies - particularly from a Sociocultural perspective - carried out in the field of education have also been included. Finally, I discuss some of the current knowledge gaps in the field as evident in the literature and outline how this study can contribute to a better understanding of computer-mediated collaboration.

2.3.2 Brief Historical Background

According to Chapelle (2001) the historical roots of CALL can be described through three developmental stages, the pre-microcomputer era, the microcomputer era, and the era of multimedia and the Internet. The pre-microcomputer era (60s and 70s) can be considered an exploratory stage both at an institutional level with projects like PLATO (Programmed Logic for Automatic Teaching Operations) and TICCIT (Time-Shared, Interactive, Computer-Controlled Information Television) in the USA and at an

individual level with people like Graham Davies (1985) and Rex Last (1984) becoming active in the UK. The PLATO and TICCIT projects supported by mainframe computers, provided the basis for both the evolution of CALL with dedicated hardware and software specifically for language teaching, and also for technologically oriented CALL investigations giving birth to the videodisk in the late 70s, for example (Chapelle, 2001:6). These systems were seen as complements to classroom instruction providing habit-formation practice in the form of vocabulary and grammar drills and so reflecting pedagogical beliefs related to behaviourism and structuralism.

CALL in the 1980s is permeated on the one hand by a considerable increase in the availability of computers for language teachers and on the other, by the popularity of Krashen's theories of SLA (1982,1985). This era also reflects a more humanistic emphasis (*cf.* Stevens, 1992), where motivation, and individual differences were regarded as important issues to be considered in the language learning environment. Two seminal books on CALL were published in 1984: *Computers in Language Learning* by Higgins and Johns and *Linguistics, Computers, and the Language Teacher* by Underwood. This work provided new ideas for programmes based on games and exercises like text reconstruction which claimed to promote language acquisition.

Finally, the two big developments of the 1990s, Local Area Networks (LANs) and the Internet, have broadened CALL possibilities and scope. Computers have become a powerful source of information on the one hand, and means of communication, on the other. CALL materials have become instantly available to an ever increasing number of learners, and they have also been conceptualised and developed in relation to the media of communication made possible by the Internet. This has given rise to an area beyond the scope of the present study, computer-mediated communication (CMC). Whereas we are concerned with interactive activity between learners *at* and *with* the computer *in the classroom*, CMC interaction through the computer normally occurs at a distance either synchronously or asynchronously.

Warschauer (1996) provides an alternative historical perspective by identifying the above three *phases* of CALL as Behaviourist CALL (60s and 70s), Communicative CALL (80s), and Integrative CALL: Multimedia (90s). However, a recent account by Bax (2003) represents, in my view, a more informative historical analysis of CALL. Bax

refers to three approaches, *restricted* CALL, *open* CALL, and *integrated* CALL; *restricted* CALL is equivalent to Warschauer's Behaviourist CALL in terms of historical period and main features, e.g. closed drills, quizzes, text reconstruction, minimal interaction with other students, 'correct/ incorrect' type of feedback, etc. However, Bax argues that the term "restricted is more satisfactory since it allows us to refer not only to a supposed underlying theory of learning but also to the actual software and activity types in use at the time, to the teachers' role, to the feedback offered to students and to other dimensions –all were relatively 'restricted', but not all were 'behaviourist'" (Bax, 2003:20). The second approach, *open* CALL, relatively open in relation to the previous one, is characterised by simulations, games, computer-mediated communication, occasional interaction with other students, more flexible feedback, etc. Finally, *integrated* CALL refers to CMC, word processing, email, frequent interaction with other students, some interaction with computers during the lesson, feedback which encourages interpretation, evaluation, commentary, etc. (p.21). Throughout his analysis of CALL, Bax highlights three issues: 1) although the three approaches described above coincide with certain historical periods, he does not accept it is possible to show clear-cut historical limits in their description. *Restricted* CALL indeed dominated from the 60s to about 1980, but some of its manifestations, e.g. grammar revision and checking, still have their place in the CALL classroom today; *open* CALL manifestations began in the 80s and are still visible today; finally *integrated* CALL "exists in a few places and a few dimensions only, but is far from common" (p.22); 2) Bax believes the way forward is to achieve *integrated* CALL through the process of 'normalisation', this is where technology is an 'invisible' part of every day life; 3) to achieve 'normalisation', CALL research needs to integrate ethnographic methodology "to identify the many interlocking and overlapping factors which have to be taken into account in implementing change in a target institution, and allow us to target our efforts more precisely" (p.27).

2.3.3 The Computer through its Metaphors

Two main metaphors for the role of the computer have emerged throughout the four decades of computer use in the second language classroom, "tutor" and "tool", or as Jones and Mercer (1993) put it, the computer replacing the teacher with a potential for providing hints, structures, feedback and factual knowledge among other things, and the

computer as "medium", not in terms of people replacement, but as an activity and interaction organiser. Since the tutor role is often intended as a temporary substitute for the teacher, software of this type tends to be used outside the classroom. According to Levy's CALL survey, however, the "most fundamental role of the computer is as tool and 55.8% of respondents registered a role for the computer as a useful provider of mechanical language practice" (Levy, 1997:128).

Within these two metaphors for the computer, different levels of agency can be identified depending on specific characteristics of the role of the computer as determined by the theoretical framework that informs the design and use of computer-based tasks. In terms of agency two types of tutor can be identified, an "active" one and a "passive" one. The active one is the kind of tutor (Taylor, 1980), instructor (Kemmis *et al.*, 1977; Wyatt, 1984), or magister (Higgins 1986, 1988) role which presents tutorials and information and then provides drill and practice exercises, or checks for students' recall. In general, the computer is assumed to have control over the task and the student is expected to follow procedures and be engaged mainly in mechanical practice. The passive-tutor role allows the student to take the initiative and interrogate the computer either to obtain information or to test hypotheses. The computer offers trial and error tasks and the student even "teaches" the computer grammar, e.g. Grammarland (Higgins, 1982).

The computer as tool is essentially a neutral device; its role depends on the methodology embraced by the teacher. It can be used in a Revelatory mode where principles are gradually revealed or discovered by the learner in an inductive way. The computer as a Pedagogue (Higgins, 1986, 1988) provides the appropriate information to reveal a pattern or rule and its role is to support exploration and discovery for the student when summoned to respond to a request. The computer can also be a "catalyst and tool for thinking and communicating" (Meskill, 1999:466) providing "contextual support for the dialogue between its users, as the focus of their attention and the target of their actions" (Mohan, 1992:122) or it can simply be a facilitator of labour, e.g. word processor. In this study the computer is conceptualised primarily as a tool for mediated interaction between learners, however, it is also an organiser of activity, and can provide feedback having thus the potential to mediate activity at both levels, physical and mental. What role or roles the machine ultimately plays can only be assessed through the observation of learners co-constructing activity.

Collaborative work *at* (learners interacting with each other in front of/ by means of the computer) and *with* (learner–computer interaction) the computer is not equal to the sum of its parts and this is one of the reasons why much of the research work carried out to compare the effectiveness of computer *versus* teacher or computer-based tasks *versus* paper-based tasks in terms of products rather than processes has been criticised (see Doughty, 1992 and Oxford *et al.*, 1998) as trying to compare incommensurable activity. Research questions such as "does CALL work?, is CALL good for second language learning?" confuse tools with methods, ignore the effects of agency discussed above, and ultimately, just reflect what Papert calls "technocentric" thinking, a simplistic view of the value and role of technology (1987 in Dunkel 1991:20). Studying the role of the computer from a Sociocultural perspective takes into account the material and cognitive potential and consequences that this instrument might bring into classroom activity, an under-researched area (Mercer and Scrimshaw, 1993).

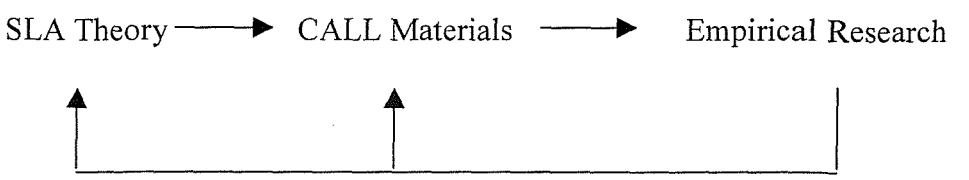
2.3.4 The study of Interaction and CALL: research overview

The current investigation of interaction in CALL - with the exception of the Computer Mediated Communication, CMC, field - has been predominantly influenced by the Interactionist approach to SLA. I believe there are two main reasons for this; first of all, influential contemporary CALL researchers such as Doughty (1991, 1992) and Chapelle (1997, 1998, 1999, 2001) have advocated

> a shift from general approaches such as those of psychology, computational linguistics, and educational technology to the specific questions and methods of researchers who investigate instructed SLA. With SLA research as a basis for investigation of CALL, the paradigm search of the next decade can be a quest for methods that complement our fundamental understanding of the language experience learners engage in through CALL activities.
>
> Chapelle, 1997:39

Secondly, some computer features such as glossing and hypertext capabilities, have been considered particularly useful –and relatively easy to implement- to make input salient, or provide modified input upon learners' request, for example (*cf.* Laufer and Hill, 2000).

Hegelheimer and Chapelle (2000:42) offer the following model for the design and assessment of CALL materials:



The diagram emphasises the recursive nature of classroom inquiry where those materials whose conceptual roots can be traced back to sound SLA theories and investigation, will eventually provide new insights into the theories that originally informed them.

As outlined in section 2.2.8, a key premise for Interactionist researchers is *negotiation of meaning*. Long (1985), Long and Crookes (1993), and Pica (1994) advocate peer interaction as an enabling activity to provide learners with opportunities for negotiation of meaning (see also Pelletieri, 2000; and Blake, 2000). The ultimate goal of negotiation of meaning in communicative interaction is seen as the modification of input into "comprehensible input". From this perspective, breakdowns in communication are seen as potential opportunities for participants to negotiate their linguistic production in order to re-establish that communication. During this process *input* can be noticed, input that is *noticed* might, in turn, become *intake*, and this process is seen as driving development of the system. Chapelle (1997) considers the design of CALL materials that would promote the dual linguistic concern of negotiation of meaning while also focusing on form, by modification of the normal structure of interaction. Based on this model for language learning, as well as incorporating some premises from the work of Schmidt (1990), Robinson (1995), Swain (1985), and Swain and Lapkin (1995), Chapelle (1998) determines the following seven hypotheses for developing multimedia CALL (pp.23-25):

1. The linguistic characteristics of target language input need to be made salient.
2. Learners should receive help in comprehending semantic and syntactic aspects of linguistic input.
3. Learners need to have opportunities to produce target language output.
4. Learners need to notice errors in their own output.
5. Learners need to correct their linguistic output.

6. Learners need to engage in target language interaction whose structure can be modified for negotiation of meaning.
7. Learners should engage in L2 tasks designed to maximize opportunities for good interaction.

From this perspective, the computer can play two different roles: it can either mediate interaction between two or more learners that are making use of it as a communication device, or it can be a participant in a learner-computer interaction. The metaphorical perspective of the computer as a participant provides a means for extending the hypotheses outlined above to CALL (Chapelle, 1998).

A complementary approach to the study of interaction and CALL is the one that informs this study, Sociocultural theory (see section 2.2). However, as evidenced in the review below, there is a real lack of research of interaction *with* or *at* the computer in the second language classroom from this perspective; in relation to interaction *through* the computer, e.g. computer-mediated communication CMC, refer to the work of Warschauer and his colleagues, for instance Warschauer (1996, 1998); and Warschauer and Kern (2000).

Sections 2.3.4.1 and 2.3.4.2 below comprise a review of current empirical work on interaction and CALL informed by either Interactionist or Sociocultural frameworks. These studies were selected because they help us establish both the theoretical and methodological background from which this comparative study of collaborative activity - with and without the computer - has emerged. The section referred as "the computer as partner for interaction" reviews work on interaction *with* the computer, usually carried out between one student and the computer, whereas "the computer as a tool for interaction" reviews work on dyadic/group interaction *at* the computer; both conditions are pertinent to our study because although our subjects worked in pairs/groups at the computer, we cannot ignore the interaction dynamics between students and computer.

2.3.4.1 The computer as partner for interaction

From an Interactionist perspective, Chapelle (1998) and Hegelheimer and Chapelle (2000) have been interested in CALL tasks and their role in providing learners with opportunities to:

- notice the characteristics of the target language input,
- produce target language output, and
- engage in negotiation of meaning.

Based on the seven hypotheses outlined in section 2.3.4 Chapelle (1998) provides two "hypothetical" examples of how CALL tasks could be designed and evaluated to test the hypotheses. The first task, to practise the language of tourism, makes use of a multimedia (text, audio, and video) database for learners to plan a trip to Quebec. The idea is that learners interrogate the computer to find out about the different possibilities in terms of activities, so if learners are interested in canoeing, the computer should be able to provide information about places to go, times, equipment, etc. The second example also focuses on functional language; this time students are provided with an interactive video story with the aim to teach them "the language of getting settled as a new student in a US university" (1998:27).

In order to provide the conditions believed to facilitate language acquisition from this stance, Chapelle argues that the tasks could be designed to support characteristics such as increased saliency through highlighted words or, in the case of audio, written transcription of words. To offer linguistic input modifications the learner could request repetitions, language rephrasing, and non-verbal cues, for instance. In terms of "comprehensible output" the fact that computers do not yet possess the capabilities to process human language satisfactorily is seen by Chapelle as an advantage since learners would have to provide "syntactically well-formed and pragmatically appropriate" (1998:27) utterances for the computer to be able to recognise the language. Realistically, however, the computer is still far from being helpful in this area, and might actually hinder learners' linguistic creativity and increase frustration, since effective human interaction is far from consisting of "well-formed and pragmatically appropriate"

exchanges. This kind of conversation simulation software, e.g. *Eliza* has been criticised by Healey (1999:132) among others, precisely for its "rigidity". Hypotheses four and five which refer to the need to provide learners with opportunities to notice and correct their errors are operationalised either by the use of computer feedback highlighting the error so that the learner notices it and corrects it, for instance, or just by trusting that by re-reading their sentences, learners might notice the errors themselves. Finally, interactions between learner and computer normally by means of mouse clicks and hypertext links, but to a more limited extent also through voice recognition capabilities, "need to move the learner toward a task goal and stop progress along the way to focus on the language" (Chapelle, 1998:28). Once again, this is an area in which computer technology has yet a long way to go.

Hegelheimer and Chapelle followed the above paradigm and designed a CALL task to explore methodological and evaluative issues to do with research on "the noticing hypothesis (Schmidt, 1990) in CALL reading materials" (2000:41). This hypothesis states that learners need to notice errors in their own output; interaction is considered a facilitator for noticing (see section 2.3.4). The reading activity was enhanced by glossing words and expressions believed to be problematic for learners and in this way providing opportunities for students to notice them. This task was designed to study two questions: 1. "to what extent does the on-line reading task create conditions for noticing linguistic problems and receiving modified input?", and 2. "to what extent are the mouse click data valid measures of noticing?" (p.51). The computer is used as a data gathering and analysis tool to register which words - and in which order - are requested by the learner. A report on activity, including a performance analysis can be obtained at the end of the task by both researchers/ teachers and student. The researchers believe that the material is highly effective although they warn in terms of *reliability* since "noticing score for each word may be based on a single instance of behaviour"; *authenticity* because "reading with hypertext glosses is unlikely to be authentic"; and *impact*, due to the fact that "learners not accustomed to reading on a computer screen may not be comfortable participating in this activity" (p.55). A limitation of this study is that Chapelle and her colleagues have not yet provided empirical evidence of their materials effectiveness for interlanguage development.

A methodological issue that transpires (see also Laufer and Hill, 2000) is the fact that interaction is defined and measured by tracking, counting, and statistically analysing mouse movements and clicking motions. Although this kind of data collection and analysis is potentially useful to understand certain patterns and characteristics of human behaviour in relation to computer-based tasks, it represents a rather limited account of the processes involved during CALL activity. Referring to a study carried out by Hulstijn & Trompetter on the use of electronic dictionaries in investigations on L2 reading and writing processes, which also used vocabulary glossing techniques and computer tracking technology to compile log files of words consulted, Hulstijn concludes that "the use of the technique of unobtrusively recording students' look-up actions with the aid of the computer... proved to be only a rather superficial measure in that it only revealed *that*, *when*, and *in which order*, but not *how* students processed the lexical information" (emphasis in the original, Hulstijn & Trompetter, 1998 in Hulstijn, 2000:38). In spite of the limitations of these studies, they have value as a plea for researchers to engage in much needed CALL research that is underpinned by SLA theory and research. Furthermore, their influence can be seen in current CALL research on interaction (see below Allum, 2002; and González-Lloret's, 2003).

Allum (2002) makes a vigorous case in support of comparative research between computer and paper-delivered tasks (see also Windeatt, 1986). Allum (2002) carried out an investigation between two groups of Japanese students of English as a foreign language, and focused on addressing some of the criticisms made on comparative research, for example, lack of clarity in relation to the conditions in which both mediums were implemented (Levy, 2001); lack of pre and post tests to assess language learning, and lack of SLA theory foundations (Chapelle, 1998, 2001); weakness in addressing the questions of whether or not, and how CALL provides "a better or equivalent means of delivering a particular instructional methodology" (Pederson, 1986, 1988 in Allum, 2002:151). In this study Allum compares the outcomes of two groups, a control group (26 students) working on a textbook in "normal" classroom conditions, including some pair work tasks, and an experimental CALL group (28 students) working on a digitised version of the textbook using the authorware programme Hot Potatoes, on one learner per computer basis; Allum was teacher/researcher in both classes to make sure conditions were as similar as possible. The experiment took place over 11 weeks with once a week ninety minute sessions for each class. Data consisted of pre and post tests

given to students at the beginning and end of each of five content units, as well as pre and post tests given at the beginning and end of overall treatment. The tests were designed to measure vocabulary learning, listening comprehension, grammatical construction, functional phrases, and spelling; "analysis was confined to T-tests on the results of pre and post tests and comparative differences in improvement" (p.153). The researcher also carried out a "judgmental" (*cf.* Chapelle, 1997, 1998) evaluation of the tasks' potential to implement Chapelle's (1998) hypotheses for developing CALL to support language learning (see section 2.3.4).

Analysis of pre- and post-tests shows variation in results across tasks and units. However, when results are collated into one figure, Allum concludes that the medium of delivery is not particularly important and suggests that CALL could be used outside the classroom to help learners maximise the potential of teacher's time during language classes. The study is a good attempt to address some of the criticisms towards comparative studies, for example the effort to provide detailed information on implementation procedures, use of pre and post tests to evaluate learners' progress, and an attempt to tackle Pederson's (1986) question of whether or not CALL provides a better means of delivery. Furthermore, and rather understated in my view, is the effort to capture learners' perception of progress and their opinion about CALL work by means of a questionnaire. Particularly interesting is "the more acute lack of sense of progress felt by the CALL group" (p.190) even though they expressed a liking for the computer and felt it was a good way to learn. Learners did not want to return to the textbook as a sole alternative, but expressed a preference for the combination of mediums. However, there are also some design problems to be addressed: L2 progress is assessed over a range of only partially defined items and structures, mixed with different skills, e.g. grammatical construction, listening comprehension, spelling, etc.; the evaluation of tasks is full of vague and unfounded assertions such as "pairwork and written work allow considerable opportunities to notice errors. In so far as the pace of written work may allow more time to notice, the CALL group may have had more opportunity" (p.155); as a result of the methodological framework, no processes of interaction are identified or studied, and Pederson's request for the investigation of *how* CALL provides "a better or equivalent means of delivering a particular instructional methodology" (Pederson, 1986, 1988 in Allum, 2002:151) remains unheard. To search for those answers we have to turn to the field of general education and computer assisted instruction (CAI).

Considering the lack of "solid evidence of the how technologies impact on learning... and on teaching and learning practices" Karasavvidis *et al.* (2003:116) set to explore the mechanisms through which computers contribute to learning in a secondary school geography classroom. They compared two groups of 10 students each, taught by the same teacher how to solve "correlational" problems (organising, locating, synthesising, and concluding). One group used paper and pencil and the other one a spreadsheet. The tutorials were videotaped, transcribed (approximately 60 hours) and analysed in terms of teacher and students' behaviours, coded using categories such as task-specific problem-solving action, direct/indirect teacher regulation, and self/other student regulation, for example. The authors found that teacher and students' behaviours differed in the two mediums in terms of feedback, questions asked, explanations given, students' regulation, task engagement, and goal setting. Of relevance in our study of CALL, however, is the issue of *mechanisms* observed when learners were working at the computer. The researchers identified three mechanisms through which the computer positively contributed to learning: feedback on errors, task engagement, and regulation. Due to the fact that correcting errors at the computer was easier than on paper, learners were relaxed and had more freedom to engage in exploration while carrying out the task; the computer allowed for higher indexes of task engagement at the conceptual level; and students were more self-regulated, making "more task relevant decisions on their own" (p.126). Although this study is only indirectly relevant to the study of CALL, it nonetheless highlights relevant methodological issues related to the study of the computer as a tool for mediation. For instance, trying to evaluate the effects of the machine upon interaction by measuring outcomes without looking at the dialogical processes that permeate activity will probably result in a limited account of the value –or not- of the computer.

2.3.4.2 The computer as tool for interaction

The previous section looked at current research where learners worked *with* the computer as a partner for interaction; this section outlines some relevant work based on dyadic or small group interaction between learners working *at* the computer. To date such CALL research is still scarce and predominantly influenced by the Interactionist approach to language learning. However, what learners talk about when working in pairs or groups,

and whether or not they do so in the target language, has been a constant preoccupation for classroom researchers. In an early study on conversation at the computer, Piper (1986) compared the talk generated by adult EFL learners working in small groups on three different CALL tasks based on: CLOZEMASTER (Jones, 1984) for a gap-filling task; VOCABULARY (Jones, 1984) for a jumbled sentence task; and COPYWRITE (Davies and Higgins, 1983) for a text reconstruction task. Three triads were video recorded and 5 minutes of each of the conversations transcribed and analysed. Data was described within three categories, 1) "basic language activities": *repeat*, repeating language from screen; *manage*, managing the computer and the task; and *discuss*, discussing the language task itself and working towards a solution/ completion (p.188); 2) "features of oral communication": number of turns per minute, number of self corrections per minute, speed of speaking in words per minute, and mean length of turn in words (p.193); and 3) "range of language" based on Sinclair and Coulthard's (1975) model of classroom discourse analysis (IRF cycles and act-categories) (Piper, 1986:195).

Regarding results related to the "basic language activities", Piper concludes that the kind of talk produced by the learners reflects the nature of the tasks themselves with the most repetition from the screen shown in the jumbled sentences task, the most management language in the cloze task, due to the complexity of inputting information in the programme (this would not be relevant any more since technology has since advanced), and the most discussion in the text reconstruction task. In terms of "features of oral communication", the cloze task produced the largest number of turns and the text reconstruction the lowest rate of turn-taking. Turns in the three tasks are frequently very short, and this fact and the low quantity of language generated (measured through 'speed of speech') lead the researcher to conclude that "CALL tasks provide no opportunity for language learners to develop the more demanding ability to construct 'long turns" nor "to extend themselves linguistically" (pp.194-195). Finally, the report on "range of language" compares the initiation, response, feedback cycles among students to what the discourse analysis literature normally associates with teacher-learner interactions, but with a more limited amount and range of language functions. Piper emphasises the repetitiveness of sequences marked, for example, with words such as *now* and *ok*, and the poor quality of discourse in terms of lexical and syntactic variety as evidenced in the "here and now-ness" of the tasks where the present simple tense is predominant, for example.

Piper's analysis of conversations at the computer shows interesting aspects of activity especially in relation to distinctive discourse characteristics brought about by the three different programmes. For example, she suggests that immediate feedback from the computer "means that repeated tries are a more efficient way of working than slow and considered input" (p.191); the text reconstruction task appears to be a memory exercise rather than a linguistic exploration; and learners sometimes engage in interaction routines that resemble those of teacher-learner ones. Her study is a pioneering effort to look at CALL tasks in a systematic and informed way. Nonetheless, the analysis also reflects some limitations arising from applying a rigid system of quantification and classification of functions, which do not look into participants' interactions as dialogic activity. I illustrate this point through her description of the "REPEAT category [as] a solitary activity generally without reference to the other participants" (p.190). While wondering about its usefulness as a language learning activity, she suggests that it "may be merely a manifestation of that normal human activity, repeating things to oneself while one is thinking" (p.190). These reflections highlight two crucial aspects of dialogic activity, on the one hand the deployment of language as a semiotic tool for regulation in times of struggle, and simultaneously, the creation and maintenance of inter-psychological spaces (Crook, 1994) where reading aloud, repetition, private speech, etc. have both individual and social dimensions at the same time (Wells, 1998). The analysis then tends to look at learners as individuals that happened to be together working on a task, overlooking the dynamics of inter-personal activity. Furthermore, the conceptualisation that learners' conversation would benefit by neatness and transmission of messages prevails as the following passage shows:

> "nevertheless there are times, when information is being exchanged, when turns are allocated in a normal manner, although even here there tends to be interrupting and overlapping. The CALL tasks therefore appear to give rise to two types of discourse –an apparently incoherent one where learners are thinking aloud and a more coherent one where they are exchanging information" (p.194).

Following Piper's study, Abraham and Liou (1991) also compared three different CALL tasks in terms of the quantity and quality of talk generated by three programmes, in order to compare their learners' talk to that found in Piper (1986). Students in this study worked in pairs at the computer. The first programme is called *Articles* and it is a

grammaticality judgement exercise based on drill-and-practice. Learners had to decide whether or not twenty sentences displayed on the computer screen contained article errors, and if so, they had to correct the sentences. The second programme is called *Eliza* which is described as "a communication program ... developed by Weizenbaum (1976) in which the computer carries on a dialogue with the user by asking questions based on key words in user responses" (Abraham and Liou, 1991:88). Finally, a problem-solving simulation programme called *Lemonade Stand* was used to implement the third task where students had to work together in order to maximise lemonade production and sales.

The researchers analysed the data quantitatively and qualitatively using procedures for discourse analysis based on Brown and Yule (1983). As in Piper (1986), but adding "negotiation", the four indicators of talk quality are 1) turn length –where it is presumed that longer turns are of greater value since learners have more opportunities for communicative practice; 2) types of language functions used; 3) average length of utterance representing a single function, and 4) frequency of negotiation (Abraham and Liou, 1991:93). Lemonade *Stand* elicited the highest number of acts. However, most of the talk was produced to manage "mechanical aspects of task" (p. 99). Although this was a problem-solving task, its nature –arithmetically oriented- did not support cognitive and linguistic activity that might have fostered interlanguage development, and students were understandably more concerned about the business based problem. *Eliza* motivated the learners to pay more attention to linguistic form. The reason for this, according to the authors, is that learners thought –at least during the first stages of the task- that if they produced correct sentences to interact with the computer, the machine would first of all, accept them, and secondly, produce intelligent responses. The drill-and-practice programme *Articles* provided the most form-focused interaction. The authors provide some speculations as to why this might have been the case. The first assumption is that because, out of the three tasks, this is the only one that explicitly dealt with language form, the learners might have perceived *Articles* as a more important task and therefore, concentrated on producing their most accurate performance. Secondly, it is thought that the complexity of the structures where articles were needed, might have led them to more thinking and discussion. The last explanation is that "when sentences with incorrect articles are presented in this program, users are required to type in the entire corrected sentence" (p.100).

The authors make two final remarks in relation to their data. First of all, they conclude that computer programmes "can generate talk similar in many important respects to the non-computer small-group tasks reported in the literature" (p.102) and so they believe their data an encouraging result for the use of computers in the language classroom. These results contrast with Piper's (1986) both in terms of the kind of language generated from the CALL tasks, and also in terms of feedback. As mentioned above, Piper reports that feedback similar to that implemented in *Articles*, the right/wrong type, is detrimental for negotiation of meaning, since learners tend to use guessing as a strategy instead of discussion and reflection when completing the task. Their second remark concerns gender. They suggest that the issue of grouping learners to work at the computer is important since their study shows males tend to dominate discussion when working in pairs.

The studies of Piper (1986) and Abraham and Liou (1991) show the importance of observing, comparing, and analysing specific tasks and their characteristics to evaluate the kind of linguistic activity they are conducive to. Problem-solving tasks, for instance, are highly regarded both in the CAI literature and in the field of SLA, because of their grounding in Constructivist and Sociocultural approaches to language learning. However, they need to be carefully designed so that the problem-solving element does not challenge the learners in such a way that linguistic work becomes unimportant and unnecessary for task completion. The investigation of task-based activity has the potential to inform teachers as to the appropriateness of tasks in relation to learners' requirements for linguistic practice, but to achieve this goal, the study of interaction cannot be confined to counts and classifications –often of only fragments of dialogue. Crucially, work on interaction needs to integrate issues of agency, that is the learners' motivation, assumptions as to what matters in the task, personal motives and goals; "...no amount of experimental or instructional manipulation ...can deflect the overpowering and transformative agency embodied in the learner" (Donato, 2000:47). It seems the learners in Abraham and Liou's study approach the three tasks differently, not only because of the implicit nature of each task, but also because they interpreted goals from their own personal and cultural perspective, e.g. a grammar task (*Articles*) was taken more seriously than a problem-solving in terms of language form.

A good example of the integration of the kind of quantitative measures described in the above two studies with a qualitative dimension is presented in a study of computer-mediated collaborative learning by Beatty and Nunan (2004). The purpose of this study was to investigate dyadic collaboration at the computer by comparing the discourse of 10 dyads working on a reading comprehension task based on Mary Shelley's novel Frankenstein. The materials were designed based on two different models of instruction, one behaviourist and the other one constructivist, with five dyads working on each. The researchers hypothesised that the behaviourist interface would lead to less exploration of computer-based learning materials in favour of task completion, and that the constructivist interface would promote more instances of collaborative discourse (p.168). They video-taped the activity of the dyads, transcribed the interactions, and carried out quantitative and qualitative analyses. They quantified aspects of the data such as turns, words and average words per turn, etc. in similar ways to Piper (1986) and Abraham and Liou (1991), and also coded data in terms of functions although in this case to study strategies such as "explain text, task, ideas", "interrupt", "offer judgments", etc. (p.173). However, by studying activity as an inter-psychological process, they were able to identify behaviour as it evolved throughout interaction; for instance, they found that participants adopt various roles (teacher, follower, facilitator, etc.) and that these roles "often changed over the course of several turns" (p.179). In relation to their hypothesis, the researchers concluded that "the behaviourist interface generated greater exploration than the constructivist interface...[and] there was no evidence that students working through a constructivist interface would engage in a greater degree of collaborative discourse" (p.179).

Another study of interaction *at* the computer was carried out by González-Lloret (2003) to investigate the promotion of interaction through task-based CALL; the paper is divided into two parts. The first part addresses the need to design CALL tasks based on SLA research and establishes that her work is founded upon two sets of principles, "Long's principles of language teaching (Doughty & Long, 2002) and Chapelle's principles for developing multimedia CALL (Chapelle, 1998)", see section 2.3.4 (González-Lloret, 2003:88). Long's ten *language teaching methodological principles* are: support integral education, use tasks as the unit of analysis, elaborate input, provide rich input, encourage inductive "chunk" learning, focus on form, provide negative feedback, respect learner "syllabuses" / developmental processes, promote collaborative

learning, and individualize instruction (pp. 88-91). The research task "En busca de esmeraldas" (*looking for emeralds*) was based on an information-gap format implemented as a 3-D simulation where one learner was the "instruction-giver" and the other one the "navigator". The aim of the task was to practise giving directions in Spanish, and the roles were not reversed. The participants were 12 English-speaking intermediate level students of Spanish, however only four protocols (8 learners) were included for data analysis due to poor tape quality. Learners' interaction was audio-taped, transcribed and coded following Doughty's "negotiation model", which states that "the essential feature of the negotiation sequence is the opportunity that is provided to the learner to process utterances in the L2 which become more comprehensible" and incorporates a *trigger*, a *signal*, a *response*, and a *reaction* (Doughty, 2000:50 quoted by González-Lloret, 2003:92).

Data analysis is rather poor, for example, the researcher states that "the data showed a variety of triggers... [and] as for types of responses, expansion, repetition, and reformulation were manifest although not abundant" (p.93). However, the reader is left to guess as to the implications of such findings. Other results establish that "the task was constructed well enough to elicit language from both participants" (p.95) and that interaction was conducted mainly in the target language; it is implied that use of L1 is exclusively related to "limited command of the target language". The researcher details the percentages of signals, responses, and triggers, but we do not learn much as to the actual benefits of the task for learners to practise the language for giving directions, for instance. More interestingly in terms of language learning, it is stated that "the discourse was examined for sequences that might reveal L2 acquisition. In two out of the four interactions there are examples of a student correcting an error during a later interaction [I believe the researcher means a later turn]" (p. 96). Although an example of what in Sociocultural terms could be characterised as *appropriation* is provided, we do not know the amount of such sequences, information that is crucial in order to assess the value of the task not only because it was effective in generating L2 interaction, but also as a language learning exercise.

To conclude this overview of research devoted to interaction *at* the computer I would like to consider –albeit in a simplified manner for reasons of space- the work of Mercer (1996), Wegerif and Mercer (1997), and Wegerif *et* al. (1999). Despite the fact that their

work has been carried out in the field of general education, specifically with primary school children, their methodological approach to the study of joint collaboration at the computer is relevant to the study of CALL. They advocate the use of the computer to combine quantitative and qualitative methods of discourse analysis in order to integrate different levels of abstraction to analyse the learners' transcribed interactions. Mercer and his colleagues believe that in order to describe and evaluate collaborative activity, three levels of analysis should be incorporated, a *linguistic* level, to examine talk as spoken text; a *psychological* level, to look at talk as thought and action; and a *cultural* level, to look at the situated, educational value of talk (Mercer, 1996:369-370). These researchers have identified three ways of "talking and thinking" among children when jointly carrying out computer-based problem-solving tasks: "*disputational talk*, characterised by disagreement and individualized decision making; *cumulative talk*, in which speakers build positively but uncritically on what the other has said" (Mercer, 1996:369); and "*exploratory talk*, defined as talk in which reasons are given for assertions and reasoned challenges made and accepted within a co-operative framework orientated towards agreement" (Wegerif and Mercer,1997:277). Their Sociocultural orientation to the study of joint collaborative discourse as thought and action has proved valuable for the investigation of computer-assisted learning and reasoning skills in general. They have also demonstrated that learners can be taught to use *exploratory talk* to improve collaborative reasoning, and that jointly acquired reasoning skills are transferable to the individual (Wegerif *et al.*, 1999).

2.3.4.3 CALL research: a way forward

CALL research is still in its infancy, though there has been some progress in that efforts are being made to 1) acknowledge the need for a CALL research agenda away more distant technology driven motivations and closer to SLA driven motivations (*cf.* Chapelle, 1997, 1998, 1999; Backer, 1995); and 2) carry out CALL research based on such an agenda. However, as the above literature review highlights, there are still serious theoretical and methodological issues to be addressed. First of all, current CALL studies of interaction *at* and *with* the computer are taking at face value the approaches to language learning research they rely on, e.g. the Interactionist one, without addressing known problems for instance, the very limited evidence about the direct link between

negotiation of meaning and language acquisition. Worse than that is the fact that the effectiveness of CALL tasks to achieve what interactionists believe promotes language learning, for instance, making key linguistic features salient, providing opportunities for comprehensible output, supporting modified interaction, etc. is assessed through "judgemental" evaluation of the tasks and/or based on hypothetical examples that have not been researched yet (*cf.* Allum, 2002:154-156). Secondly, progress –or lack of it- is consistently measured in terms of outcomes, overlooking the need to study interaction as a social process where learning might be taking place outside the parameters of what the researcher thinks should be learned through a certain task. Thirdly, the significance of the tool as such, i.e. the computer, is not being sufficiently attended to.

The present study aims to address some of the problems identified throughout this literature review, both in relation to the Sociocultural approach to language learning (section 2.2.8.3), and to its application to the field of CALL. First of all, by comparing learners' activity in the two mediums of implementation (paper and computer) through microgenetic analysis, we should be able to study the specific ways in which the computer might be influencing the course of interaction. This cannot be done by exclusively pre and post testing learners' L2 perfomance; the latter measures outcomes, the former, processes, therefore the two methods/procedures should be complementary, not exclusive. Secondly, a strength of the Sociocultural approach is precisely that it allows us to investigate to *what extent* and in *which ways* different components, and the relationships they generate, influence activity. The processes of collaborative activity in the classroom cannot be effectively studied by isolating the different elements, i.e. computer, task, language, the learner, etc., and then trying to explain interaction by adding up the results. In other words, what the different constituents offer the learner is partially intrinsic to the constituent, and partially created through situated activity. A third strength of this study is that it incorporates more analysis of learners' interactions (see chapter 3), than other qualitative studies. Finally, by exploring face-to-face collaboration *at* the computer in the language classroom we will be contributing to an area of CALL that is seriously under-researched despite the potential that providing the learners with two powerful mediational tools in combination, computer and language-in-collaboration, might bring.

2.4 Theoretical Framework for the Investigation of Computer-based Tasks

As stated in the introduction (chapter 1) to this dissertation, we are going to make a distinction between CALL and Computer Mediated Communication (CMC) or Network-based language learning where CALL refers to work at the computer based on software programmes and computer tasks specifically designed for language learning whereas CMC relates to language learning tasks made possible by means of intranets or the World Wide Web and does not involve face-to-face communication. The following theoretical framework constitutes the foundations upon which the computer-based tasks implemented in the study are conceptualised and designed. This section reports mainly on the theoretical underpinnings of the tasks; for a full description of the tasks in relation to the research questions, refer to chapter 3.

2.4.1 Task definition

Defining what a task is, has varied in accordance to different pedagogic objectives. It has been defined in very general terms to include virtually any activity or piece of work humans do either to achieve something or get something done (see Long, 1985) or more specifically to refer to a particular procedural event -controlled by teachers- that allows learners to achieve a goal as Prabhu (1987) defines it (cited in Bygate, *et al.*, 2001).

Bygate *et al.* (2001) explore a series of conceptualisations of what a task entails in order to reflect the concerns of pedagogical research, and/or assessment perspectives. Their core definition: "*A task is an activity which requires learners to use language, with emphasis on meaning, to attain an objective*" (p.11) is then modified to underscore more specific aspects of these perspectives. In the context of the present study, the following definition embraces important issues to be considered:

> "*A task is a focused, well-defined activity, relatable to pedagogic decision making, which requires learners to use language, with emphasis on meaning, to attain an objective, and which elicits data which may be the basis for research*" (p.12).

This definition attends to a dual concern, the task as a tool, serving as a facilitator for language use in the pedagogical context, and also as a research tool for data collection. Like the core definition reproduced above, it also reflects a communicative stance to language learning where meaning is placed at the foreground of activity, as opposed to focus on language form. Within the construct of this definition, "task" and "activity" are essentially seen as synonyms, but with an emphasis on "task" as being a more structured and delimited "activity". However, from a Vygotskian perspective to language teaching, task and activity are not the same.

> *A task...is a kind of "behavioral blueprint" provided to subjects in order to elicit linguistic data...An activity, by comparison, comprises the behavior that is actually produced when an individual (or group) performs a task. It is the process, as well as the outcome, of a task, examined in its Sociocultural context.*
> (Coughlan and Duff, 1994:175)

The present study adopts this latter definition as a helpful framework for the study of collaboration in computer-mediated activity. We identify a task as a focused piece of work that serves as a blueprint for learners to engage in meaningful activity in pursuit of a goal. The activity generated by the learners' interaction with the task is a unique event since it is defined by the processes that develop as a result of that interaction in combination with the learners' own goals and perceptions of the task. In other words, we see a task as a generic event that provides an opportunity for unique activity to co-construct knowledge in the classroom. By studying the processes that result from a task and the activity it promotes we should find ourselves, as teachers, researchers, and materials designers, in a better position to design, implement, and use tasks that will promote fruitful collaboration in the language classroom.

2.4.2 Task characteristics

Tasks can be defined and constructed taking into account a series of characteristics that will provide the basis for the kind of learners' activity which is believed to promote language learning, e.g. collaboration, negotiation of meaning, and problem-solving endeavours among others. Although task characteristics co-exist and are interwoven as a holistic unit, for the purposes of design, analysis, and evaluation of task-based activity, it

is possible and indeed desirable to see these characteristics as discrete elements that can be grouped in terms of their structural, cognitive/metacognitive, and sociocognitive nuances. This kind of analysis is necessary both for task design, and for prediction and evaluation of linguistic outcomes and processes of learners' interactions when performing tasks.

Task characteristics are determined by (1) the nature of the task itself, (2) the degree of structure embedded in the task, and (3) its foci as dictated by both structure and content. The nature of the task is dependent on type, whether it is an information-gap, a problem-solving assignment, or a more mechanical exercise. A problem-solving task, for instance, might be an essentially cognitive problem, or a linguistic reconstruction like a puzzle, a cloze, or jumbled words or sentences. The degree of structure embedded in the task can be relatively simple if task completion requires a linear pursuit, or more complex when, in order to achieve a goal, it is necessary for learners to work on subtasks as part of a more global event. This would be the case of an information gap exercise where learners need to request information from each other to then write together a whole narrative that contains the information gathered. Finally, focus and structure are closely interdependent; a well-designed task should make use of structural patterns to help learners concentrate on meaningful interaction, language form or both depending on activity purpose and learners' needs.

Tasks goals and purpose as perceived by the task designer can be explicitly stated or implicitly embedded in the task; either way, however, learners must be given a clear idea as to what the task outcomes entail so that they can plan and/or proceed with its completion. Cognitive requirements embrace issues like learners' familiarity with the task content and information, the kind of decisions they need to make to achieve a goal and whether or not those decisions can be reached individually or collectively, and whether task content and information need to be transformed, reproduced, or reinterpreted (Skehan, 2001:173).

Sociocognitive characteristics determine the learners' roles in task completion, and the kind of interaction required. Ellis (2001) classifies tasks as "reciprocal" or "non-reciprocal" based on their information flow. Speaking tasks are typically reciprocal requiring a two-way flow of information between speaker and listener, whereas a

listening task, for instance, is of a non-reciprocal nature, requiring only a one-way information flow. Normally, the classification between reciprocal and non-reciprocal tasks works as a continuum between the two poles rather than a fixed typology (Ellis, 2001:49). Sociocognitive demands can be eased and aided by means of contextual support. Tasks, according to Mohan (1992), can be "context-reduced" or "context-embedded" depending on the discourse support they provide. A context-reduced task might depend more on linguistic cues and patterns for its completion, whereas context-embedded tasks would rely more strongly on situational cues that would help learners negotiate for meaning and give feedback to each other (Mohan, 1992:121). From a Communicative Language Teaching perspective, context-embedded tasks are perceived to be more authentic, imitating naturalistic interaction and potentially facilitating transfer from classroom activity to real world interaction. However, level of task authenticity can be determined by learners' needs and their own perception of those needs; working on grammar, for instance, is perceived as an authentic task for many students (Egbert and Jessup, 1996). The way learners themselves perceive the purpose and goals of a particular task will affect the pattern of interaction during activity (see section 2.2.3) and the way in which this is conducted throughout task completion.

The dimension added by the computer in computer-mediated tasks needs to be carefully studied in task design and evaluation. The role of the computer must be accounted for within the three parameters described above: structural, cognitive, and sociocognitive. However, whereas structural and cognitive characteristics are mostly in-built and pre-designed in the computer-mediated task, the role of the computer in terms of the sociocognitive aspect becomes a more perceptual matter. The computer has a dual role: it is the provider of a space for interaction, a mediator, and it is also a participant in that interaction in so far as learners input information, expect feedback from it, etc. The way in which learners perceive the role of the computer, make use of it, and incorporate it into their social context cannot be accounted for until learners are performing or have performed the task. From a Sociocultural perspective, the role of the computer in terms of regulation should reflect the learners' state of development by progressing from a degree of object-regulation to self-regulation.

2.4.3 Task implementation

In terms of task design and implementation, Hubbard (1992) suggests that designers of language teaching software should take into account the same kind of considerations that apply to designing language teaching methods in general. These considerations are outlined in terms of Approach, Design, and Procedure. Approach refers to the method's assumptions as to what the nature of language and language learning is (see section 2.4.4.1); Design involves the conceptualisation of those assumptions in terms of tasks and procedures (see section 2.4.4.2); and Procedure refers to the actual implementation of specific tasks, taking into account the type of task it is, how it will be presented on the screen, human-computer interface, the kind of feedback offered to the learner, help options, and control options, among others (see chapter 3). Hubbard advocates task implementation that is based on and consistent with sound theoretical assumptions about language learning and which is designed for a particular audience, with particular learning objectives (Hubbard, 1992:62). The following section details some of the implications in terms of Approach and Design, whereas Procedure will be developed in the methodological chapter.

2.4.4 Task conceptualisation

2.4.4.1 Approach

A Sociocultural framework for second language acquisition emphasises the role of social interaction as the means to co-create knowledge. The processes that occur while inter-mental activity takes place, and that might be conducive to linguistic events containing microgenetic examples, must be studied in order to learn more about which features of interaction promote the development of the target language in the classroom as well as the task features that allow for interaction in the first place.

Vygotsky assigns a developmental status to social interaction and it is for this reason that collaborative activity in the language classroom needs to be further studied. It is inter-mental activity that will allow individuals to change and be changed by their partners in

terms of linguistic and cognitive development (Rommetveit, 1985, cited in Donato, 1994). A Sociocultural approach to language learning does not see interaction and communication as the transmission of "ready made" messages. Language learning and meaning are created by means of inter-mental activity and by undergoing the process of internalisation. Language learning tasks should provide for the elements that will allow learners to become increasingly self-regulated with the help of the other, through scaffolded activity.

2.4.4.2 Design

In keeping with Sociocultural principles, the tasks for the study were designed according to the following parameters. The tasks have an explicit goal whose problem-solving nature should have the capabilities to maintain interest and motivation while providing the basis for cognitive and metacognitive processes to take place. The goals of each task are twofold; on the one hand there is the explicit goal of the "macro" or main task where learners have to collaborate either to solve a specific problem, or produce a piece of work based on a transformation of the language and content dealt with throughout the task. On the other hand, the tasks are based on multiple "micro" or sub-tasks with an emphasis on form and whose implicit goals are of a grammatical nature since the study took place within the grammar module of the Spanish course (refer to Methodology chapter). Although there is a very strong grammar element, especially in the first two tasks, the "macro" purpose of the tasks goes beyond the practice of grammar, so that it provides ground for cognitive and metacognitive activity with emphasis on meaning.

In task number 1, the main goal is to create a document (with visual and linguistic content), partly based on an interview that learners had to reconstruct, but that also reflected the learners' own thoughts and beliefs in relation to the world of work. Throughout the exercise, the learners had the opportunity to reflect on language by discovering, at the same time, what the thoughts of a Spanish professional are. Task number 2, is a typical problem-solving exercise; not only did students have to solve "micro" language puzzles, like jumbled sentences and mini cloze exercises, to retrieve the pieces of information necessary for solving the problem, but they also needed to

collaborate closely meta-cognitively throughout its completion. The third task is based on a "dictogloss" format (see Methodology chapter for further description of tasks).

Egbert and Jessup (1996) underscore the importance of constructing tasks that make it necessary for all the participants to interact with all the resources available to the group, or in this case to the dyad. The computer has the potential to play an essential role in this respect. As a mediational entity between the task and the learners, it can provide a collaborative space where learners are able to work together towards achieving a common goal. The computer can play two crucial roles during activity. On the one hand, it can be the knowledgeable peer or expert that holds the information and dispenses it in response to learners' actions, input, and needs; on the other hand, its role might just consist of being the recipient tool that will react to the information fed by the dyad. In the latter case, the dyad would, hopefully, have become the expert by collaborating their way towards partnership expertise (Donato, 1994). Either as participant or tool, the computer adds a different dimension to interaction, one that has not been fully studied yet, but that will certainly become part of the dynamics of the language classroom.

The tasks provide learners with the opportunity to make use of two tools for mediation, the computer and language, the mediational tool *per excellence*, according to Vygotsky (1986). Our role as researchers is to learn about the processes that take place when learners interact with and by means of these tools which are intrinsically different in nature. Cole and Wertsch (2002) argue that "...artefacts do not serve simply to facilitate mental processes that would otherwise exist. Instead they fundamentally shape and transform them." This argument is of particular interest in our study in terms of the pervasive influence of the computer and what it brings in terms of both the inter-personal patterns of interaction, and also any visible linguistic and/or intrapersonal cognitive development. The case for language might be different to the way in which Cole and Wertsch see it since learners of a foreign language have already undergone cognitive development and knowledge of the world by means of their first language. To learn about the role of the target language from this perspective, we need to pay close attention, for instance, to learners' code use when faced by problem-solving challenges.

2.4.5 Tasks and Activity

The theoretical framework explored in previous sections of this chapter accounts for the conceptual and practical nature of the tasks as research instruments in the present study. The three tasks have been designed to provide support for collaborative activity at the computer that will, ideally, result in learners' linguistic development. However, the activity that each of the tasks will generate has to be studied during the process of data analysis. We are here alluding to two interwoven levels of analysis: the level of task and the level of Activity[1]. Although an approach to task completion has been predicted by the researcher during the task design stage, learners' view of the task, their own goals, actions, and beliefs will prevail during task implementation and therefore, the task design cannot determine Activity (*cf.* Lantolf, 2000:21, Donato, 2000:44, Ohta, 2000:76).

The dimension added by the computer in computer-mediated tasks needs to be studied in task design and evaluation. The role of the computer can be analysed within the three parameters described above: structural, cognitive, and sociocognitive. However, whereas the structural and cognitive characteristics are mostly in-built and pre-designed in the computer-mediated task, the way in which learners perceive the role of the computer, make use of it, and incorporate it into their social context cannot be fully described until learners are performing or have performed the task.

Based on the theoretical framework introduced in this chapter, three different tasks delivered in two mediums of implementation, computer and paper-based, were compared and investigated. The following chapter outlines the methodological design of the project that allowed us to study the degree to which the tasks supported collaborative activity in the classroom, the ways in which learners deployed semiotic mediational mechanisms in the context of collaborative work, and the importance of the computer as a mediational tool in the processes of collaboration.

[1] Note how Breen distinguishes these two levels of task, but he defines task as "task-in-process" and activity as a work plan (1987 in Chapelle, 1999b: 113–114).

3 Methodology

3.1 Introduction

The purpose of this chapter is to outline the methodological design of the project. The foci of the study as operationalised in the research questions will be addressed in relation to the context and participants in the study, and the methods and instrumentation believed to best support our inquiry. Section 3.2 outlines the rationale for the research design; section 3.3 details the context in which the study took place including instrumentation and procedures for data collection; section 3.4 describes the analytical procedures applied to the data; and finally, section 3.5 concludes this chapter with an overview of the research design.

3.2 Research Design: rationale

The study was informed by a Sociocultural approach to language learning which underlines the notions that learning and development are first achieved through social interaction, and then internalised by the individual, and that the co-construction of knowledge is always mediated by either physical or psychological tools. The study set out to investigate the processes of collaborative activity and their relevance to foreign language learning, as well as the impact of the computer as a mediational tool during collaboration. The research took place in a Spanish foreign language classroom as learners worked in dyads/triads across three different tasks delivered in two mediums of implementation, computer and paper-based, for comparative purposes. The following questions provide the foundations for the study:

1. To what degree do the three different tasks in the two mediums of implementation - computer and non-computer based - support collaborative work in the classroom?

a) How do learners deploy semiotic mediational mechanisms such as repetition, L1, and reading aloud in the context of collaborative activity?
b) To what degree do participants engage in High Quality Collaboration (HQC)?
c) What is the significance of HQC in the processes of second language learning?

2. What is the importance of the computer as a mediational tool in the processes of collaborative activity?

Because we were interested in studying learning processes as they take place during inter-mental activity, an in-depth qualitative methodology that incorporates analysis of the learners' discourse, and the tasks and contexts where collaboration is constructed was considered to be the most appropriate approach. From a Sociocultural approach "L2 acquisition ... is not considered to be wholly resident in the mind of the language learner, such that it can only be inferentially accessed by the researcher..." (Ohta, 2001:51). Therefore, it was necessary to record the learners' interaction while they accomplished tasks with a problem-solving nature (see 3.3.1.4.1 below) to observe some aspects of the learning process. Problem-solving tasks that present learners with "obstacles" are believed to allow the researcher "to observe how changes (i.e. development) occur as a result of the interference" (Roebuck, 2001:85).

Social interaction is profoundly influenced by the context and specific circumstances in which it takes place. A qualitative study has a twofold potentiality indispensable for the understanding of the kind of interactions in the language classroom we are interested in. By recognizing "the complexity and 'embeddedness' of social truths," (Cohen, Manion, and Morrison, 2001:184) this style of inquiry lends itself, and might indeed require, the integration and consideration of the different levels that permeate Activity when viewed from a Sociocultural perspective. In addition, this kind of study empowers the researcher with the capabilities to observe social interaction as a process thus providing the opportunity to observe and analyse the participants and their interactions throughout the dynamic, evolving progression that takes place in the language classroom.

3.3 The study

This section outlines the context in which the study took place. It then describes the research instruments, and the procedures for data collection. It must be noted that in this chapter a distinction is made between the *learners* (34) in the two groups where data collection took place in order to provide a comprehensive description of the context, and the *participants* (18 out of the 34) who were the subjects for the study.

3.3.1 Context and Learners

The data collection took place during an academic semester in the School of Modern Languages (SML) at the University of Southampton. The learners enrolled were 34 (26 females and 8 males; years 1-3) university students of Spanish as a Foreign Language. The students were randomly divided by the department of Spanish into two groups: SP193/01 with 19 members and SP193/02 with 15. Most students were native speakers of English, but there were two native speakers of French and one of Arabic. Group 01 consisted of 7 males and 11 females and Group 02 of 1 male and 15 females. Half of the students in group 01 were also studying another language, either French (7) or German (2) whereas in group 02 there were only four students doing French as well. The majority of the participants were in their late teens/early twenties with two exceptions, one aged 32 and another 40. Students' entry level of Spanish was Intermediate level (level SP193 at the University), which corresponds to a grade C "A" level qualification in Spanish. The University requirements for placement at stage SP193 state that students should have undertaken a notional 240 hours of study time (class contact plus independent learning) or equivalent and comply with the language skills described in appendix one.

3.3.1.1 The classroom and the language programme

Students attended their SP193 *Resource* class once a week as part of the three 45 minute contact sessions that form their Spanish language module. The other sessions were a *Text* class, described by the department as "grammar in context" because its focus is on

analysing grammar in the context of texts both written and oral, e.g. articles, essays, and videos; and an *Oral* session where they were encouraged to participate for instance, in debates, discussions, academic presentations, and informal chats. Apart from the contact hours students are expected to attend as part of their course requirements, they are expected to work independently for a minimum of seven hours a week on their Spanish language development. There is a fully equipped Language Centre at the School of Modern Languages where students have access to a range of written and audio-visual materials including access to Internet and CALL software packages. The classes where data collection took place, like most of the other *Resource* classes in the SML, took place in the newly installed Smart-Classroom. The design and equipment of this room provided flexibility in terms of group work dynamics and technological facilities. Its layout allowed for work at the computer stations when required, and work at tables without the machines interfering with human interaction. Although the participants in the study reported (in a questionnaire, see section 3.3.1.4.3) an average of 1.3 hrs computer use a day, the integration of the computer as part of their *Resource* classes was an innovation.

The Resource class was conducted largely in the target language, although English was sporadically used. The class focused on grammar as the core element of study and its main objective was to give students the opportunity to explore specific grammatical structures based on four units in their text book *Acción Gramática* by Turk and Zollo. The grammatical structures to be practised during semester one (when the data collection took place) were personal pronouns to include subject, direct and indirect object, prepositional and reflexive pronouns; infinitive verbs; radical changing verbs; and "ser" *versus* "estar". None of these structures were expected to be completely new for the students although, as the pre-test showed, they had indeed problems with their use. The approach to grammar used in the classes was mainly inductive. In other words, students would be given sets of sentences containing the target structures and they would first work in pairs to try and work out the grammar rules that the sets of sentences might illustrate. Then, there would be whole group discussion where the use of metalinguistic terms such as subject, object, verb, tense, infinitive, pronoun, etc. were regularly deployed, followed by practice both oral and written, e.g. dialogues in pairs using cue cards, cloze exercises, and sentence translation exercises. These types of tasks also reflected the kind of performance that is required from the students in their final

departmental examinations where they would also have to perform a reading comprehension exercise and write an essay. The tasks used for the study's data collection (see 3.3.1.4.1) were an integral part of their Resource class.

3.3.1.2 The participants in the study

The students were informed about the fact that some of the pair/group tasks would be audio recorded for research purposes and were invited by the teacher-researcher to privately tell her if any member would prefer not to take part in the study in which case their recordings would be destroyed. However, none of the students expressed any objections towards the study. From a total number of 38 recordings, 12 were selected to comprise the database for the study (5 hrs 20 min of learners' interaction, see 3.3.1.4 for further details and rationale). The 18 different participants involved in the study are described (with pseudonyms) in Table 1:

Table 1: The participants

Student	Native Language
Jean	English
Nora	English
Gill	English
Joe	English
Cleo	English
Lyn	English
Liam	English
Sue	English
Conny	English
Gem	English
Fred	Arabic
Henry	English
Jack	English
Mina	English
Ellen	English
Hena	English
Alex	French
Paul	French

3.3.1.3 The teacher-researcher

The teacher-researcher was an experienced foreign language teacher, and a native speaker of Spanish. Efforts were made to integrate data collection as unobtrusively as possible into the normal Spanish lessons both to respect the learners' needs and space, and also to achieve the research goal of studying interaction as situated activity in the language classroom. I tried to keep the lessons' approach and my teaching behaviour consistent throughout all the sessions, regardless of whether or not data were being collected. As described in section 3.3.1.1 above, the pace, activities, and work groupings remained constant during the semester; the integration of the computer to carry out some tasks in the classroom, however, was a new experience for the learners and as such, conclusions regarding the impact of the machine need to account for this. During data collection sessions, I did have some extra involvement with students working on paper tasks (see section 3.3.1.4.1) since I provided feedback and materials that learners working at the computer could access themselves, therefore there was a degree of variability in the levels of involvement during the research situation (Burns, 1999). Nonetheless, I monitored the work of the whole class and assisted any students when required regardless of whether they were working at the computer or not. This fact might be particularly relevant to understand the impact of the computer since I was always part of "the social world in which the research [was] being conducted" (Wetherell *et* al., 2001:19).

An "insider perspective of social learning processes... may be helpful" (van der Aalsvoort & Harinck, 2000:18) not only in relation to the wider context involved in trying to "bridge the gap" between research and practice (*cf.* Woods, 1986; Hitchcock and Hughes, 1989; Threadgold, 1985), but also because I had internal knowledge - and responsibility - of the research project from design and piloting stages to implementation, data collection and analysis, as well as the class situation. Fulfilling as it is, the role of teacher-researcher is not an easy one, and there are of course, disadvantages, including having to face dilemmas, difficulty of being fully objective (Altrichter *et al.*, 1993; Walker, 1985; Pollard, 1985) and ensuring data collection runs smoothly, e.g. ensuring that recorders are working, tapes properly identified, learners returning their post-task

questionnaires, etc. while making efforts not to compromise the learners' right to receive their "normal" language class, for instance.

3.3.1.4 Instrumentation

The main instrument for data collection was the task. Learners were audio-recorded while performing the tasks in pairs/groups. The recorded data were transcribed to produce *protocols* for data analysis. The three tasks, described in more detail below, were implemented in two modes: computer-based and paper-based. The main purpose for comparing the two modes of implementation was to facilitate the study of the computer pervasiveness in activity. Secondary research instruments were pre- and post-tests and the two types of questionnaires described below.

3.3.1.4.1 The tasks

Three problem-solving tasks (see rationale section 3.2) were specifically designed as the main data collection instrument to record the processes of collaboration undergone by participants while accomplishing them either at the computer (CALL tasks) or in a paper version (Paper tasks). The main methodological purpose of the tasks as instruments for data collection was to provide the participants with an opportunity to engage in inter-psychological activity by collaborating to complete them. The purpose of carrying out a comparative analysis of the two modes of implementation was to inform our study in relation to the specificity of the computer as a mediational tool in the processes of collaboration. In order to support the comparison between the two mediums of task delivery, computer and paper, a compromise was necessary. The use of potentially powerful computer features such as multimedia and hypertext branching that could have led to an unbalanced comparison of collaborative activity was avoided. However, computer features such as drag and drop, random jumbled sentences, provision of immediate and tailored feedback, etc. were deployed because the presence of the teacher to provide requested feedback and assistance meant that learners working on paper would not be inherently disadvantaged. In terms of language learning, the tasks were designed to promote the production of output since this might lead to language development -e.g. through focusing on form; by "pushing" learners to get involved in

more mental efforts and so, process language at a deeper level; by moving from semantic to strategic levels in order to achieve accurate production, etc. (*cf.* Swain, 1995). As discussed in chapter 2, it is through and by means of dialogue that noticing, hypothesis testing, and reflective metalinguistic talk (language used to describe or talk about language) can occur (Swain, 1997). Finally, the tasks were designed as instruments for research to provide the teacher-researcher with a window for the observation and study of collaborative activity in the language classroom.

The CALL tasks were created with two pieces of software, a Web page generator, GoLive by Adobe, and an authoring programme, HotPotatoes by Half-Baked. Although there was some scaffolding (see below) available from the computer by means of access -on request- to clues and feedback, and easy access and retrieval of visual information, it was expected that learners themselves would make use of scaffolding techniques to complete the tasks satisfactorily; e.g. by jotting down required information to solve the problems, by working out –together- grammatically correct sentences, by exploiting their co-knowledge focusing on a shared goal. The Human Computer Interface (HCI) was kept as simple as possible, using hypertext links common to most Websites for navigation. The tasks required linear navigation, however, learners could work their way backwards if they so wished, either to re-read instructions or to access previous information. Learners had control over access to clues and feedback although the number of clues had been pre-determined.

The capabilities of HotPotatoes to implement various forms of feedback were utilised as described in the specific tasks below. In general terms, however, feedback and help from the computer was provided in three different ways: *clues*, *hints*, and *correction* button. *Clues* were selectively provided by means of a question mark button next to a blank; when clicking this button students would obtain clues in the top frame of the screen. *Hints* were available in selected frames; this button was always positioned at the bottom of the screen and students would get letters for the words required just by putting the cursor in the desired blank and clicking the hints button. The *correction* button, always located at the bottom of the page and provided in every frame, would integrate correct answers to the text, but marking them by means of bold type; incorrect gaps would be cleared out for students to continue working on them. The teacher-researcher was

always available to everyone whether they were working at the computer or on the paper versions of the tasks.

Task 1: Profesionales de Hoy

The first task (Professionals Today, appendix two, Frame 1 shows text for both versions paper and CALL) consists of three parts: 1) a discussion about the world of work; 2) an interview reconstruction; and 3) a document creation. The goals of this task were on the one hand, to provide a space for participants to discuss the topic and explore some related issues by collaborating to reach common agreement as well as express their own thoughts and, on the other hand, to practise personal pronouns in a contextualised way. Inter-mental activity was expected to take place in relation to communication for meaning (throughout the task as a whole), metalinguistic talk (when tackling the discrete question-answer patterns), and metacognitive activity (when planning and organising the last stage of the task).

In preparation for the content of the task, in the first part participants are given a list of concepts like status, intellectual development, etc. to discuss and negotiate what they consider to be more and less important in the world of work so that they can organize them hierarchically, according to their personal opinion. Then they discuss some of the qualities they consider important in terms of human relationships and complete two sentences that express their thoughts; the sentences are elaborated in such a way that each participant is expected to complete a sentence about their partner. The second and core part of the task is an interview reconstruction. A Spanish professional is interviewed about some of his views of the world of work and relationships and participants are expected to collaborate in order to reconstruct the dialogue. Finally, and meant as a post-task for participants that finish the first two stages before their classmates, they are asked to create a document - a paragraph including an illustrative picture - expressing their own views about the topic, but in the context of the UK.

Feedback and help from the computer was provided in various degrees and three different ways: clues, hints, and the correction button. In general, there was more help available as the task progressed, the rationale for this being the encouragement of participants to collaborate and try to get help from each other before resorting to the

machine. Not all the kinds of help and feedback were available in all the frames, with the exception of the "correction" button which was available at all times except in Frame 2 (appendix two), where there was no one correct answer.

The Paper mode of this task was a reproduction of it by means of a Word Processor. Each dyad was given only one copy of the task just as their CALL task counterpart would focus on the one screen. Feedback and help were provided from the teacher-researcher when requested and learners were given the printed whole interview when they finished the reconstruction process for them to check their answers and discuss the outcome.

Task 2: Gifted Daughters

Task number two (appendix two, Frame 1) is a traditional problem-solving task where participants are given linguistic clues that will help them solve the problem posited. This task can be described as a variation on a trail quiz that consists of a macro-task: finding out which language and which musical instrument belongs to which of five sisters so that they can fill in the table provided to them on paper (Figure 1), and five embedded micro-tasks that focus on grammar (personal pronouns and infinitive verbs). In other words, the dyads have to solve a problem by collecting the necessary five pieces of information, the object for this being the encouragement of metacognitive talk which is believed to stimulate individuals, provide them with an infrastructure to negotiate development, take and manage control of their activity and learning, and guide them through the tasks (see Ohta, 2001; Hoven, 1999; Swain, 2000; and the literature review, chapter 2). This is expected to take place between the participants' inter-mental activity as part of the necessary planning, negotiation, organising, etc. required to solve the problem of the macro-task. Each piece of information is provided to them by the computer after completing a micro-task based on grammar. This task is also intended to bring about metalinguistic talk in relation to personal pronouns and use of infinitive verbs in Spanish. The first micro-task is a two-sentence gap filling exercise and it is followed by the first clue exemplified in Frame 2 (see appendix two). The second micro-task is an English into Spanish translation task and in micro-task 3 (Frame 3), learners have to collaborate to write a sentence which describes the sign provided on the left hand side of the screen.

The fourth stage of this task is a "drag and drop" jumbled sentence problem (Frame 4) and the last micro-task is another translation task.

Figure 1: Hermanas dotadas

Resuelvan el problema: **Hermanas Dotadas**

Cuatro hermanas, hijas de un diplomático canadiense, tienen talentos musicales y también hablan cuatro idiomas europeos (uno de ellos es el **italiano**). Cada una toca un instrumento musical diferente (los cuatro instrumentos son **el clarinete, la flauta, el piano y el violín**) y cada una habla un idioma diferente.

Para resolver el problema y completar el cuadro, necesitan **JUNTOS(AS)** obtener **CINCO** oraciones que les darán todas las claves necesarias. ¿Cómo obtener las oraciones? Bueno, pues deben **COLABORAR** como **pareja**, y **SIEMPRE** hablando **español**, en los ejercicios que tienen en la computadora. Cada vez que completen CORRECTAMENTE los ejercicios, obtendrán una oración. Si ponen atención a los ejercicios, también ahí obtendrán algunas pistas. Pueden copiar en esta hoja las claves que vayan obteniendo para que al final tengan toda la información junta.

!Ahora a la computadora!

NOMBRE	INSTRUMENTO	IDIOMA
Elisa		
Rita		
Ana		
Tere		

Participants are free to decide how they want to tackle the problem-solving task. They can either collect all the clues and then collaborate to fill in the chart or they can try and work out the solution of the problem with the information available every time they obtain a clue. Computer feedback consists of letter hints in some of the micro-tasks and the correction button works in the same way as in the previous task; after pressing it, correct answers become integrated in the text, but marked in bold typeface whereas incorrect answers are erased so that learners have the opportunity to continue working on them. No clues button is provided in this task.

In the Paper version of this task, the teacher-researcher gives participants the five clues and micro-tasks gradually after they successfully accomplish each stage and also provides feedback when requested, checks each micro-task when dyads finish and encourage them to continue working on the incorrect output so that participants have a similar opportunity to dyads working on the CALL version. As with the previous task,

dyads only get one copy of the paper task to encourage them to collaborate and become involved in inter-mental activity.

Task 3: La Ciudad de México

Finally, the third task "La Ciudad de México" is an adaptation of "dictogloss" (Kowal and Swain, 1997:295 and Swain and Lapkin's 2001:101) which is described as "...a procedure that encourages students to reflect on their own output. In this procedure, a short, dense text is read to the learners at normal speed; while it is being read, students jot down familiar words and phrases; the learners work together in small groups to reconstruct the text from their shared resources..." (Kowal and Swain, *Ibid*). The purpose of implementing a type of dictogloss in the study was two fold, on the one hand to promote the kind of metalinguistic talk described above while providing learners with practice on "ser" and "estar", on the other hand, to compare the effects of the computer (as opposed to the Paper version) in terms of creativity and accuracy. It was expected that the CALL version would compromise creativity, but provide more opportunities for reflection on output, whereas dyads working on paper might decide to ignore the gaps provided and try to construct their own text, even though based on the original.

In the CALL version of dictogloss participants read the text provided on the right hand side of the computer screen instead of listening to it (Appendix two, Frames 1 and 2) and they cannot typewrite while the text is on the screen. Participants have a minute to read the text and after that the text disappears from the screen (Frame 3); as stated in the task instructions, they can read the text twice. When learners are ready to read the text a second time they only have to press the button "Leer otra vez" on the top right side of the screen for it to reappear. Feedback is provided by means of clues, marked as question marks next to some blanks, and there is also a correction button at the bottom of the screen that behaves as in the previous two CALL tasks. The text is designed for learners to focus on the Spanish verbs "ser" and "estar". Inter-mental activity is expected to produce metacognitive and metalinguistic talk. Learners that finish early are encouraged to use a word processor to write a similar text about London.

The Paper version of this task consists of three pages: one with the instructions, another one with the text, and a third one with the title of the text and the blanks for learners to

reconstruct the text; as in the CALL version, punctuation marks are provided. Participants are requested to read the text only twice and not to write while looking at the text. Feedback is provided by the teacher-researcher on request. As in the previous tasks, dyads are given only one set of paper to work on in order to encourage collaborative work.

To summarise, the three tasks designed for collection of data in this study provided the students with a twofold and explicit general objective. On the one hand, students had the specific aim of completing the problem solving phase of the task, and on the other hand, they were able to focus on form by working on the grammatical structures that were part of the exercises embedded in the task, and which students had perceived (e.g. on the questionnaires, see appendix four) to be a very important aspect of their Spanish language lessons.

Table 2: Summary of the tasks as a tool for data collection

TASK	PROCEDURE	MAIN GOALS	EXPECTED INTER- MENTAL ACTIVITY	PROGRAMME TYPE FOR CALL VERSION
1. Profesionales de hoy.	1. Discussion -aided by computer- about the world of work and relationships. 2. Cloze exercise to complete interview with a Spanish professional about perceptions of work and relationships. 3. Creation of a document to express students' own views towards either professional life in Spain, taking into account the views in the interview, or work life in the UK.	To practise personal pronouns. To discuss and express their views on the task topics. To create a document in order to synthesise their discussion.	Communication for meaning. Metalinguistic talk. Metacognitive activity (e.g. planning)	Drag-drop programme implemented with HotPotatoes Partial- deletion programme. Webpage generator GoLive.
2. Problem-solving task: variation on a trail quiz.	Students have to solve a problem by collecting the necessary information (5 pieces). Each piece of information is provided to them by the computer when they successfully complete a grammar task.	To solve a problem. To practise personal pronouns, and the infinitive.	Metacogntive talk leading to the solution of the problem (e.g. planning, and negotiation) Metalinguistic talk.	HotPotatoes to produce cloze, translation, matching and jumbled sentence exercises. GoLive.

3. La Ciudad de México: Text re-construction, a variation on Dictogloss	1. Students read a short text on the screen that will disappear after 60 seconds. (They have two opportunities to read the text.) 2. Students collaborate on reconstruction of the text, following a cloze format . 3. Students write together a similar text, but this time about London, using a word processor.	To work on "Ser" y "Estar" by reconstructing a text in which these verbs are essential. To create a document that will reflect their personal perceptions about London. To negotiate the kind of information to be included in their text.	Metacognitive talk: planning how to tackle the task. Metalinguistic talk. Communication for meaning.	HotPotatoes. GoLive.

3.3.1.4.2 Tests

Pre and post research tests were administered to the students (see appendix three). Both tests were exactly the same; the objective of the pre-test was to establish students' state of knowledge in relation to the four grammatical issues (target structures) that were going to be the basis for the course and also the focus of microgenetic investigation: personal pronouns to include subject, direct and indirect object, prepositional and reflexive pronouns; infinitive verbs; radical changing verbs; and "ser" *versus* "estar". The objective of the post-test was to gain a notion of progress and achievement of the group as a whole and of individuals after a term's work on the target structures. The tests were a further means to understand potential relationships between dyadic task performance and achievement in relation to the target structures.

The test followed a design similar to the grammar section tests of the Spanish Section in the School of Modern Languages at the University. It made use of two techniques considered by Seliger and Shohamy (1989:176-178) as being of a high level of explicitness in terms of elicitation of language data for the purposes of research, *translation* and a variation of *cloze*. Thus the first section contained eight main sentences/questions to be translated from English into Spanish; 19 points were given for all correct answers. These items were designed so that students had to produce pronouns, infinitives, and radical changing verbs. The second section was an eight-gapped cloze exercise where students had to fill in the blanks with either "ser" or "estar" in their appropriate form according to context (8 points given for all correct answers).

3.3.1.4.3 Questionnaires

Questionnaires were selected as an economical way to gather some relevant information about the participants. Two types of questionnaires were used. The first one, questionnaire A "Attitudes towards using computers" (see appendix four) was administered once, on the first day of classes; the second one, questionnaire B and its variant C, was administered every time students worked in pairs as part of the data collection process.

Questionnaires have been widely used in SLA research to study motivational aspects, learners' attitudes, and learners' strategies (Seliger and Shohamy, 1989:172) both as part of survey research, and also as part of multi-method research (Johnson, 1992) as well as in the general field of education (Walker, 1985; Woods, 1986). In order to gain a deeper understanding of the role of the computer as a mediational tool in collaborative activity in a holistic way, it was necessary to gain an insight into the learners' habits and use of the machine in their everyday activities, and also into the learners' attitudes not only towards the computer, but towards pair work and the role of grammar in their Spanish lessons. Questionnaire A: "Attitudes towards using computers" played then a twofold objective throughout the study. On the one hand, it was necessary for the teacher-researcher to obtain information that would help her provide adequate practical guidance and help when the computer was being used in the classroom; on the other hand, learning about participants' attitudes towards the issues mentioned above, was a means to gain information about the group's characteristics in general and about individuals in particular, the questionnaires being non-anonymous. This fact might compromise, in some cases, the degree of honesty in students' replies, but it was considered that the gains would be more significant than the possible losses, for example to be able to refer back to and compare different data sources.

The questionnaire "Attitudes towards using computers", was adapted from Warschauer (1996) to include information particularly relevant to this study, e.g. learners' attitudes towards pair work, grammar, etc. It consisted of three sections; the first one gathered personal information, name, age, degree being studied, and year in the university. The two remaining sections comprised the three components of attitude questions identified

by Mertens as affective, cognitive, and action (1998:126) both in terms of students' knowledge of computers and amount of time spent daily at the computer as well as seeking to collect information about attitudes towards the computer and some of its applications, attitudes towards working in pairs, and students' thoughts in relation to learning Spanish grammar.

Questionnaire B, and its variant C (see appendix four), was an introspective questionnaire administered immediately after participants had completed a data collection task. The main objective of this questionnaire was to seek information regarding specific tasks, and sessions as perceived by the participants. Although they were structured questionnaires, students had the opportunity to add comments if they so wished.

Questionnaires B and C were then designed as a complementary tool to gather information about:

a) collaboration by seeking students' perceptions of tasks and work with their partners;
b) language learning potential of the tasks by seeking learners' perceptions of task effectiveness and how they rated their achievements throughout the various sessions in terms of their individual goals and motives and;
c) learners' attitudes towards the computer by seeking learners' feelings after task completion on repeated occasions.

3.3.2 Procedures for data collection and overview of the research design

Data were collected by the teacher-researcher during weeks 1, 5, 8, 11, and 12 out of a 12-week programme. These weeks were chosen for data collection to provide students with computer-based work evenly throughout the teaching semester and because the research tasks were designed to give students the opportunity to practise and recycle the grammar structures required by the programme. The questionnaire "Attitudes towards using computers" and the linguistic Pre-test were given to participants during their first

session of semester one at the University. Participants were asked to work individually and not to consult their dictionaries or grammar books. The post-test was administered in week 12, before learners prepared for the final departmental examinations, and without having been told they were going to be tested. However, they were advised these test results were not going to be taken into account for their official marks.

Table 3: Data collection overview

WEEK No.	INSTRUMENT	TIME	GROUP SP193/01	GROUP SP193/02
1	Questionnaire: Attitudes towards using computers Linguistic Pre-test	13' 17'	18 learners 18 learners	15 learners 14 learners
2	Computer exercise (recorded, but not considered for data collection)	15'	16 learners	11 learners
5	CALL Task 1 Paper Task 1	30'	9 learners 6 learners (2 protocols for analysis)*	5 learners 5 learners (2 protocols for analysis)
8	CALL Task 2 Paper Task 2	26'	7 learners 6 learners (3 protocols for analysis)	6 learners 4 learners (1 protocols for analysis)
11	CALL Task 3 Paper Task 3	23'	7 learners 4 learners (3 protocols for analysis)	8 learners 4 learners (1 protocols for analysis)
12	Linguistic Post-test	15'	15 learners	11 learners

* protocols = transcribed interactions, refer to section 3.3.2.2 for data selection rationale

3.3.2.1 Audio recording procedure

In order to familiarize participants with working at the computer in the classroom, and to feel at ease working in pairs while being audio-recorded, all the students participated in a CALL exercise in week two. The CALL exercise consisted of 10 gapped sentences for learners to work on personal pronouns; this material was not analysed for the study.

Due to the fact that data collection was implemented as part of the students' *Resource* class in Spanish, participants were free to decide whom they wanted to work with since this is what normally happens in all the Spanish sessions at the University and it was not in conflict with the study design. The main data collection took place during weeks 5, 8, and 11. The questionnaire "Attitudes towards using computers" showed that the great majority of the participants worked with computers regularly, nonetheless, the projection facilities in the SmartClassroom were used in weeks 2 and 5 to demonstrate the main task features participants needed to be familiar with when working at the work stations, e.g. feedback issues, how to access orthographic accents for Spanish, and drag and drop. Before each of the three sessions started, participants were asked to turn on their tape-recorders and say their names.

For each of the tasks, participants were divided into two groups, and half of the dyads would accomplish a CALL task and half a Paper task. An effort was made to give everybody the opportunity to work alternately in the two modes throughout the three tasks. In other words, participants that had worked on CALL mode in task 1 were asked to work on Paper mode in task 2 and so on. At the end of each of the three sessions, participants were asked to complete the post-task questionnaires (appendix four) for the appropriate mode of implementation.

3.3.2.2 Transcription of data

Twelve interactions were transcribed for analysis (5 hrs 20 mins of collaborative activity) based on the following criteria: 1) it was considered that 4 protocols, 2 paper-based and 2 computer-based for each of the three research tasks, would provide a representative –but manageable- amount of data to carry out in-depth qualitative analysis of full interactions (as opposed to selecting fragments from a larger amount of interactions) in order to observe and compare situated activity as it evolved throughout task completion (*cf.* section 2.2.8.3) while also providing enough material to obtain meaningful quantitative information; 2) the 12 interactions were randomly selected from the two groups after discarding recordings badly damaged due to technical problems, however, the interactions of one dyad that worked together across the 3 tasks (2 computer-based and 1 paper-based) were specifically selected in order to compare

potential influence of learners' styles when working in the two different mediums, for example. Translation of all excerpts included in the Results chapters are shown in italics for readers unfamiliar with Spanish. The system for transcription (see Hitchcock and Hughes, 1989) combined both existing transcription conventions based on Psathas (1995:70-8), and Ohta (2001:27) and some purposely developed ones. They are listed in Table 4.

Table 4: Transcription conventions

Symbol	Explanation
J:	speaker
T:	teacher
(.)	brief pause
((pause))	longer pause
[	overlapping
=	latching: when one starts speaking immediately another has finished
( )	indecipherable
(( ))	any comments like ((cough)) ((sneeze))
,	slight rise in intonation
?	rising intonation
capital letters	to show speaker's emphasis
" "	reading aloud
italics	translation into English
→	to draw the reader's attention to something

3.4 Analytical Procedures

Framed within a Sociocultural approach to language learning, the main objective of the investigation was to study collaborative activity across the three tasks in their two modes of implementation in order to assess the value of collaborative activity as a source for possible restructuring of interlanguage, the value of the tasks as pedagogical instruments to support collaborative activity in the foreign language classroom, and the impact of the computer as a mediational tool in the processes of collaborative activity. The nature of the investigation required predominantly qualitative analyses, however, quantification of some aspects of the data was carried out in order to gain a perspective of the phenomena in question in relation to the overall picture being presented, in Schegloff's words "to

establish the "weight" or gravamen of an observation or assertion" (1993:100-101). To study the nature of collaboration and its outcomes, it was necessary to approach the data from a grounded perspective. The analysis was a recursive process that pursued the investigation of pre-set milestones (described in the sections below) upon which analysis was anchored, but which developed as the process progressed and became more grounded in the data. The recursiveness I am referring to necessarily relates to both the participants' co-construction of activity and also task and computer influence upon activity. Analysis focused on the study of patterns emerging from the data on the one hand, but also on the study of behaviour that might be unique to certain dyads on the other so that we could better understand the degree to which certain tasks and task features might be considered as blueprints in terms of being pedagogical tools, and what the specificity of the computer might be throughout the processes of collaborative activity. This section describes the procedures for data analysis and is organised according to the research questions (see section 3.2 above).

In preparation for analysis, the 12 recorded interactions which comprised the study corpus were transcribed and prepared for use in two different software packages that aided data management and analysis, *N5* (a package for qualitative data analysis from QSR) and the spreadsheet application *Excel* from Microsoft.

3.4.1 Degree of collaboration across the tasks and mediums

The degree of collaboration in the study refers to a dual dimension during interaction, a) the social relationships developed among the participants, i.e. did they collaborate, compete, argue, etc. and b) what the focus of those social relationships was, e.g. the task, the target language, social conversation. In order to assess and compare the degree of collaboration and foci of interaction among tasks and between mediums, the data were coded for *language related talk* (following Swain and Lapkin, 1995, any talk about the language students are producing, any language-related questioning, or when they other - or self-correct their language production), *task related talk* (talk specifically related to task implementation, i.e. about content, problem-solving activity, or simply carrying out the task without focusing on the target language), and *off-task talk.* Subsequently, percentages of the foci of talk across the data were calculated in order to gain a

quantitative perspective of the relationships between type of task and medium of implementation, and the foci of talk supported. These percentages were calculated taking the *text unit*[2] as the unit for analysis. The *text unit* was adopted for this kind of quantification rather than the speech turn, because that is the unit utilised by N5, the software package through which data were managed.

The information outlined above provided a general understanding of patterns and relationships between task types, specific task features, and medium of implementation and also highlighted some individual traits emerging from particular dyads/groups. However, further inquiry was necessary to investigate *how* and *to what degree* learners engaged in the specific kind of collaboration conducive to knowledge co-construction.

3.4.1.1 Semiotic mediational mechanisms deployed in collaborative activity

From a Vygotskian perspective the co-construction of knowledge is always mediated by either physical and/or psychological tools; therefore the study of these tools as personal and social resources for the construction of knowledge (*cf.* Mercer, 1995, 1996; Kumpulainen and Mutanen, 2000) is an essential step to understand this knowledge building and the dynamic processes of interaction where it takes place. Second language learning researchers interested in mediated activity have identified the use of *repetition*, *L1*, *reading aloud* and *private speech* as particularly important in the co-construction of knowledge (*cf.* Swain and Lapkin, 2000; Roebuck, 2000; Frawley, 1992; DiCamilla and Anton, 1997). Preliminary analysis of our data also showed that these features, and others such as discourse markers and pauses, were constantly being deployed among the participants and merited detailed examination. Quantitative and qualitative analyses per protocol, per task, and per medium of implementation were therefore carried out. The corpus was coded for *repetition*, *L1*, and *reading aloud* in N5, which uses the line as the smallest possible *text unit* for coding and analysis purposes. Percentages of the three semiotic mediational mechanisms in each protocol was therefore calculated in relation to

[2] In N5 a line is a text unit "of at most 74 characters in length (including spaces)" QSR International Pty Ltd© 1980-2000. A text unit, therefore, does NOT necessarily correspond to a speech turn.

the number of text units of each mechanism, as part of the total amount of text units in each protocol; private speech, discourse markers (often manifested through L1, reading aloud and/or repetition) and pauses were qualitatively analysed throughout the study.

In relation to *repetition*, and for coding purposes, any text unit that contained self-repetition or that was part of an exchange where allo-repetition (repetition of what others say) was deployed was coded as *repetition* regardless of whether it was self or allo. To exemplify the procedure, the following text units were all coded as *repetition* for counting purposes although a) was treated as self-repetition and b) was treated as allo-repetition throughout the subsequent qualitative functional analysis.

a) self-repetition (1 text unit)

G: team eh "es el (.) es el (.) es el" (.) so "para mi lo más
team eh "*is the* (.)*is the* (.) *is the* " (.) so "to me the most

b) allo-repetition (5 text units)

J: estuvo (.) estuvo
(s/he) was (.) (s/he) was
N: estuVO,
(s/he) was
J: estuvo dos ((pause)) yo estuve=
(s/he) was two ((pause)) I was=
N: =estuVIO=
=wAS=
J: =estuVE
=I wAS

In relation to use of *L1*, any text unit that contained one or more words in English was coded as *English* regardless of the exact number of English words in that text unit. A single word such as "OK", for example, might not have the same qualitative weight as a several-word utterance in the L1; however such qualitative differences in the use of English throughout activity were studied at the core of the analytical process. For *reading aloud*, any text unit that contained one or more words where learners were

reading text from the screen/paper was coded as reading aloud. Due to their situated role, other features of language that mediated collaborative activity such as private speech, discourse markers and pauses were analysed and discussed as part of the ongoing qualitative analysis throughout the study, but they were not quantified.

This preliminary coding procedure allowed me to effectively locate specific features throughout the data on the one hand, and to quantify them on the other. A shortcoming of the quantitative analysis was that it highlighted the constant use of certain linguistic features during task implementation, and this fact is useful in suggesting a possible point of departure for qualitative analysis, but the figures do not enlighten us as to *how* and *why* the mechanisms are deployed. Because I was interested in studying the processes of collaborative activity across the tasks and mediums, it was of paramount importance that a qualitative analysis was performed.

Having located the specific mechanisms, a system of coding based on functional categories (for definition and exemplification of each functional category refer to appendix five) was developed combining two methods. On the one hand some categories were adopted from previous research (see above) and on the other, categories were created as they emerged from the data itself. For validity and reliability purposes, the process for developing the coding scheme entailed various stages where categories were defined, checked, and refined until we (supervisor and researcher) were confident the system worked and could be applied to the data reliably, e.g. two protocols were independently coded and results compared.

Although analysis of functions is not without controversy since it might lead to de-contextualised segmentation of data, I believe, like Coll and Onrubia (1997:52), in "the need to focus attention (in terms of both theory and empirical analysis) on the functions and uses of language...[which] are at all times established directly in relation to [the] context and the activity which forms a part of it." Functional categorisation was not made upon text unit bases (as was done to calculate percentages of semiotic mechanisms within each protocol); instead, it was developed in relation to *instances*. The *instance,* as a unit of analysis, might consist of one or many text units involved in a specific functional category, moreover the same *instance* (or part of it) might be recoded within different categories if learners are deploying a mechanism for simultaneous purposes.

The following example of repetition illustrates the procedure where text units 40 to 57 count as *one instance* categorised as allo-repetition/ language related functions/ *language reflection* and text units 40-41 count as *one instance* of self-repetition/ task-implementation functions/ *to gain task control.*

40 G: el porque porque ((pause)) estuvo estuvo estuvar es

41 imperfecto? es imperfecto?

*the because because ((pause)) was was *to be is imperfect? is imperfect?*

42 C: esta? estuvo ((pause))

to be? was ((pause))

43 G: estuvo ((pause))

was ((pause))

44 C: umm ((pause))

45 G: estuvo estuvo

was was

46 C: con e?

with e?

47 G: pudo

could

48 C: pudo es ah

could is ah

49 G: pudo es umm pret

could is umm pret

50 C: preterit?

51 G: preterit?

52 C: preter

53 G: estuve? es

I was? is

54 C: esta

is

55 G: esta?

is?

56 C: esta

is

57 G: estuve estuvo ah si si estuvo ((pause)) pudo practicar

I was s/he was ah yes yes s/he was ((pause)) could practise

Once the semiotic mechanisms were quantified and qualified in terms of functional categories, further qualitative analyses were carried out in order to look at the findings within their specific contexts, as well as to establish patterns and differences across the three tasks in their two mediums of implementation (computer *versus* paper), and within the situated activity of each dyad/group. Although the isolation of specific semiotic tools and their functions facilitated description and analysis of collaborative activity, this practice was carried out within the wider context of linguistic mediation as a tool to implement the tasks and co-construct knowledge (see section 3.4.1.2 below). To summarise, analysis of semiotic mediation was carried out in the following stages:

1. semiotic mechanisms were identified in the twelve protocols, coded, and quantified;
2. *instances* were sorted into functional categories and quantified;
3. in-depth qualitative analysis was carried out.

3.4.1.2 Degree of engagement in High Quality Collaboration (HQC)

In order to assess the suitability of the tasks (and the impact of delivery medium) to support collaboration where learners, working within a zone of proximal development (ZPD) were able to co-construct language related knowledge, i.e. the value of the tasks to support High Quality Collaboration (HQC), see 3.4.1.3 below, it was necessary to revisit, and focus on, all the text units identified as *language related talk* (see 3.4.1). These text units were further segmented and coded into *episodes* following Swain (1998:70) who defines a language related episode (LRE) as "any part of a dialogue in which students talk about the language they are producing, question their language use, or other -or self- correct", and which focus on one "language item only" (Fortune and Thorp, 2001:146). Once LREs had been identified and quantified, it was necessary to "map" language related activity incorporating different axes for the analysis, classification, and evaluation of LREs in order to gain a deeper understanding about the "distinctive features of the interactions –[the] richness in the data which it is important to capture...[the features that] relate to both the 'value' and the 'nature' of the episodes" (*Ibid*:152).

LREs throughout each protocol were then categorised according to the following criteria:

- The episode *outcome*: correct, incorrect, or inconclusive. Episode outcome discrimination helped us gain a perspective on the tasks and target language in relation to difficulty levels, as well as information about the learners' goals, priorities, focus of attention, task motivation, e.g. as to when and why inconclusive LREs took place.
- The *socio-cognitive* axis upon which LREs were co-constructed: procedural or reflective (see examples in Figure 2 below). Classification of episodes along a continuum ranging from *procedural* to *reflective* provided information about the nature of collaboration to co-construct linguistic knowledge, the kind of semiotic mechanisms that mediated either procedural or reflective activity throughout the data, and the kind of cognitive processes learners activated to tackle the tasks. Following Mercer (1996) and his colleagues, and Kumpulainen and Mutanen (2000), I have defined *procedural* activity as perfunctory interaction where learners do not engage in overt reasoned consideration or reflective action whereas *reflective* activity is characterised by reasoning – to various degrees. Reflective activity is evident in interaction where learners attempt to overcome problems through language resources such as use of metalanguage, L1, and circumlocution among others. However, even when decision making processes are not always overt (e.g. through metalinguistic choices), this does not mean they are not at play (*cf.* Fortune and Thorp, 2001:151).

Figure 2: Socio-cognitive axis

procedural activity		***reflective activity***	
H:	ahhhm (.) tengo(.)que *ahhhm (.) I have (.)to*	G:	este está? **is is?*
h:	si *yes*	C:	está? *is?*
H:	aprender aprender (.) en el no *learn learn (.) in the no*	G:	estuvo?((pause)) *he was*
h:	pues *cause*	C:	qué tiempo, qué tiempo es? *what tense, what tense is it?*
H:	no	G:	es (.) no preterit? *it's (.) isn't it preterit?*
h:	no	C:	umm ((pause)) su padre no pudo *umm ((pause)) her father couldn't*

H:	no	G:	( )to come? because es pues pues ( )to come? because *it's cause cause*
h:	no te ent ((excited))tengo (.) tengo que aprender aleman (.) pues no te entiendo qué crees que tengo que aprender (.) si por qué no? ((they check what Helen typed)) *I don't und ((excited)) I have (.) have to learn German (.) cause I don't understand you what do you think that I have to learn (.) yes why not?*	C:	umm
H:	yeee	G:	el porque porque ((pause))estuvo estuvo estuvar es imperfecto? es imperfecto? *the because because ((pause))he was he was *to be is imperfect? is it imperfect?*

- Whether or not LREs were resolved within the learners' *zones of proximal development* (ZPD). In other words, whether or not learners achieved, through collaboration, language constructions and/or knowledge which were beyond their individual capabilities as evident at the beginning of the LRE in question. Examples are given in Figure 3.

Figure 3: Zone of proximal development

within ZPD		***outside ZPD***	
S:	tú (.) tú "puedo" **you (.) you "I can"*	G:	yeah ((pause)) "en los" años eighties (.) si? ((typing sound)) "los ejecutivos basaban su éxito en el" power dinero but now the intelligence and the initiative ((pause)) yeah ((pause)) "*in the*" *years* eighties (.) *yes*? ((typing)) "*executives based their success on*" power *money* but now the intelligence and the initiative ((pause))
C:	umm no(.) [it'd be yo *umm no(.) [it's be I* ((correct observation))	J:	son, "consideramos" **are, "we consider"*
S:	[tu "puedo asegurar" [*you "I can assure"	G:	yeah si (.) de yeah *yes (.) of*
L:	yeah it'd be=	J:	son ((typing)) es el **are ((typing)) is the*((they needed a pronoun not a verb))

C:	=yo *= I*		
S:	pero *but*		
L:	te puedo *I can* ((correct pronoun to indicate indirect object pronoun))		
C:	umm		
L:	I can asure you		
C:	si *yes*		
S:	uhum		
L:	cause it's got		
S:	yeah I can		
C:	asure (.) you		
L:	that ((pause))		

Mapping language related activity as described above provided an insight into the amount and quality of collaborative activity with respect to the research tasks -and mediums of delivery- as pedagogical instruments in the language classroom. The processes involved throughout this analytical method required a grounded approach to the data; a constant recursiveness between individual episodes and the situated activity upon which they were co-constructed, including the learners' perspectives - when available - as reflected in their post-task questionnaires (see 3.3.1.4.3), and the semiotic and/or physical (e.g. computer) mechanisms that mediated activity. To understand language related activity, it was necessary to study its socio-cognitive and socio-affective origins; this was the methodological rationale for studying dyadic collaboration as it evolved from beginning to end of task implementation. Studying how learners co-create a common ground upon which to tackle the task (Crook, 1994), including *off-task talk*, provides a foundation for understanding the origins of development (both linguistic and cognitive), e.g. how learners tackle problem-solving activity. This can only be achieved through the kind of microgenetic analysis deployed in the study.

3.4.1.3 Relevance of HQC in the processes of second language learning

For the purposes of the present study I have defined High Quality Collaboration (HQC) as collaboration where learners, working within a zone of proximal development (ZPD), are able to co-construct language related knowledge. This can be achieved through what

Donato (1994) has called "collective scaffolding", which is collaboration where several "novices" are able to empower each other by achieving as a dyad/group what they could not achieve individually; or by an individual "expert" providing the necessary assistance required by a "novice" to achieve any kind of language related development. In my view, and as the definition of HQC implies, *microgenesis* episodes (MGEs), i.e. episodes where the learning process towards internalisation *can be perceptible* to the researcher's eye, are not the exclusive manifestation of learners working within their ZPDs. This metaphoric socio-cognitive space is also "inhabited" by other LREs where learners achieve, through collaboration, language constructions which appeared to be beyond their individual capabilities as evident at the beginning of the LRE in question, but where the *process of change* as such is not overt. Figure 4 provides examples of the two kinds of LREs I have categorised as HQC.

Figure 4: High Quality Collaboration

microgenetic episode	***non-microgenetic LRE***
129 H: pero continuo (.) es el= *(but carried on (.) it's the=)*	65 E: ehhe "qué piensan ustedes acerca de lo que es importante" ((fading voice while reading instructions)) *ehhe "what do you think is important"* ((fading voice while reading instructions))
130 h: =no s no estoy seguro (.) continuo= *(=I'm no I'm not sure (.) carried on)*	66 M: um (.) ah (.) LE parece? ((pause)) o la A *um (.) ah (.) to her ((in Spanish indirect personal pronoun "le")) it seems? ((pause)) or the a*
131 H: =[gerundio *(=[gerund)*	67 E: a a mi (.) compañera ((pause)) LE si *to to my (.) classmate* ((pause)) le *yes*
132 h: [a leer? *([to read?)*	68 M: le parece? [si le parece *to her it seems? [yes to her it seems* ((using correct personal pronoun "le"))
133 H: después de [continuar *(after to [continue)*	69 E: [le parece porque es (.) indirecto ((pause)) que la inteligencia gencia es [más? *[to her it seems because it's (.) indirect ((pause)) that intelligence is [more?*
134 h: [continuar leyendo leer leyendo (.) leyendo?= *([to continue reading to read reading (.) reading?)*	

135	H: =si es leyendo porque es el gerun gerundio average(.) después de seguir y continuar ((she recalls? a grammar point studied in class)) =(*yes it's reading because it's the gerund* average *gerund (.) after to carry on and to continue*)	
129	h: pero continuo (.) es el= (*but carried on (.) it's the*=)	
130	H: =no s no estoy seguro (.) continuo= (*=I'm no I'm not sure (.) carried on*)	

In the microgenetic episode we are able to witness how Henry (h) progresses from being unable to produce the correct form in turns 130 and 132 to gaining control of the form and producing it correctly in turn 134 as a result of Hena's intervention (H) and the collective experience, which enables them to engage in a pedagogic routine. In the non-microgenetic example, on the other hand, the correct form is produced by Mina in turn 66, but she shows uncertainty (turns 66 and 68). Ellen takes Mina's suggestion and hesitation (t66) as a point of departure for reflective consideration (t67) that culminates in metalinguistic consolidation for both participants (t69). Although change is not "visible" in the episode, knowledge construction and consolidation are, as learners empower each other within a ZPD.

Methodologically therefore, the process of categorisation of HQC (and the other classifications described in this chapter) is simultaneously intertwined with qualitative analysis. The method was rooted in the work and notions conceptualised in fields such as psychology, education, and SLA, but was developed as analysis became more grounded in the data. Once the data had been classified, mapped, and quantified as described throughout this chapter, it was possible to study patterns and make comparisons that guided the report in relation to the generalization and singularity of findings across the tasks, in relation to delivery mediums, and when relevant, in terms of individual dyads/groups or students.

The analytical method developed and applied in the study provided the tools to observe and assess the relevance of HQC in the processes of SLL. To further focus on those processes, the Vygotskian concept of *microgenesis* was adopted to identify and study the unfolding of single language development events and the processes underlying them

while learners engaged in collaboration. Although quantitative analysis was carried out to gain a perspective of the amount of microgenetic episodes (MGEs) in relation to the total amount of LREs across tasks and delivery mediums, qualitative analysis of interaction foregrounded the investigation. Analysis involved the investigation of:

- the processes observed in MGEs and their particular characteristics;
- the nature of the linguistic events taking place; and
- the semiotic tools that mediated the co-construction of HQC;

Finally, possible sources of influence of collaborative activity upon individual achievement as reflected in the pre and post grammar tests (see 3.3.1.4.2) were investigated. The nature of the study, i.e. a classroom based investigation where learners were exposed to various sources of input as well as formal instruction throughout the semester, did not allow for direct association between collaborative activity as carried out during research task implementation and test performance. Nonetheless, it was important to investigate the different data sources that could suggest such links to enrich our understanding of the phenomena observed on the one hand, and to provide possible bases for future research. In this light, HQC episodes relating to target items (i.e. personal pronouns to include subject, direct and indirect object, prepositional and reflexive pronouns; infinitive verbs; radical changing verbs; and "ser" *versus* "estar") were quantified and evaluated against the total number of LREs and the total number of HQC episodes to analyse their relevance across the data. Subsequently, the episodes were investigated on an individual basis against the pre and post grammar tests and within the context of individual situated activity.

3.4.2 Impact of the computer as a mediational tool in the processes of collaborative activity

The second research question focused on the investigation of the computer as a mediational tool for collaboration in the language classroom. The relevance of the machine was assessed throughout all the stages of analysis as an integral aspect of the phenomena being investigated. However, the computer's impact was specifically studied through quantitative comparisons across the data in relation to its effect on talk

foci, i.e. language related talk, task related talk, and off-task conversation, as well as to the use of semiotic mechanisms mediating CALL activity. These analyses were carried out to inform us on possible advantages or drawbacks of using the computer to implement specific types of tasks.

The impact - and role(s) - of the computer upon situated activity, however, cannot be evaluated or understood through a series of quantifications alone, since a fundamental aspect of this understanding involves the learners' use of this sophisticated tool. Close scrutiny of the discourse throughout the computer-based protocols allowed me to study a) how students made use of the computer as a tool for mediation both between themselves, and/or between actions and knowledge; b) how students approached the computer in its role as tutor; and c) how the presence of the machine was manifested throughout interaction. Analytic description of relevant episodes was carried out and presented as vignettes.

3.5 Overview of Research Design and Conclusion

	Research Instruments	Research Questions Addressed	Data Analysis Processes
CORE INSTRUMENTS	Tasks	**Degree** of collaboration across tasks and mediums: • Evidence of collaboration (social relationships and foci of interaction) • Relationship between tasks/ mediums and collaboration patterns • Deployment of semiotic mechanisms across tasks/mediums • Degree of engagement in HQC • Relevance of HQC in the processes of SLL **Specificity** and role(s) of the computer throughout the processes of collaborative activity	**Quantitative** & **qualitative** analysis of transcribed audio-taped protocols of participants accomplishing tasks
	Linguistic Tests	**Potential** relevance of HQC in interlanguage development	**Quantitative** comparison of linguistic pre & post tests results **Qualitative** analysis of learners' performance in tests in relation to HQC

SUPLEMENTARY INSTRUMENTS	Questionnaire "Attitudes towards using computers"	**Exploration** of participants' attitudes towards the computer, collaboration, and Spanish grammar	**Recursive** examination and analysis of questionnaires to determine any significant pattern that might influence participants' accomplishment & perceptions of collaborative tasks
	Post-task questionnaires	**Exploration** of participants' perception of collaboration quality and learning outcomes	**Recursive** examination and analysis of questionnaires to assess participants' perceptions of collaboration & learning in the different tasks

The study set out to investigate collaborative activity and its relevance in second language learning as well as the impact of the computer as a tool for mediation. Sociocultural theory provides the theoretical and methodological frameworks that inform the study; from this stance development is always mediated, first achieved during social interaction and then internalised by the individual. In order to study how learners co-construct knowledge, it was necessary to record, transcribe, and examine the learners' interactions while completing three purposely designed research tasks delivered either via the computer or on paper. A combination of qualitative and quantitative techniques provided the means to investigate the processes that led to the learners' construction of common ground upon which to tackle the tasks and to the construction of linguistic knowledge. While microgenetic analysis enabled the study of processes and mediational tools (i.e. language and computer), quantification of relevant aspects of the data provided a perspective upon which to weigh the bearing of the findings.

In addition to outlining the rationale for the research design, this chapter has sought to provide a detailed description of the context in which the study took place and the procedures for data collection and analysis so that the reader can exercise his/her own judgement as to the extent of transferability of our findings. The next chapter presents and discusses the results of the investigation.

4 Results and Discussion (Part I)

4.1 Introduction

In the following two chapters (4 and 5) I will present and discuss the results of the investigation. Chapter 4 presents the results in relation to the degree of collaboration across the tasks and mediums of implementation and includes the analysis of semiotic mediational mechanisms deployed in collaborative activity. Chapter 5 looks at the degree of engagement in High Quality Collaboration (HQC, section 5.2), and presents an analysis of language related activity and microgenesis (section 5.3). Section 5.4 looks at the role and impact of the computer in collaborative activity; and finally, section 5.5 presents a concluding review of the three tasks to include specific aspects that were not discussed in the previous sections. I will begin this chapter with a recapitulation of the aims and objectives of the study.

4.2 Aims and Objectives

The present study investigated collaborative activity in a Spanish foreign language classroom as learners worked in dyads/triads across three different problem-solving tasks throughout an academic semester at university intermediate level. The tasks were delivered in two different mediums, via a computer and on paper, for comparative purposes. The investigation was framed within a Sociocultural approach to second language learning which underlines the notions that learning and development are first achieved through social interaction, and then internalised by the individual, and that the co-construction of knowledge is always mediated by either physical or psychological tools. The study set out to investigate the processes of collaborative activity and its relevance to foreign language learning, as well as the impact of the computer as a mediational tool during collaboration. The data corpus comprised the recorded interaction of twelve pairs/trios of students working on the research tasks, six delivered on paper and six delivered via the computer. Therefore four protocols, two paper and two computer-based, were analysed for each of the three tasks.

The first objective was to study collaborative activity across the three tasks in their two modes of implementation. Recent studies have identified certain kinds of interaction, e.g. "collaborative dialogue" (Swain, 1997); "collaborative scaffolding" (Donato, 1994); "assisted performance" (Ohta, 2001), as sources for possible restructuring of interlanguage. Following this line of inquiry, transcribed protocols of the learners' interactions recorded during task implementation were analysed in order to identify the processes underlying the students' activity, the ways in which they deployed language as a mediational means to engage in collaboration, and ultimately to assess the degree and quality of collaboration across the tasks and mediums. The goal was to determine the value of the tasks as pedagogical instruments to support collaborative activity in the foreign language classroom, and the value of collaborative activity, from a Sociocultural perspective, as a means to enable interlanguage development, i.e. microgenesis. Although the protocols were the main research instrument, especially to investigate language learning as it might happen during inter-mental activity, pre and post grammar tests focusing on four target structures (personal pronouns, radical changing verbs, infinitives, and "ser" *versus* "estar") were administered at the beginning and at the end of the academic term, i.e. before and after participants worked on the tasks, which also focused on those structures. The purpose of the tests was to assess the learners' individual performance in relation to those structures on the one hand, and to identify any possible influence of collaborative activity during task implementation on the participants' interlanguage in relation to the target language foci. Finally, the perception of the students in relation to their language learning, the tasks, collaboration, and medium (computer or paper) was sought by means of a third research instrument, post-task questionnaires completed at the end of each research session.

The three instruments allowed the researcher to investigate the research issues from different perspectives, and importantly, in different performance conditions. In other words, the main data (transcribed protocols) was gathered while students were working on the tasks, which provided access to interaction as it took place in the classroom; the grammar pre and post tests allowed the researcher to assess degree of progress, albeit influenced by general work during the academic semester both inside and outside the classroom; and the post-task questionnaires provided an insight into what the participants themselves felt they had learned, and wished to communicate in relation to the tasks.

The second research focus was the investigation of the computer as a mediational tool for collaboration in the classroom. I was interested in assessing the impact of the machine in dyadic collaboration, as well as investigating the computer's role as part of the interactive process. The computer was investigated in its role as tool for mediation both between the students themselves, and also between the actions they undertook while completing the tasks and the co-construction of knowledge. In other words, how the computer was deployed to organise activity and interaction, and how it provided support for dialogue, attention, thinking, and communication. The study also considered the way in which learners approached the machine in its role as tutor, i.e. as a provider of information and of feedback. Finally, the impact of the computer upon interaction was assessed to determine its possible effects upon cognitive processes during collaboration. In addition to the research instruments previously described, a general questionnaire entitled "Attitudes towards using computers" was administered at the beginning of the semester prior to research task implementation. The first section in the questionnaire gathered personal information such as name, age, degree being studied, and year of study at the university. The remaining sections comprised questions both in terms of students' knowledge of computers and amount of time spent daily at the computer as well as attitudes towards the computer and some of its applications, attitudes towards working in pairs, and students' thoughts in relation to learning Spanish grammar, so that possible sources of influence upon the computer's role during collaborative activity could be identified. The research questions posed at the beginning of the dissertation are hereby reproduced for ease of reference:

1. To what degree do the three different tasks in the two mediums of implementation –computer and non-computer based- support collaborative work in the classroom?

    a) How do learners deploy semiotic mediational mechanisms such as repetition, L1, and reading aloud in the context of collaborative activity?
    b) To what degree do participants engage in High Quality Collaboration (HQC)?
    c) What is the significance of HQC in the processes of second language learning?

2. What is the importance of the computer as a mediational tool in the processes of collaborative activity?

4.3 Degree of collaboration across the tasks and mediums

The first research question in the study related to the degree of collaboration supported by the three different research tasks in their two mediums of implementation, computer and paper-based. The question subsequently focused on a) the mediational mechanisms learners deployed to engage in collaboration, both to implement the task and to co-construct HQC; b) the degree to which participants engaged in HQC throughout the tasks; and c) the relevance of HQC in the processes of second language learning. This section summarises analysis results in terms of general interaction as reflected in the learners' talk, i.e. percentages of language related talk; percentages of off-task talk; and percentages of talk specifically related to task implementation, for instance about content, problem-solving activity, or simply to carry out the task without focusing on the target language. Before proceeding, it must be stated that no disputational talk or un-collaborative behaviour was identified in any of the transcribed protocols; all the participants in the study showed willingness to work as part of a team. Table 5 shows the time average spent per task within the 45-minute sessions where data collection took place, and the percentages of talk (calculated over total number of text units[3] in each protocol) relating to different foci.

Table 5: Talk percentages across the tasks

	Task 1 Average time spent on task: 30 min					Task 2 Average time spent on task: 26 min					Task 3 Average time spent on task: 23 min				
% of text units	CT1	2CT1	PT1	2PT1	**Global**	CT2	2CT2	PT2	2PT2	**Global**	CT3	2CT3	PT3	2PT3	**Global**
Language Related Talk	55	64	56	78	**63.25**	48	85	53	58	**61**	24	11	45	23	**25.75**
Task Related Talk	36	26	44	22	**32**	44	15	41	42	**35.5**	71	79	52	77	**69.75**
Off – Task Talk	9	10	0	0	**4.75**	8	0	6	0	**3.5**	5	10	3	0	**4.5**

Note: CT1 refers to *computer* task 1, PT1 to *paper* task 1, etc.

[3] In N5 a line is a text unit "of at most 74 characters in length (including spaces)" QSR International Pty Ltd © 1980 – 2000. A text unit, therefore, does NOT necessarily correspond to a speech turn.

As Table 5 shows, task 1, the interview reconstruction based on a gap filling format successfully provided the learners with opportunities to engage in language related talk. Most of their talk was focused on the target language (63.25 %) whereas 32 % addressed content issues brought up by the topic under discussion, and/or task management and instructions. A small percentage of talk (4.75%) was off-task which took place among learners working at the computer; although most of this talk was socially related, some of it was also due to computer distractions such as trying to find out how to typewrite orthographic accents. Task 2, based on a macro problem-solving task which included micro problem-solving language exercises, was also successful in providing learners with a platform for plenty of language related opportunities. An average of 61% of the text units comprising these four protocols focused on language related talk. Most of the task related talk, 35.5 % of the text units, was dedicated to working out the macro problem-solving task and some of it to discuss instructions and deduce how to carry out the task. A very low percentage of talk (3.5 %) was off-task; however, the dyad working at the computer spontaneously engaged in some socialising, whereas the paper-based dyad who engaged in off-task conversation did so only when they were waiting for the teacher to check their work. Finally, the focus of collaboration in task 3, a version of dictogloss, was very different from the previous tasks. Not only were the differences content related, but they were also related to the approach developed by the learners in the two different mediums, computer and paper. Most of the talk in task 3 (69.75 %) focused on the reconstruction of the text, but with the clear exception of a triad working on paper, the reconstruction was primarily seen as a memory test. Learners working at the computer were constrained by the medium to replicate –as opposed to recreate- the original text; this fact is reflected in the very low percentages of talk related to the target language (25.75 %). Although the balance shown by the triad working on paper was very different from computer-based learners since the former interpreted the task as a creative endeavour, the second paper-based dyad did not show the same degree of creativity, nor did they take advantage of the medium to reconstruct the text. Most of the off-task talk (4.5 %) also took place among learners working at the computer.

The above summary of results addresses the general issue relating to the degree of collaborative work supported by the three different research tasks and highlights the fact that the participants in the study indeed collaborated with their partners throughout. Tasks 1 and 2 supported more language related talk whereas task 3 was not as effective

for this purpose. In terms of medium of task implementation, people working on paper in task 1 engaged in a slightly higher degree of language related talk, but the medium did not appear to make an important difference to talk focus. Task 2 was similarly successful in supporting language related talk although for this task people working at the computer showed a higher degree of language related talk than their paper-based counterparts. Task 3 supported a much lower degree of language related talk and the medium –albeit not exclusively- had a big impact in the focus of collaboration. However, these results only show the degree and focus of talk across the tasks, but do not provide much light about the quality of that talk, which takes us to the following sections.

Two main issues that have been identified throughout the Sociocultural literature also became evident in the present study. Firstly, since not all interaction –or even collaboration- supports co-construction of knowledge, it is essential that we investigate the kind of collaboration that might do so in order to learn about second language learning processes; attention to semiotic mediation deployed by learners is fundamental in order to achieve the previous goal; and secondly, variation across the dyads/triads in relation to collaborative activity underlines the importance of studying pedagogic tasks as blueprints for situated activity which can only be fully assessed through qualitative inquiry. The remaining sections of this chapter synthesise and discuss the study findings in relation to these issues as well as the impact of the computer upon collaborative activity.

4.3.1 Semiotic mediational mechanisms deployed in collaborative activity

The second major aim of the study was to investigate how learners were making use of language to mediate collaborative activity and knowledge building in relation to the target language. From a Vygotskian perspective the co-construction of knowledge is always mediated by either physical and/or psychological tools; furthermore, in order to understand how cognitive development occurs and how knowledge becomes internalised from the inter-psychological to the intra-psychological plane it is necessary to study the social origins of cognitive development. For that purpose Vygotsky advocated

developmental analysis, i.e. the domain of microgenesis (*cf.* Robbins, 2001:26-29). As discussed in chapter 2, section 2.2.8.2, second language learning researchers studying mediated activity have identified the use of L1, repetition, and reading aloud as particularly important semiotic mechanisms in the co-construction of knowledge, for instance in the creation and maintenance of intersubjectivity, as tools for regulation and scaffolding, etc. (*cf.* Swain and Lapkin, 2000; DiCamilla and Anton, 1997; Frawley, 1992; Roebuck, 2000). Upon preliminary analysis of the data it became apparent that these mechanisms as well as other features such as discourse markers were being deployed by the participants and also played an important role during collaborative activity in our study. For this reason they were investigated so that we could determine their specific functions and prominence across the three tasks and mediums. Results of the analysis show that the participants deployed these mechanisms to a greater or lesser degree for specific functions within the following four main categories: socio-affective functions, meta-task functions, task-implementation functions, and language related functions. Other features of language that mediated collaborative activity such as private speech, discourse markers, and pauses were analysed and discussed as part of the ongoing qualitative analysis throughout the study due to their situated role and because the former two were usually manifested through repetition, L1, and reading aloud.

It has to be emphasised that the isolation of specific semiotic tools, and/or language functions is a practice carried out to facilitate the description and analysis of collaborative activity. However, the processes that learners activate through both single utterances and dialogic exchanges are complex and normally involve simultaneous functions and levels of activity. What is essential to bear in mind is that this activity is situated and culturally embedded. Table 6 shows the percentages of use of each of the semiotic tools across the protocols; the following sections will present and discuss the findings for each of the three main mediational mechanisms investigated throughout the study.

Table 6: Semiotic mechanisms in the three tasks (number and percentage of text units)

	CT1	2CT1	PT1	2PT1	CT2	2CT2	PT2	2PT2	CT3	2CT3	PT3	2PT3
Total No. text units	461	532	329	437	296	419	325	255	425	205	387	310
Repetition	122 (26%)	151 (28%)	57 (17%)	79 (18%)	84 (28%)	206 (49%)	55 (17%)	106 (41%)	144 (34%)	66 (32%)	137 (35%)	114 (37%)
L1	23 (5%)	154 (29%)	43 (13%)	103 (24%)	21 (7%)	30 (7%)	119 (36%)	31 (12%)	29 (7%)	14 (7%)	22 (6%)	114 (37%)
Reading aloud	105 (23%)	94 (18%)	46 (14%)	102 (23%)	30 (10%)	41 (10%)	13 (4%)	12 (5%)	5 (1%)	1 (0%)	0	22 (7%)

The three semiotic mechanisms shown in Table 6, repetition, use of L1, and reading aloud, account for 57% of the total amount of text units that comprised the data. 37% was made up of varied target language that formed part of the learners' proficiency in Spanish, and the remaining 6% was teacher's talk. Procedures for identification and coding of each of the mediational mechanisms are detailed in chapter 3 (Methodology). However, it is important to underline here the difference between the two units of analysis upon which the results and discussion of semiotic mechanisms will be presented below: *text units* and *instances*. While a *text unit* is a line of at most 74 characters in length, an *instance* might consist of one or as many text units carrying a specific functional category, moreover the same instance (or part of it) might be coded within different functional categories if learners are deploying such an instance for simultaneous purposes (see 3.4.1.1 above and Table 7 below). Whereas for quantification purposes the boundaries of the unit of analysis - i.e. *text unit* - are crucial, quantification of text units per *instance* was not relevant since I considered their qualitative character, e.g. functions, at the core of their importance for analysis.

4.3.1.1 Repetition as a mediational tool in collaborative activity

The functions of repetition as deployed by learners in the two modes of implementation were determined by taking the categories already documented in the literature as an analytical springboard, but keeping an open mind as to the situated functions emerging

from our data to develop other categories as appropriate. This categorisation[4] is organised as shown in Table 7 for ease of presentation and discussion of analysis in subsequent sections of this chapter. However, just as language in general is a tool that normally functions simultaneously at different levels, e.g. at cognitive and socio-cognitive levels, this specific semiotic feature usually aids learners to carry out processes that affect different dimensions of either or both inter-psychological and intra-psychological activity. Therefore, the categories illustrated in Table 7 are not necessarily mutually exclusive. The quantification of repetition instances and its functions enabled the researcher to study general patterns and characteristics in relation to the three different tasks and both modes of implementation.

Table 7: The *functions* of repetition in collaborative activity and number of *instances* across the 12 protocols

Allo-Repetition

Socio-Affective Functions		Meta-Task Functions		Task-Implementation Functions		Language Related Functions	
Agreement / Acknowledgement	126	Content generation	9	Attempting Consensus	9	Corrective feedback	15
Control Management	39	Organisational	13	Correction	2	Feedback acknowledgement	4
Emotional (relief/ humour)	13	Task evaluation	2	Focus tool	22	Language construction	18
				Text co-construction	32	Language practice	9
				To re-establish task implementation	5	Language reflection	77
						Semantic inquiry	5

Other Instances of Repetition 3

Self-Repetition

Agreement / Acknowledgement	23			Focus tool	23	Corrective feedback	3
Control Management	15			Mnemonic tool	10	Language construction	48
Emotional (relief/ humour)	11			Text co-construction	11	Language reflection	52
				To gain task control	51	Self-correction	13
				To re-establish task implementation	1	Semantic inquiry	15

Other Instances of Repetition 9

[4] For category definitions and exemplification refer to appendix five.

As can be seen in Table 7, the main functions of repetition both self and allo-repetition (repetition of what others say) throughout the tasks were the following; learners used it to for socio-affective purposes to express agreement and/or acknowledgement, as well as to show emotions such as relief or humour, they also deployed repetition for control management, for instance to "verbally" share and/or manage the writing or typewriting task. Meta-task functions, i.e. the co-creation of an infrastructure that then allowed learners to carry out the task were carried out exclusively through allo-repetition and included the generation of content, general task organisation, and task evaluation. Repetition helped learners to actually implement the task through the following functions, attempting consensus, as a focus tool, to co-construct text, and to re-establish task implementation when they had been distracted from the main task, for instance to deal with computer/keyboard matters; allo-repetition specifically was also used for correction, for example when one of the participants had not heard the other properly, whereas self-repetition itself was also used as a mnemonic tool. Finally, repetition was used throughout language related episodes (LREs) to provide corrective feedback and its acknowledgement, for language construction, to reflect on language, and for semantic inquiry. Allo-repetition was also deployed for language practice, e.g. pronunciation, with self-repetition also providing a means for self-correction. Examples of each individual category are provided in appendix five(a).

In spite of the fact that the percentage of repetition calculated over the actual number of *text units* in each protocol shows that tasks 2 and 3 had almost identical percentages of this semiotic tool (34.8 and 34.7 %) respectively, and in task 1 it was only 23.2 %, qualitative analysis in terms of total amount of *instances* (which could include any number of text units containing repetition, but were deployed to perform a particular function) provides a different, but in my opinion more accurate representation of the weight and value of repetition across the tasks to achieve different functions. Looking at repetition in terms of *instance* percentages based on the total number of repetition instances in the corpus (678), more repetition instances were identified in task 3 (256 or 37.7%) than instances in task 1 (221 or 32.5%) and task 2 (201 or 29.6%). In terms of medium there was a clear difference between computer-based learners' deployment of repetition (33%) and paper-based learners (27%). Although there is variation across dyads/groups (see 5.2) particularly in tasks 1 and 2, there are also some patterns that help us understand the use of this mechanism across the tasks and mediums.

The majority of repetition instances was used for language related functions, 257 instances across the 3 tasks although there is a contrast in relation to the mediums. Learners working at the computer in tasks 1 and 2 used repetition for language related functions much more than their counterparts on paper. This is the opposite of task 3 where learners working on paper used more repetition to work on the target language than learners doing task 3 at the computer. This fact is not surprising since the two dyads doing task 3 at the computer engaged in much less language related activity than any of the other dyads/groups in the study mainly because the computer in this task constrained them to interpret it as a text reconstruction from memory. Within the language related functional category, repetition was a very important tool for learners – particularly in tasks 1 and 2- to engage in what I have called "language reflection" which essentially encompasses an effort to verbally "highlight" words, or strings of language, hopefully to think about them, but otherwise to at least keep them in mind for mutual consideration. Repetition deployed for this purpose might be particularly supportive for learners at lower levels of language competence since they might not have the metalinguistic knowledge to contribute in this way during collaboration. However, if used in isolation, e.g. without L1, exemplification, etc. it might also provide a substitute for other means that could be more beneficial for the collective effort, such as trying to spell out more private thoughts about the language they are pondering about. Repetition, especially self-repetition, for language construction was the second most important function and it was particularly prevalent among learners working on the paper version of task 3. Repetition appears to be an anchor device that provides students with some extra time to put strings of language together without losing the floor, in the case of self-repetition, or as a means to build up cohesion in the case of allo-repetition. Once again the nature of tasks is reflected throughout this pattern in that tasks 3 and 2 allowed for more opportunities to co-construct longer strings of language rather than constraining the focus upon single gaps at any one time. Learners used self-repetition to clarify or request the meaning of unknown words, and repetition in general for self or other correction / feedback. Finally, it was occasionally used for language practice, e.g. pronunciation.

Our data analysis corroborates findings reported by DiCamilla and Anton (1997) in relation to the importance of repetition not only for the co-creation of common ground to

implement the tasks, but also for the co-construction and maintenance of scaffolding throughout task implementation. Maintaining interest in the task, keeping focused, providing encouragement and help, etc. are essential elements for all aspects of collaboration. Participants in our study used repetition effectively for the creation of socio-cognitive environments without which collaboration would not be feasible. I identified 237 instances of repetition serving socio-affective functions. It was primarily used for agreement / acknowledgment, and to simply "keep in contact" or share emotions with a partner through collaboration; there were no significant differences across tasks for these purposes, although learners working at the computer showed a much greater use of this mechanism particularly for agreement and emotional purposes such as showing frustration, or adding emphasis to agreements. Control management, for example to verbally share tasks such as typewriting / writing shows a similar pattern with the exception of a triad working on the paper version of task 3 where repetition was frequently used to control the pacing and act of writing. Across the rest of the data, it was learners at the computer that appeared to have a greater "need" for a verbal share of actions. What is clear throughout the data is that repetition supports the socio-cognitive infrastructure that enables learners to thread on collaborative activity in subtle, but powerful ways.

Repetition was also essential for the actual implementation of the task, for instance to co-construct text by repeating and adding language (task 3) or as a focus tool when students were trying to choose between one concept or another while deciding what they thought was more important in the world of work (task 1), for instance. These two functions were the most prominent within the task implementation category followed by the use of self- repetition to gain task control. To a lesser degree learners also deployed self-repetition specifically as a mnemonic device, for example trying to remember a name they had read in the dictogloss text (task 3). Finally, allo-repetition was occasionally used to attempt consensus, re-establish task implementation when this had been disrupted, and to correct an error caused by mishearing.

As noted above, learners working at the computer deployed repetition to a higher degree than their paper counterparts. This and other issues of particular significance in relation to the impact that the computer might have had on collaboration are explored in sections 4.3.1.4 and 5.4 below.

As was emphasised at the beginning of this chapter –and elsewhere in the study- the isolation of specific semiotic tools (e.g. repetition), and/or language functions is a practice carried out to facilitate the description and analysis of collaborative activity and, as such, needs to be studied within the wider context of language teaching and learning in the classroom. Learners are constantly engaged in complex processes activated through interaction and mediated by language. Within this situated and culturally embedded activity students engage in what Ohta has called interactional routines (see Ohta, 2001:5-9). Interactional routines refer to activity students have probably engaged in throughout their educational history, and specifically, in their language classrooms. Repetition is an essential tool for enacting what I call pedagogic routines.

4.3.1.1.1 Pedagogic Routines

I have called this kind of dialogic exchanges pedagogic routines because they illustrate characteristic behaviours that are commonly present in the teaching-learning environment of the language classroom. Although the different excerpts below are unique because they address specific language problems being dealt with by the learners, they are common because they all share the deployment of empowering linguistic resources as learners seek the appropriation of the target language.

Making the problem manageable

The following routine illustrates how repetition is deployed by this triad as a multifunctional tool for scaffolding lead by the acting "expert" in the group, P. Repetition is used to provide corrective feedback; to practice language after modelling, e.g. pronunciation; to get further assistance; and to provide explanatory tutoring and language reflection. In this excerpt learners are working on the description of Londoners as part of a text they are writing about London.

Excerpt 1 (PT3)[5]

326	P	son um ((pause)) sonrientes, are um ((pause)) smiling,
327	J	son sonrentes, *are smiling, ((wrongly pronounced))*
328	P	sonrientes *smiling*
329	A	sonrientes *smiling*
330	J	um sonrientes, *um smiling,*
331	P	son ri en tes es sonreír son ri en tes *smi ling it's to smile smi ling*
332	J	sonrientes *smiling*
333	A	sonrientes *smiling*
334	P	si ((pause)) *yes*

Paul becomes an expert in this dialogic exchange after he realises Jack is having problems with the word "sonrientes" (smiling) in Spanish. Paul suggested this description of Londoners in turn 326, and –as a good listener- he hears a pronunciation discrepancy in Jack's acknowledging repetition in turn 327. Paul adopts a tutorial role in the interaction and proceeds to assist his classmate. He first provides corrective feedback (turn 328) by repeating the word for Jack and at this moment Alex also joins the routine (turn 329) –probably to practise himself; he does not join the tutorial routine lead by Paul. Just like learners do in language classrooms, Jack repeats the corrected version of the word, but with rising intonation, expecting thus further feedback from the expert. Not only are his feedback expectations fulfilled, but he receives more targeted assistance consisting of a syllabic pronunciation of the word plus a tutorial explanation when Paul describes in turn 331 where the form of the adjective in question comes from, the verb "sonreír" (to smile) and a final extra modelling of the adjective which Jack dully repeats again in turn 332. Alex repeats as well (turn 333) and finally, Paul closes the routine by accepting the pronunciation of his classmates.

[5] The source of excerpts is indicated in capital letters, e.g. PT3: paper-based task 3; CT3: computer-based task 3.

This is an example of how effective collaborative activity can be when learners are able to progress by taking advantage of scaffolded assistance provided by a more knowledgeable peer. It also shows how learners that are not necessarily involved in a particular exchange –in this case Alex - might also benefit by indirectly receiving the help being directed to others. This has been studied and documented by Ohta (2001) who by examining private speech in her data demonstrates how learners notice corrective feedback that had not been addressed to them, but to other classmates (2001:172–173) and she also points at the fact that although learners might also pick up their classmates' errors, her data show the benefits of collaborative activity "outweigh any problems that emerge" (2001:113).

Seeking assistance

In Excerpt 1 we witnessed the processes enabled by a knowledgeable peer that was able to perceive a mistake made by his classmate and provide the necessary scaffolding to help him achieve a language correction and even potentially internalize the form thanks to the graded, reflective nature of the assistance. In Excerpt 2 help is sought rather than offered. Both self and allo-repetition are the mechanisms through which learners reconstruct the text (turns 37-43), and they also use repetition in the collective to focus on form and respond to a call for assistance.

Excerpt 2 (PT3)

37	P	de la bella *of the beautiful*
38	A	de la de la de la *of the of the of the*
39	P	de la belleza de *of the beauty of*
40	A	de la belleza *of the beauty*
41	P	belleza *beauty*
42	J	de la ciudad *of the city*
43	A	de la ciudad si *of the city yes*
44	P	de los *of the*

45	J	*what*
46	A	de la de la belleza b e *of the beauty b e*
47	P	b e
48	A	si b e *yes b e*
49	J	cómo se escribe? *how do you spell it?*
50	P	eh b e *double* l ((pause)) e z a
51	J	ah belleza *ah beauty*
52	P	belleza *beauty*
53	J	[eh
54	A	[de la ciudad *[of the city*
55	J	si de la ciudad *yes of the city*

There is a difference with respect to the language gap regarding the word "belleza" (beauty) that exists between Paul and Alex on the one hand, and Jack on the other. Whereas the former noticed the word in the original text, it is difficult to believe Jack did since he is not able to match it against his current knowledge –even when Paul and Alex have been repeating it- until later in the exchange (t51) where there are signs of microgenetic development taking place (refer to 5.3.2). In turn 46 Alex begins dictating the phrase to Jack who tries to write, but is having problems with the word, he writes "pa" on their paper sheet and later crosses it out. In turns 47 and 48 Paul and Alex use repetition to spell the beginning of "belleza" –they must be looking at the paper Jack is writing on- without realising yet Jack is having problems with the whole word, not just the beginning. Jack therefore seeks help overtly in turn 49 by asking how to spell the word. Paul helps (t50) and Jack finally achieves regulation through more repetition (t51). This regulatory routine comprises repetition to provide help by isolating the problematic word from its contextual phrase in order to assist the novice.

Talking to the self

Excerpt 3 represents an example of a pedagogic routine where repetition appears to be deployed as a tool for acquisition by reinforcing to the self the modified input that has just been provided by the partner. This routine involves the use of private speech for the

achievement of self-regulation in response to an incidental recast[6]. In turn 132 Alex produces an incidental recast of the definite article "las" (the) while deploying allo-repetition to build upon his classmate's language and add to the text they are reconstructing. This personal learning routine for Jack is grounded on the incidental "teaching" of his classmate during inter-mental activity, and transformed into a learning affordance by himself through self-repetition of the correct form.

Excerpt 3 (PT3)

131	J	=las las mexicanos *=mexican ((using wrong definite article))*
132	A	los mexicanos [son morenos *mexican [are dark ((using correct definite article))*
133	J	[ah los mexicanos *[ah mexican ((using correct definite article))*

Activating memory

Self-repetition in Excerpt 4 is deployed as a psychological tool for vocabulary retrieval. It is particularly interesting that Mina's personal strategy of sounding out the word to trigger her memory is also taken up by Ellen as an assistance strategy "tailored" to the partner's needs. In spite of the fact that Ellen cannot provide more targeted help to Mina -who is really struggling as her use of L1 in turn 178 also suggests- she shows pedagogical sensitivity to her classmate. Because Ellen did not re-read the paragraph Mina is reconstructing, her assistance to Mina could have been either too limited or simply non-existent. However, in turn 181 Ellen deploys her partner's chosen strategy for retrieval, and not only does this prove to be effective –they recall the word- but it also shows the reciprocal influence learners have on each other. Whereas Mina takes Ellen cognitively on board in terms of strategic choice, Ellen is able to produce the word they need by adopting the other's cognitive behaviour.

[6] Incidental recast has been defined by Ohta as "an utterance that incidentally contrasts with the learner's erroneous utterance and is not in reponse to it" (2001: 141).

Excerpt 4 (CT3)

178	M	something like bielas bielas belas bellias
179	E	dónde *where*
180	M	no se ((e laughs)) que *I don't know ((e laughs)) that/what*
181	E	bel bel bel bellias?
182	M	no no e
183	E	bellas
184	M	si *yes*

Sounding out a word to trigger memory has also been reported as a successful strategy for lexical self-initiated self-repair in dyadic discourse by Buckwalter (2001). She reports that when the items in question were in a "stage of acquisition", learners "seemed to prefer to come up with the item on their own" (Buckwalter, 2001:387). To that effect, learners use –for example- long pauses before releasing the item they are searching for in the L1, and just immediately before providing alternatives themselves so that the partner does not interrupt the cognitive process, presumably. This is of particular interest in our study because Mina and Ellen who are working at the computer do not seem –and indeed Ellen expresses- to be engaged in a language learning task as such, they just want to complete the text reconstruction which they see as a memory task. Although it is evident in this exchange that learners are collaborating, engaging in cognitive strategy, and even focusing on a particular linguistic item, if the task and/or context of implementation fails to involve the students' goals and motives into language learning activity as such, the learning environment must be modified.

Experimenting with language

In her examination of the cognitive underpinnings of focus on form in relation to second language instruction, Doughty (2001:206-257) refers to macro and micro-processes that have been identified as potentially important for successful language learning. In this section I am alluding to two of such processes that are particularly relevant in the following pedagogic routine (Excerpt 5): matching up information against prior knowledge and selective attention. This dialogic exchange between Mina and Ellen arises as an offspring of the computerised feedback they are receiving and represents a

genuine communicative desire of Mina's to express herself in the target language, thus its particular importance.

Excerpt 5 (CT3)

346	M	si tu tienes pero el es el (.) wrong place? cómo se dice? *yes you have but the it's the (.) wrong place? how do you say it?*
347	E	el ah *the ah*
348	M	el el (.) lugar *the the (.) place*
349	E	malo lu (.) malo lugar? (.) no *bad pla (.) bad place? (.) no*
350	M	mm lugar incorrecto *mm incorrect place*
351	E	lugar incorrecto ((laughter)) *incorrect place ((laughter))*
352	M	no se *I don't know*
353	E	está en mal lugar? yo no sé *it's in a bad place? I don't know*
354	M	quizás *perhaps*

While comparing their text with the computer text, Mina points out at a word they correctly remembered, but which they wrote in the wrong place. Mina begins expressing her idea in turn 346 in Spanish and then realises she lacks the knowledge to continue in the target language. This realisation is marked by the deployment of self-repetition and a pause before resorting to private speech in a code-switching mode ("wrong place? cómo se dice?"). Her regulatory efforts partially pay off and she is able to produce one of the words she is searching for, the Spanish for place (lugar) in turn 348. This stage (the "noticing" stage) represents a pedagogical opportunity as described by Doughty: "ideally, focus on form should come at cognitively opportune times, i.e. when the intervention can somehow be seamless with processing for language learning, rather than at overtly intrusive moments" (2001:227). Unfortunately, there is no expert at hand for such intervention. However, not all is lost, their communicative efforts continue and presumably, their linguistic development continues as well: they engage in inter-mental cognitive mapping.

By means of repetition both Ellen and Mina begin "experimenting" with their interlanguage and hypothesising by exchanging the long and short form of the adjective "malo" (wrong/bad) with the noun making thus cognitive connections. For a literal translation they would have needed the short form "mal" before a masculine noun "lugar" (place) –which Ellen eventually utters. Their hypothesis testing is primarily based on literal translations where a native speaker would have probably used a different expression altogether. Nonetheless, there seems to be some restructuring (*cf.* McLaughlin, 1987) taking place as a grammatically correct sentence is produced by Ellen in turn 353 "está en mal lugar". The absence of an expert during these critical moments where there was a window of possibility for intervention means the learners are left unsure as to the accuracy/ appropriateness of their language as their expressions show in turns 353 and 354: "yo no sé" (I don't know) and "quizás" (perhaps). Whether or not there is language development is not clear, and that is why this particular episode was not considered a microgenesis example (see 5.3.2 below). However, it is clear these two learners are involved in a pedagogic exercise that arouse out of their own linguistic and communicative needs. This kind of event supports the idea of developing tailored tests based on the learners' protocols to assess language learning that includes the forms learners have focused on as Swain (1997) and Swain and Lapkin (2001) have advocated.

4.3.1.1.2 Conclusion

The analysis of repetition as a tool for dealing with linguistically motivated problem-solving has also allowed us to observe some of the ways in which learners engage in teaching-learning activity. The excerpts analysed in this section have been called *pedagogic routines* because they all show that learners working collaboratively in pairs or groups often enact the behaviours of the socio-cultural environment in which they have been immersed throughout their academic life. When there is an "expert" in a group, he/she naturally offers the kind of support that a tutor would, for instance. Furthermore, not only does collaborative activity benefit the "novices" in a particular situation, but it potentially benefits the acting "expert" by providing learners with opportunities to activate their linguistic knowledge to assist a weaker classmate, or simply contribute to dialogic activity. We have also seen how learners that are not even directly involved in a particular issue tend to join the routine and make it a personal

practice session as learners have been observed to do when immersed in classroom situations (*cf.* Ohta, 2001). So, motivated learners working in collaboration with their peers exploit occasions for learning by engaging in the kind of activity they have experienced throughout their educational life either in teacher-fronted classes or when given the opportunity to work with other students. It is, however, clear that learners need feedback at hand so that opportunities for learning when students appear to be in a potentially optimal condition for acquisition do not go wasted.

4.3.1.2 L1 as a mediational tool in collaborative activity

Different approaches and methods for second language teaching have –throughout the years- reflected various views as to how much or how little use of the L1 can be "allowed" in the classroom: one extreme of the spectrum being represented by the grammar-translation method and the other by the direct method, popular for Spanish teaching and which "prohibited any use of English in the classroom" (Ohta, 2001:236). Generally, use of the target language as much as possible is encouraged and it is up to particular institutions and/or teachers to either discourage L1 or completely try to ban it. Teachers that worry about its use tend to also worry about asking their students to work in pairs or groups because they believe students, given the opportunity, will shift into their L1 to perform the tasks (*cf.* Swain and Lapkin, 2000). Recent years, however, have seen closer examination into the purposes for which the L1 is deployed in interaction from a socio-cultural perspective.

The use of the L1 has often been attended to as part of the study of interaction and collaborative activity in general (Swain and Lapkin, 1982; Brooks and Donato, 1994; Brooks *et* al., 1997; De Guerrero and Villamil, 2000; Garcia and Asención, 2001; Buckwalter, 2001 among others). However, the importance of the first language as a mediational tool has become so apparent during collaborative activity that researchers have begun to specifically target its investigation (Anton and DiCamilla, 1998; Swain and Lapkin, 2000; Ohta, 2001). The L1 has been found to be a facilitator for cognitive activity, but also an important tool to build and maintain inter-subjectivity during interaction. The purpose of the following sections is to build on this kind of research by

examining the amount and use of English throughout our data and its effects on collaborative activity.

The participants carried out the tasks using mainly the target language although 16% of the total amount of text units in the corpus contained at least one word in English. There is, however, considerable variation across the protocols (see Table 6: Semiotic mechanisms in the three tasks above) in relation to both the amount and functional use of English. More English was deployed in task 1 (18%) than in task 2 (15%), and task 3 (13%). In relation to medium, paper-based participants deployed a much higher percentage of English (21%) than students working at the computer (11%). I will now discuss these results in the light of the functional analysis carried out.

Due to the fact that one of the objectives of the study was the investigation of *why* and *how* learners deployed linguistic mediational mechanisms during collaborative activity, qualitative analysis of L1 use was carried out in terms of *instances* rather than text units or speech turns, an instance being a functional unit that might contain more than one text unit. Furthermore, one instance might carry out more than one function. There was a total of 545 instances where learners made use of L1 across the data, see Table 8 below; for definitions and exemplification of each of the categories refer to appendix five(b).

Table 8: The *functions* of English in collaborative activity and number of *instances* across the 12 protocols

Socio-Affective Functions		**Meta-Task Functions**		**Task-Implementation Functions**		**Language Related Functions**	
Agreement / Acknowledgement	72	Task evaluation / comment	34	*Content discussion*	10	Confirmation request	9
Inter-personal contact / attention	31			Task management	81	Language question	20
General reply / comment	30			To gain task control	57	Language reflection	45
Off-task conversation	20					Spelling correction	1
						Translation	42
						Vocabulary translation	21
						Word search	26
Total	**153**		**34**		**148**		**164**

Socio-Affective Functions	Meta-Task Functions	Task-Implementation Functions	Language Related Functions	
			translation	
			Word search	26
Total	**153**	**34**	**148**	**164**

Other Instances of English:
Code-switching 2
Private speech 25
Unidentified 19
Total 46

As Table 8 shows, the most common use of L1 was for *language related functions* (164 instances, 30%). Above all, English was a tool for *language reflection*; when learners encountered problems with the target language, English mediated their attempts to overcome those problems and gain regulation. Secondly, they used *translation* of Spanish text surrounding a gap, for instance, as an aid to make sure they understood the context that would give them the clues to fill in the gaps. This use of L1 is particularly prominent in task 1 which is based on this type of exercise. *Vocabulary translation* was an important means of assistance both to provide it and to seek it, e.g. to confirm that the meaning of a word was understood; vocabulary translation can be an effective way to provide help when the student acting as an expert is focusing on something else and does not want to get distracted, for example. Also related to semantic work, learners used English to *search for words*. Finally, L1 was used to ask *questions* about the target language and seek confirmation about language speculation. The amount of English utilised for language related purposes reflects to a certain degree the nature of the tasks. The majority of L1 instances were identified in task 1 and most of these involved language related functions; task 1 (interview reconstruction) was based on a large number of gap filling questions and answers. In task 1 learners where constantly being guided to work on Spanish to complete the blanks whereas task 2 offered more variety of language exercises and a macro problem-solving task, and task 3 (dictogloss) was more open to interpretation from the learners.

The second most prominent use of L1 involved *socio-affective functions* (153 instances, 28%). In spite of the fact that the number of instances here is almost as high as the

number of instances described above for language related functions, it also includes many one word instances including words and markers such as ok, yes, yeah, etc. and, in my view it does not carry the same functional weight as the categories described above. A distinction can be made between socio-affective functions of L1 to express *agreement*, *acknowledgement*, and to simply show and maintain *inter-personal contact / attention*, and English used to make general *comments* and engage in *off-task conversation*. The former categories mainly comprising the use of mono syllabic markers whereas the latter being generally more complex expressions and language.

Task-implementation functions (148 instances, 27%) refer to the use of English to carry out the task as such. It included the use of L1 for *task management*, for instance deploying expressions such as "try that" to move the task along. Learners also resort to English *to gain task control* particularly in times of cognitive struggle where markers such as "so", and "then" are deployed, as well as using English to discuss task instructions, for example. Finally, L1 was occasionally used to *discuss content*, e.g. to express opinions and thoughts about topics emerging from the task such as the importance of certain concepts in the hierarchical exercise in task 1. In terms of *meta-task functions*, our fourth functional category, only 34 instances (6%) were identified. L1 was used for *task evaluation* and/or comments about the task they were carrying out. Other instances of English (46, 8%) included private speech; code-switching, where no functional reason was evident to the researcher; and other instances where learners used English, but the context did not allow for identification of a function either, e.g. undecipherable or poor quality recording.

The data reflects certain patterns and reasons across the tasks and mediums as to why learners might resort to L1 during collaborative activity. However, the use of this particular mechanism is highly dependent on individual learners and dyads/groups' needs, goals, and choices. As stated earlier in this section, learners working on task 1 relied on English to a greater extent than learners on tasks 2 and 3. Moreover, L1 was an important tool in task 1 for engagement in LREs; there are however some differences between learners working at the computer and learners working on the paper version of this task. Whereas computer-based learners mainly used L1 for translation purposes, in other words to regulate their understanding of text surrounding gaps on the monitor, learners working on paper used it for more varied purposes. Although paper-based

learners also translated text surrounding gaps, they equally used English to specifically translate vocabulary, and reflect on language, i.e. to pay overt attention to form and/or meaning while thinking about the target language and considering their answers which was not the case for people at the computer. This pattern was also reflected in task 2 with learners working on paper, who used L1 to reflect on language to a much higher degree than learners working at the computer. In the case of task 3, language related activity at the computer in general was considerably lower than for learners working on the paper dictogloss; use of L1 for this purpose was therefore minimum in the computer task 3 whereas paper-based learners used it for word searches, language questions, and to a lesser degree for confirmation requests and language reflection.

In relation to socio-affective functions across the tasks and mediums, L1 was a preferred tool to seek agreement and acknowledgement across the tasks, but overwhelmingly for people working on paper versions with the exception of task 1 where learners on the computer also used it to a high degree for these purposes although not as often as their paper counterparts. There were no striking differences across the tasks and mediums for other uses of L1 such as inter-personal contact, or general comments although learners working on the paper version of task 3 used it to a higher degree for general replies and comments than their other classmates. Finally, some off-task conversation was carried in English, particularly among learners working on computer task 1.

English use for task implementation functions was particularly deployed by learners working on tasks 1 and 3 which was surprising since task 2 had a more complex structure that included a macro problem-solving task and individual micro problem-solving exercises. Therefore, it offered more variety and opportunity for learners to make strategic choices as to how to implement it. There is a clear difference, however, between computer and paper based versions of task 2 where learners at the computer used a minimum amount of L1 for either task management or task control, they simply "followed" the computer without engaging in discussions or planning as to how to proceed. Learners on the paper version deployed L1 particularly to gain task control, for example to make sure they understood instructions. There was very little difference in the use of L1 between the mediums for task 1; all learners relied on it for task management and to gain task control to a similar degree. For learners doing the

dictogloss (task 3) L1 was very important in the paper version again for task management and control, but not for learners at the computer.

Finally, meta-task functions carried out in L1 were minimal across the data. Participants only deployed English for task evaluation and comment, particularly learners in task 1 at the computer. In the case of task 2, it was the learners working on paper who use L1 for this purpose, and learners in task 3 did so to a very low degree with a slightly higher amount in the paper version than the computer one.

4.3.1.2.1 Individual differences and the use of English

In her longitudinal study of 6 native speakers of English and 1 native speaker of Mandarin Chinese learning Japanese, Ohta underlines the importance of the materials and "instructional design" in the use of English during interaction, but she also states that "...there are strong individual differences. Different learners seem to have different thresholds of English use, with some using much less English and others using English much more frequently" (Ohta, 2001:235). The results of our study also show considerable variability among learners' use of English and individual preferences for its deployment. Table 9 shows the percentages of English used by each individual student across the tasks in which they participated. Percentages were calculated in relation to number of text units containing English over total number of text units uttered by each student per task and across tasks. Text units spoken by the teacher or other students that occasionally intervened in certain tasks were not taken into account for these calculations. The last column in the table also includes the proficiency results obtained by individual students in their grammar Spanish examination at the end of the semester. The exam results are provided in an effort to include all available information that might enlighten the analysis of English deployment as a mediational tool during collaborative activity.

Table 9: Amount of English use by individual students

Percentage of English per Task					
Student	Task 1 %	Task 2 %	Task 3 %	TOTAL across tasks %	Proficiency test results
Jean			42.4	42.4	46
Nora		37.5	34.8	36.3	53
Gill	36			36	55
Joe	28.2	48.5		35.8	39
Cleo	31.2			31.2	40
Lyn	30.6			30.6	50
Liam	25.2		6.5	17.2	51
Sue	16.5			16.5	66
Conny		13.8		13.8	28
Gem		11.8		11.8	46
Fred		8.6	10.7	9.5	40
Henry		9.5		9.5	50
Jack			9.4	9.4	32
Mina	3.5	8.1	8.8	6.7	59
Ellen	6.9	6.7	5.5	6.3	67
Hena	6.7	3.5		5.5	70
Alex			4.7	4.7	N/Available
Paul			4.2	4.2	40

Note: shading represents non-native speakers of English

Table 9 has been organised in descending order from students who used a higher percentage of English during their interaction to students who deployed very little English. Twelve protocols were selected for analysis in this project which meant that some of the students participated in just one of the research tasks while others worked on the three tasks. The results of their proficiency test at the end of the semester -shown in the last column- are based on a maximum of 100 points. The maximum grade was obtained by Hena with a mark of 70/100. Although it is beyond the scope of this investigation to examine the relationship between proficiency level and use of L1 in the language classroom, Spanish proficiency is a variable that has to be considered as part of the integral context in which learners performed the tasks. It is also necessary to highlight the fact that three of the students (Fred, Alex, and Paul) taking part in the research were not native speakers of English and therefore caution has to be applied in the analysis of these learners' use of English which, as shown in the chart, is very low.

How much English and for which purposes learners use it during collaboration seems to be influenced not only by task characteristics and mode of implementation, but also by students' individual preferences, motivations, and perceptions of task objectives and goals. What follows is a comparative exploration throughout Joe and Hena's interactions with their respective partners to demonstrate the apparent impact that individual differences in terms of English use had upon collaborative activity. These two learners were chosen to illustrate the analysis because they both worked on two out of the three tasks and in both modes of implementation computer and paper based. Joe is a high user of English (28.2 % in computer-based task 1 and 48.5 % in paper-based task 2) whereas Hena is a low user of English (6.7 % in paper-based task 1 and 3.5 % computer-based task 2).

Making sense of the task

Collaboration, as understood in this study, is characterised by the learners' creation of a common space within which understanding, mutual help, and language development can be founded. Successful and productive peer interaction incorporates dialogue that upholds cognitive activity. Mercer *et al.* (1999) have identified effective language deployed in collaborative reasoning as exploratory talk which they define as

> ...that in which partners engage critically but constructively with each other's ideas. Statements and suggestions are sought and offered for joint consideration... In exploratory talk, *knowledge is made publicly accountable* and *reasoning is visible in the talk* (their italics). (Mercer *et* al., 1999: 97).

Some of the ways in which Hena and Joe make sense of the task and the target language are reflected in the use of particular words such as *so, then, because, but*, and their equivalent terms in Spanish, *entonces, porque, pero*. Words like these as well as other expressions to link claims and reasons, e.g. "I think", have been studied in the context of exploratory talk to investigate how it is that knowledge is constructed and visible during interaction (Mercer, 1996; Wegerif and Mercer, 1997; Mercer *et* al., 1999). A key issue that differentiates cognitive activity –as discernible during collaboration- between Hena and Joe and their respective partners is *the code* in which they manifest it.

The way in which Hena and Joe use language to tackle task 2 provides an insight into how learners build upon their own sub-vocal and spoken reasoning, but crucially upon their classmates' vocalised cognitive activity to co-construct knowledge. In this section I use two excerpts, the first one carried out in Spanish, and the second one in both L1 and L2, to contrast and exemplify Hena and Joe's choices in situated activity. Task 2 was designed to provide learners with a space to work on the target language while providing an opportunity for them to have fun and use Spanish to solve a macro problem-solving task where they had to match the names of four girls with the languages they spoke and the instruments they played (refer to 3.3.1.4.1 for a detailed description). In order to accomplish the problem-solving task they needed clues that could be obtained by successfully completing grammar exercises (also of a problem-solving nature) such as gap-filling, jumbled sentences, and translation. Hena and her partner Henry (who is also a low user of English, see table above) work at the computer and engage in L2 reasoning to solve the macro task. Between both of them they use the word "entonces" (so/then) 25 times, 12 and 13 respectively. Excerpt 6 shows the culmination of their efforts and happens almost at the end of the session when they succeed in solving the problem.

Excerpt 6 (CT2)

205 Henry umm (.) ni Tere ni Elisa toca el clarinet (.) la hermana que habla español le gusta mucho su instrumento pues no tiene que cargarlo a sus clases de música=
umm (.) nor Tere nor Elisa play the clarinet (.) the sister that speaks Spanish likes her instrument very much since she doesn't have to carry it to her lessons=

206 Hena =[entonces es el piano
=[then it's the piano

207 Henry [entonces (primero) es piano si entonces la hermana que habla español (.) es (.) es una de tres no pero oh si=
[then (first) is the piano yes then the sister that speaks Spanish (.) is (.) is one of three no but oh yes=

208 Hena =es si
=is yes

209 Henry es Elisa o no no puede ser Elisa entonces Rita habla italiano no, ( ) toca el clarinet,
is Elisa or no no it can't be Elisa then Rita speaks Italian no, ( ) plays the clarinet,

210 Hena umm si(.) si
umm yes (.) yes

211 Henry italiano (.) entonces ella no puede hablar italiano
Italian (.) then she can't speak Italian

212 Hena uh hum entonces Ana habla francés=
uh hum then Ana speaks French=

213 Henry =y ella tampoco (.) entonces ella no puede hablar francés (.) es español o italiano francés
=and she either (.) then she can't speak French (.) is Spanish or Italian french
214 Hena francés porque Elisa toca el.. piano
French because Elisa plays the (.) piano
215 Henry si... umm ( ) ni español la hermana que toca el [clarinet no habla ni francés ni alemán
yes (.) umm ( ) nor Spanish the sister that plays the [clarinet doesn't speak nor French nor german
216 Hena [Tere toca Tere toca el violín porque porque piano es Elisa
[Tere plays Tere plays the violin because because piano is Elisa
217 Henry ah si
oh yes
218 Hena entonces la otra es Ana
then the other one is Ana

The excerpt above is a rich example of the kind of cognitive activity motivated learners engage in. Although they are facing a considerable challenge, they develop their dialogue, thoughts, and reasons in the target language. They use key words such as entonces (then/so); pero (but); and porque (because) to put forward their arguments, contrast each other's reasoning, and link their "claims to reasons" (Mercer *et* al., 1999). The above exchange shows the level of engagement and collaboration between the learners who even utter the word "entonces" simultaneously (turns 206-207). These turns suggest they are both thinking and paying attention to the other's words as a source of information because they use the word "entonces" to link prior reasoning, developed by Henry in turn 205 to a logical assertion in turns 206 and 207 –a pattern that continues throughout the exchange. Hena also uses the marker "porque" (because) in turns 214 and 216 to strengthen her argument and convey meaning of causality whereas Henry uses the contrastive marker "pero" (but) in turn 207 which suggests he is assessing conflicting thoughts. It has to be stressed, however, that Hena is a very strong learner as this kind of dialogue and her proficiency test score show. Therefore the level of regulation exercised by her and her partner, who is not as proficient as her, but is very motivated as well, does not reflect the majority of learners in the corpus.

Joe and Nora (his partner in task 2 and high user of English as well) approach the same task in a different way, among other reasons, because they worked on the paper-based version of the task and this meant they continuously had to wait for the teacher to check their exercises and provide them with the macro problem-solving clues. Furthermore,

Nora was confused and not very enthusiastic about the macro task and throughout the session expressed this with comments such as "I don't understand", "I'm just I still don't understand what she's on oh just let's get around this..." while Joe shows a preference for working at the computer: "isn't it supposed to be done with the computer I really don't know if I'm doing it right". Unlike Hena and Henry who first complete the grammar exercises and leave the macro problem-solving task to the end, Joe and Nora alternate between the two. Excerpt 7 is equivalent to Hena and Henry's above and although both learners, Nora below and Henry above, begin the exchange by reading aloud the clue provided, Nora's voice fades away in turn 189, probably as she got further involved in cognitive activity since in turn 191 she expresses excitement while she announces what she believes to be an answer to the problem ("piano"). She continues her utterance with an attempt to give the explanation behind her thought, her reasoning being introduced with the word "porque" (because). However, this utterance appears to be addressed to herself rather than to Joe. Like private speech, the utterance "piano porque no es posible tener que car sí español" (piano because it isn't possible to have to carr yes Spanish) is elliptical and does not make sense on its own. After Joe's sneeze, there is code-switching into English and she makes a further assertion which Joe challenges in English in turn 192.

Excerpt 7 (PT2)

189	N	gracias ((she smiles)) oh ((smiles)) "a la hermana que habla español le gusta mucho su instrumento pues no tiene que" ((goes on reading silently)) *thanks ((she smiles)) oh ((smiles)) "the sister who speaks Spanish likes her instrument very much since she doesn't have to" ((goes on reading silently))*
190	J	(a vivir) (to live)
191	N	aha aha ((excited)) piano porque no es posible tener que car sí español ((jamie sneezes)) she practices so we know that that's right *aha aha ((excited)) piano because it isn't possible to have to carr yes Spanish* ((Joe sneezes)) she practices so we know that that's right
192	J	how do you know Tere plays the piano?
193	N	porque a la hermana que habla español no tiene que cargarlo a sus clases de música you can take this you can take the clarinet but not piano *because the sister that speaks Spanish doesn't have to carry it to her music lessons* you can take this you can take the clarinet but not piano
194	J	yeah but how do you know that's Tere?
195	N	no I don't know it's that but I'm just doing it 'cause that's just a mess
196	J	all right
197	N	like so the piano and spanish ((murmurs something)) ok ((excited))

Although Joe's question is expressed in English, Nora introduces her answer in Spanish with the causality marker "porque" (because -turn 193), then reads the clue which is in Spanish, and finally switches into English to continue expressing her reasoning. Analysing Nora's turns 189, 191, and 193 it is possible to see how this student is breaking up task difficulty into more manageable segments for her. She alternates activity from social to individual planes as she is trying to work out a solution for the problem, and it is this dynamic cycle that leads her cognitive path. This is the clue she is reading: "A la hermana que habla español le gusta mucho su instrumento pues no tiene que cargarlo a sus clases de música" (the sister who speaks Spanish likes her instrument very much since she does not have to carry it to her lessons) and this is the chart they are completing:

NOMBRE	INSTRUMENTO	IDIOMA
Elisa		
Rita		
Ana		
Tere		

In turn 189 she moves from the inter-psychological plane (reading aloud) to the intra-psychological plane (silent reading) which could potentially increase her concentration capacity. This behaviour pays dividends in turn 191 when she enthusiastically utters the word "piano" moving to the social plane again while she also tries to explain to Joe –in Spanish- the reasoning behind her answer. Importantly, by trying to explain she becomes more confident about her answer because the explanation holds key information to solve the problem. Her utterance "piano porque no es posible tener que car sí español ((Joe sneezes)) she practices so we know that that's right" is simultaneously working at a communicative and cognitive level: "*no es posible tener que car" is the beginning of a reason linked to piano, i.e. it is not possible to carry a piano to the lesson. The syntactic structure of the sentence shows the juxtaposition of the socio-cognitive levels Nora is creating, in and because of the activity space she is inhabiting with Joe. She is rightly processing the clue "the sister...does not *have to* carry..." as impossibility of carrying a piano and expresses this in inaccurate Spanish that would translate as "it is not possible to have to carr" when she should have said "it is not possible to carry". She does not even finish uttering the word "cargarlo" –probably because at that point her mind has

also processed the necessary information to conclude that piano and Spanish might go together and so brings the inner thought to Joe with the second part of her Spanish utterance "sí español" (yes Spanish). The second part of this turn (still 191) is interrupted by Joe's sneeze after which Nora uses L1 to conclude her elucidation: "she practices so we know that that's right". Up to this point, Nora has been working on linking the last two out of the three constituents of the chart (name, instrument, language).

In turn 192, however, Joe questions the name "Tere" which Nora has probably written in the chart, and we then learn why in turn 195: "no I don't know it's that but I'm just doing it 'cause that's just a mess". We can only elucidate what her referent for "mess" is (e.g. the task), but what we can ascertain is that a manageable way for her to make sense of the problem-solving task was to concentrate on the information she could cognitively process at that moment in time. Throughout this exchange, L1 is Nora's tool to exercise regulation both over herself, and also over her classmate. English provides a means for self reassurance –of a process that was partially carried out in Spanish- while trying to explain her reasoning to Joe: "she practices so we know that that's right" –the last words "that's right" expressed with enthusiasm in turn 191- and "you can take this you can take the clarinet but not piano" (turn 193). English being deployed in dialogic events such as this provides learners who have not yet gained enough regulation in the target language with a complementary tool for tackling the task. Being able to use both languages allows learners who might otherwise give up the task due to frustration to move forward.

Facing challenges (or not)

Hena and Joe face challenges differently. Hena prefers to tackle problems in Spanish as a first choice and normally uses English as a regulatory tool as a second option. Joe's use of English as a mediational tool to solve problems is taken up more readily. As will be discussed below, Hena uses L1 as a tool to provide scaffolded help to her classmate rather than a first choice translation when facing language related challenges. When she feels insecure about her Spanish answers during task completion or Spanish use in general, she tends to use L1 as a tool to obtain feedback. The following two examples illustrate this point:

136	H	si ((pause)) que es estoy resfriada resfriada? cold? *yes ((pause)) that I've got a cold cold*? cold?
137	L	ah si? ah yes?

140	H	se como las personas en en el mundo (.) "en qué se basa hoy en día el éxito prof" ((reading rapidly, recapitulating)) "bueno para mi para mi lo más importante importante es el" trabajar en equipo? trabajo en equipo? *se ((reflexive pronoun)) like the people in in the worlds (.) "what is prof success based upon nowadays" ((recapitulating)) "well to me to me the most important important is the" work in a team? team work?*
141	L	si yes
142	H	team work?
143	L	yeah it makes sense

In both turns 136 and 142, English is not Hena's first choice, but a delayed mechanism to get some kind of feedback from her classmate. The first example (turn 136) is a very creative use of Spanish outside the boundaries of the task. Hena is making a comment about her sneezing and ventures the word "resfriada" which is perfectly correct. In the second example, the use of English in turn 142 is also deployed after she has been considering some alternatives in Spanish (turn 140). This time Liam provides a more reassuring response albeit in English.

When Joe and his partner face challenges during collaboration they tend to make use of English more promptly. In Excerpt 8 below Joe and Gill are working in a hierarchical task at the computer. The task is implemented as a drag-and-drop exercise that includes the option "otro" (other) among the concepts they are organising in order of relevance. This option was designed to give learners the opportunity to discuss their priorities in relation to the world of work. In turn 47 Gill suggests "variable" –probably meaning variety at work- as a possible concept denoted by the screen box marked "other". Although the cognate "variable" is identical in Spanish –except for pronunciation- Gill produces the word in English and continues to explain what she means by it in turn 49, also in English. Although Gill (herself a very high user of English, 36 % against 28.2 % for Joe) addresses Joe in English, in this occasion Joe experiments with a term in Spanish (turn 50), but they do not pursue the word search (what Joe proposes is not accurate):

Excerpt 8 (2CT1)

47	G	um el el otro um ((pause)) variab variable *um the the other um ((pause)) variab variable*
48	J	variable,
49	G	umm (.) you know wide ranging lots of things um
50	J	varios, es varios ((pause)) status (.) poder *varied, it's varied ((pause)) status (.) power*
51	G	int int interesante ((pause)) ((they laugh)) es opiniones si, ((laughs)) *int int interesting ((pause)) ((they laugh)) it's opinions yes, ((laughs))*
52	J	no se ((laughing)) *I don't know* ((laughing))
53	G	how can it be wrong, (.) ok ((laughing)) ((must have clicked the cross button))
54	J	it's a sensible answer ((they murmur and laugh))
55	G	ok umm (.) satisfacción personal yeah desarrollo intelectual (.) umm status poder o el dinero it's certainly not what I think (.) um
56	J	they programme to think ((laughs))

The second part of this exchange (turns 51–56) is marked by a pause and laughter when they try to check their drag-and-drop exercise and the computer rejects it. Instead of pressing the "avanzar" (advance) button, they pressed a different button on the screen expecting the machine to correct their answers; by doing that they reset the drag-and-drop boxes which they interpreted as a rejection of their answers. Although at the beginning of the challenge they kept to Spanish (turns 51-52) they then swapped to L1 to complain about the computer. What is particularly interesting about this type of code-switching is that learners appear to distance themselves and their opinion from the task – or what is happening in relation to the task- by means of their L1. In turn 51 Gill tries to make sense in Spanish of what the task required, "es opiniones si," (it's opinions, isn't it,) and then in turn 53 she begins expressing her dissatisfaction -in English- but gives in to the computer. While complaining about it she is prepared to change their original answers just to "please" the computer. This contrast in the use of the two languages provides an insight into how these learners appear to use L1 to deal with real opinions and the target language to address the contrived world of the classroom.

Lack of challenge (e.g. lack of interest in the task or confusion) also triggers an expression of reality which is consistently articulated in L1. In Excerpt 9 Joe and Nora (high user of English as well see table above) are engaged in a paper-based problem-solving task for which they need clues to be given by the teacher when they correctly complete some language exercises. They are struggling to understand what they have to

do in relation to the macro problem-solving task and they are both trying to gain task control through use of L1, but also showing their frustration in English (turns 41-42).

Excerpt 9 (PT2)

41	J	so she gives us the clues ah this is fun (cinco claves)
42	N	I'm just I still don't understand what she's on oh just let's get around this "su padre no pudo ir al concierto pues"
43	J	estoy está then está I thought it might be that
44	N	jugar
45	J	umm possibly ((pause)) wanna stop,
46	N	umm
47	J	let's just put lugar

The excerpt above reflects a lack of engagement partially caused by not having a clear idea of what exactly they need to do and how the macro problem-solving task relates to the language exercises. This confusion and lack of interest triggers deployment of L1 to make a series of comments that reflect their frustration as well as the kind of "strategy" learners adopt when facing these situations. In other words, their psychological mood is shown by expressions such as "oh just let's get around this..." (t42), "wanna stop," (t45), and "let's just put..." (t47) which suggest that learners are not carrying out the task as a learning enterprise, but as a task that has to be completed.

Self and Other: do learners influence each other in relation to L1 use?

Hena's partner in task 1, Liam, uses English to a much higher degree than her (25.2 % compared to 6.7 % for Hena). His English use, however, consists mostly of short expressions such as yeah, ok, sorry, etc. When he deploys more extended English utterances, e.g. "I bet it's a way of saying that...", they are normally for regulatory purposes in relation to the task. There is also a marked difference between his use of English in this task (1) and task 3 when he worked with a non-native speaker of English (only 6.5%). In task 1, Hena appears to be unaffected by the language in which she receives input from her partner even when Liam uses more English and sometimes addresses her in L1. She consistently maintains her use of Spanish as much as possible, only deploying English when this practice might help her scaffolding efforts or her own regulation.

In the case of Joe and Gill there does not seem to be a pattern of influence in terms of code-switching either. In other words, the fact that one student addresses the other in a particular language does not necessarily mean the reply will be in the same language. As we have seen throughout this chapter, the use of L1 appears to be governed by other factors including regulatory and personal styles. There are, however, sporadic occasions when some direct influence of the other might be taking place during interaction, one such instance is exemplified in Excerpt 10 below:

Excerpt 10 (2CT1)

167	G	shall we leave the mistakes shall we go? ((pause))
168	J	tenemos correctas las que tenemos *we have correct ones the ones we have*
169	G	these are correct yeah?
170	J	estas son *these are*
171	G	they are correct (.) or incorrect
172	J	no these are incorrect (.) el negro es correct (.) incorrect ((maybe pointing at blanks)) no these are incorrect (.) *black is* correct (.) incorrect ((maybe pointing at blanks))

In the excerpt above, Joe makes a comment in Spanish (t168) even when he has been addressed by Gill in English in turn 167. In turn 169 Gill continues to address Joe in English, but Joe keeps to his Spanish. However, the third time the pattern changes and Joe provides a mixed language response (t172). The continued use of English by Gill seems to have an effect on Joe who keeps Spanish for his own words ("el negro es") but picks up the words Gill utters in English and incorporates those in his utterance "these are incorrect ... correct ... incorrect" –with the exception of "these" which is a modification from "they" in turn 171. There is no other apparent reason for this change than Gill's direct influence, Joe knows the Spanish terms for the words he uses in English in turn 172 since he had already used them in the previous turns. It seems that Gill's insistence on a particular point in English had an effect on Joe.

Ohta (2001) was also interested in the possible influence learners might have on their partners in relation to the amount of English spoken during interaction, but she could not find any patterns either. What she perceived was that "learners choose to work with students who have a similar orientation toward peer learning tasks" (Ohta, 2001:248). Learners in my study kept a dynamic interactive flow in terms of work groupings during

their lessons. Two of them were an exception since they tended to work together most of the time and certainly did during the three research tasks although they also incorporated another classmate once. In general students seem to keep their individual styles and reasons for using –or not- L1 during collaboration with others.

Optimal use of L1 (language related functions)

What is the optimal use of L1 in collaborative tasks? When is English a facilitator of task performance and/or L2 development and when is it overused by learners at the risk of depriving them of opportunities to stretch their interlanguage, receive feedback, try out their hypotheses, etc.? These are some of the questions that need to be addressed if we are to be able to apply research to task design and implementation as well as make sound judgements in relation to the use of computers in the classroom. Use of English in our corpus provide tentative answers to some of these questions. The data show that unlike high users of L1, low users tend to deploy English as a last resource for both self and other regulation; this is illustrated in Excerpt 11[7] below:

Excerpt 11 (PT1)

	12	L	um qué es desarrollo intelectual? *um what's intellectual development*?
	13	H	es umm es como ((pause)) ah (.) que es umm que tu aprende ah durante ah su carrera= *it's umm it's like ((pause)) ah (.) that is umm that your learn ah during ah your career=*
	14	L	=ok
→	15	H	intellectual development
	16	L	ay yeah ((laughter))

Hena - as an acting expert in that particular situation - seizes an opportunity brought by Liam's vocabulary question in turn 12 to create a Zone of Proximal Development for both of them. In turn 13 she makes an effort to answer the question in Spanish by stretching her own use of the target language and providing input to Liam at the same time. However, she is sensitive enough to her partner's needs (probably picking up cues from Liam's hesitant OK) to realise that further scaffolded help is required and therefore

[7] This excerpt is analysed in further detail in 5.3.2.2.1.

produces a vocabulary translation in turn 15. In contrast, Joe tends to make use of translation as a first choice when facing similar situations:

Excerpt 12 (2CT1)

125 G ["lo más importante" es el (.) ah (.) "en equipo" (.) qué significa equipo?
["the most important" is the (.) ah (.) "in team work" (.) what does "equipo" *mean*?
126 J equipo, team

Caution, however, is required when assessing the possible reasons why learners resort to L1 in the first place since it might also be an indicator of what learners perceive the objectives of the task are and/or where their concentration should be. This is the case of Hena who normally exhausts her target language resources before deploying English, but on one occasion she seems to translate a vocabulary item straight away probably because she is focused on something else.

Knowing when English might empower either the individual –as in self-regulation- or the collaborative effort appears to be a crucial difference between low and high users of L1. Hena uses English both to help herself and the other as seen above, as well as to invite feedback and/or assistance as the following examples illustrate:

Excerpt 13 (PT1)

136 H si ((pause)) que es estoy resfriada resfriada? cold?
yes ((pause)) that I've got a cold cold? cold?
137 L ah si?
ah yes?

Excerpt 13 is a comment by Hena as a result of her sneezing. After using the expression "estoy resfriada" (I've got a cold) in turn 136, she finishes with the word "cold" and rising intonation. It is not possible to ascertain whether she was being sensitive to her classmate and making sure he understood the expression (quite advanced for lower intermediate students) or whether she was seeking feedback. Because of the nature of dialogic activity we can speculate that both reasons apply in different degrees. Hena seems to seize any opportunities –even socio-affective- to stretch her language. It has to

be noted that the high results in her proficiency test (70 over 100) are reflected in the kind of pro-active attitude she has in relation to her interactive performance throughout activity –yet another characteristic of low English users. The final excerpt in this section illustrates another effective use of L1 when she gains from its deployment by receiving help from her partner Has:

Excerpt 14 (CT2)

52	Hena	no no se los umm ((pause)) los commands
53	Henry	no nadar you mean umm imperativos
54	Hena	umm imperativos

Although her hesitation markers and pause suggest she is trying to communicate in Spanish, she realises she cannot and uses English to finish her utterance. Henry knows the metalinguistic term she was seeking (imperativos) and provides it in turn 54. She duly repeats the word in turn 54 to acknowledge her partner's help, and perhaps to internalise it as well.

While optimal use of L1 varies according to individual needs, styles, and particular circumstance in which L1 is deployed, our data suggest that low users of English tend to restrict its use as a tool for self and other regulation while high users also tend to make it a preferred means of general communication during interaction. English is effectively deployed in language related episodes as a mediational mechanism for providing scaffolded help, seeking assistance, and allowing learners to focus their cognitive resources on what they consider important at a particular moment by using this tool to provide requested help without having to engage in paraphrasing or circumlocution, for example.

4.3.1.2.2 Conclusion

Analysis of English use throughout the data support the concept that the L1 is an important mediational mechanism during collaborative activity (Anton and DiCamilla, 1998; Swain and Lapkin, 2000; Ohta, 2001) particularly at earlier stages of L2 learning. Like repetition, albeit to a lesser degree, English is deployed to co-create and maintain

the inter-subjective plane where learners can then engage in interaction. English is, however, strategically used during the processes of task implementation and language learning. In relation to task implementation, L1 is used for task management purposes that allow learners to discuss and engage in actions to move the task forward, and was also observed in language related matters where learners deployed L1 for scaffolding purposes as well as cognitive endeavour to gain self-regulation.

How much English and for what purposes learners use it during collaboration varies considerably from learner to learner and it is also influenced by the kind of task and exercise learners are engaged in at particular moments. Conditions such as boredom, having to wait for teacher feedback for a long time, and increased cognitive challenges appear to encourage more use of L1. Furthermore, high users of English seem to be influenced by task perceptions and goals, appearing to mark, through code use, the world of the classroom and the grammar task as separate from the "real" world. Although it is not possible to generalise as to what the optimal use of L1 in collaborative activity is – this partially depending on what individual learners need and gain from it- the data from stronger students, as reflected by their proficiency marks and participation in activity, suggest that L1 is particularly important for scaffolding assistance, cognitive regulation when learners face challenges, and socio-affective purposes.

4.3.1.3 Reading aloud as a mediational tool in collaborative activity

Reading aloud functions throughout the data were more limited than functions for repetition or L1. I have described reading aloud as a "working" tool that allowed learners to carry out aspects of the tasks such as the implementation of cloze exercises and the creation of a communal space to work on the macro problem-solving task. Importantly, the functional categories of task-implementation and language related functions had to be treated as a unit for analysis purposes since reading aloud was a supportive tool throughout the gap-filling exercises which intrinsically calls upon attention to pre-set target language aspects.

Table 10: The *functions* of reading aloud and the number of *instances* across the data

Socio-Affective Functions		Task-Implementation Functions	
Acknowledgement of the other's presence / creation of a bonding relationship for collaborative work	49	Gap-filling (language related functions)	235
		Problem-solving activity (and related instructions)	40
Total	**49**		**275**

There are important differences among the percentages of reading aloud across the tasks. The highest percentage was deployed in task 1 (20%) for the following purposes: to read language contextualising the gaps to be filled followed by either a suggestion to fill in the gap, or to read text to evaluate an answer given for a gap. A minimal amount of reading aloud in task 1 was used as a bonding tool, e.g. to keep in touch with the partner, or to read instructions while acknowledging the presence of the other. There is virtually no difference between the mediums in task 1, with 20% of the reading aloud carried out by people working at the computer and 19% by students working on the paper version.

The percentage of reading aloud in task 2 was much lower than in task 1, only 7%. Most of the reading was deployed for reading instructions, both to keep in touch with the partner, but also to maintain a collaborative bond while trying to make sense of the task. There were differences between the mediums in task 2; people at the computer felt a greater need for this than learners working on the paper version of the task with percentages being 10% against 4.5% respectively. Reading aloud was occasionally used to evaluate answers or contextualise suggestions.

Finally, a minimal amount of reading aloud was deployed in task 3 (2%) and this was mostly done by one triad working on paper. The occasional instances of reading aloud by people working at the computer were carried out to read feedback from the screen and twice to revise what they had written. In contrast the triad working on the paper version of the task deployed this semiotic mechanism to recapitulate on what they had co-constructed and also to move forward in terms of text creation. They also used it when revising and comparing their version of the text with the original.

4.3.1.3.1 Reading aloud as a bonding tool in the dialogic enterprise

Learners read aloud instructions, problem-solving keys, and feedback from the screen. In the case of instructions and problem-solving keys, reading aloud normally fades down as the person reading apparently becomes more cognitively engaged with trying to make sense of the information being received. Another characteristic of this kind of reading is that it sometimes appears when there have been some seconds of silence which indicates that learners are constantly aware of the need to send and receive inter-personal signals while working as a partnership or group. Excerpt 15 illustrates how this mediational mechanism is deployed:

Excerpt 15 (CT1)

63	E	"avanzar"= *"go forward"=*
64	M	=a claro *=oh of course*
65	E	ehhe "qué piensan ustedes acerca de lo que es importante" ((fading voice while reading instructions)) *ehhe "what do you think about what is important" ((fading voice))*
66	M	um (.) ah (.) LE parece? ((pause)) o la A *um (.) ah (.) **le** ((personal pronoun to him/her)) seems? ((pause)) or the **a***

Excerpt 15 - taken from computer-based task 1 - shows two aspects of reading aloud deployed for bonding and socio-affective purposes. In turn 63, the reading of the word "avanzar"(advance/continue) by Ellen exemplifies a common feature in the dialogue of students working at the computer. It appears that the verbalisation of commands (enabled by clicking on screen buttons) allows learners to balance the axis of control over the physical manipulation of the computer. If it is uttered as a request by one of the participants for his/her partner to manipulate the controls, this verbal feature allows the requester to play an active role during activity even if s/he is not in physical control of the mouse; in other words, speaking is a way of doing. When it is uttered by the participant who is in actual control of the mouse and/or keyboard, the verbalisation – which acknowledges the presence of the other during the collaborative act- implies an act of control sharing from the person who is in physical control. Manipulating the mouse or keyboard brings an alteration of the screen appearance either substantially by completely changing the visible frame, as would be the case of the "avanzar" button

since a different page would appear, or in the case of subtler changes such as pressing the button "pistas" (clues) which would make letters appear to help learners complete a box. It is therefore important during computer-mediated collaboration to establish and maintain a working space for all students to take part.

The fact that students do not feel the need to read aloud the whole of the instructions or keys, points towards this practice being implemented as a tool for socio-affective functions. Once again, reading aloud information that is simultaneously being accessed by both/all participants sustains the dialogic event. This reading practice enacts a deictic function: it is a verbal way of pointing to a partner where –in the context of the task- one is positioned.

4.3.1.3.2 Reading aloud as a working tool: task implementation and focus on form

Reading aloud is used as a mediational strategy that strongly supports the implementation of sub-task exercises delivered in a gap-filling (cloze) format. That is the reason why reading aloud is concentrated in task 1 protocols (with 214 instances). It was also identified in task 2 protocols, but to a much lesser extent (21 instances supporting the gap-filling sections).

Excerpt 16 illustrates the use or reading aloud to contextualise an answer, but also to isolate a chunk of language to reflect on an aspect of grammar, i.e. the use of the indirect object pronouns:

Excerpt 16 (CT1)

66	M	um (.) ah (.) LE "parece?" ((pause)) o la A *um (.) ah (.) to her ((in Spanish indirect personal pronoun "le")) it seems? ((pause)) or the a*
67	E	"a a mi (.) compañera" ((pause)) LE si" *"to to my (.) classmate"* ((pause)) le *yes*
68	M	le "parece?" [si le "parece" *to her "it seems? [yes to her it seems"* ((using correct personal pronoun "le"))
69	E	["le parece" porque es (.) indirecto ((pause)) "que la inteligencia gencia es" [más? *[to her it seems because it's (.) indirect ((pause)) "that intelligence is" [more?*

This particular example also includes the use of some metalinguistic talk by Ellen in turn 69 to provide further evidence as to the accuracy of their answer. Although in most cases, students do not make such explicit use of metalanguage, reading aloud is deployed as a tool that marks out language for exploratory reasons. Excerpt 16 shows how Ellen is making connections between the new experience she -and her classmate- is facing and grammatical knowledge she already possesses. It appears that collaborating in this gap-filling exercise where Mina forwards a suggestion (t66), Ellen evaluates it against her own knowledge through reading aloud contextualisation (t67), and the ability to match it with specific grammar information about the use of personal pronouns (t69) has facilitated the use and activation of the appropriate knowledge (*cf.* McCarthy, 1991).

4.3.1.4 Conclusion

As has been stressed throughout the study, the isolation of specific semiotic mechanisms and/ or language functions facilitated the description and analysis of collaborative activity and some of the ways in which learners co-constructed it while carrying out the tasks. However, the processes that learners activated by means of both individual utterances and dialogic exchanges are complex and normally involved simultaneous functions and activity that can only be grasped within the situated context in which they were embedded, hence the need for qualitative analysis to gain a full understanding of this activity.

The participants were able to construct a space for creative engagement in the target language while deploying certain semiotic tools that supported task implementation and control. The balance of mediation fluctuated across tasks and mediums thus reflecting students' needs, and goals, as well as the underlying nature of the different tasks. However, it appears that learners deployed higher levels of mediational mechanisms with more structured tasks and less with more open-ended tasks. In task 1 the percentage of these mechanisms is higher (61%) than in task 2 (58%) and task 3 (50.4%). Task 1 was highly structured and provided less opportunities for freer construction of Spanish; learners had to work closely with provided text and were guided to produce more specific language to fill in gaps. In task 2 learners had more opportunities to produce longer strings of language, e.g. through translation of whole sentences, caption writing,

problem-solving discussion, the variety of sub-tasks meant they were not locked in a certain kind of exercise during the whole session. Finally, task 3 was highly influenced by the medium of implementation. The paper version of this task provided a better opportunity for learners to engage in more creative target language whereas the computer version was very restrictive and although there were similar percentages of repetition in both mediums, for example, the functional emphasis varied between co-construction aid of their own version of the text (paper-based task) and mnemonic aid to reproduce the original text (computer-based task).

There was virtually no difference in terms of reliance upon semiotic mechanisms between learners working at the computer (56%) and learners working on paper (57%). However some interesting differences between the mediums –computer *versus* paper- emerged in relation to specific mediational mechanisms. Learners at the computer deployed higher levels of repetition (33%) and reading aloud (12%) than learners working on paper versions (27% and 9.5% respectively). Repetition and reading aloud are semiotic means that underlie a collective, public approach to the task in question. In the case of repetition, it is generally an aid to bring language forward for mutual consideration and to keep the social event going; it also helps learners indicate where their focus of attention is and gives individuals time to continue working on a specific issue while keeping "in touch" with their partners, for example. Reading aloud also signals where the attention of the reader is at any particular moment and emphasises the awareness and acknowledgement of the other's presence. Reading aloud is not a strong cognitive aid hence the characteristic patterns of students reading aloud only partially, e.g. gradual decrease of reading aloud as, presumably, more individual thinking increased. It appears that the presence of the computer slightly emphasised the "collective" space in which learners operated. Moreover, detailed analysis of specific exchanges across the data indicate certain patterns of "inclusion" of the machine as a participant in interaction and these mechanisms are an enabling part of it. Use of L1, on the other hand, was predominantly higher among learners working on paper (21%) than among learners working at the computer (11.5%). Unlike the other two mechanisms, L1 can be a more individual tool to gain control over language and/ or task on the one hand, and reflects more individual styles, choices, and needs, on the other, as seen in the degree of variation across protocols. These observations, however, are based on a fine balance, which is also influenced by particular events within situated activity, and by individual

approaches among our twelve participant dyads/groups, and therefore cannot be generalised beyond the circumstance of the present study without further, more specific, investigation into semiotic differences between the mediums.

5 Results and Discussion (Part II)

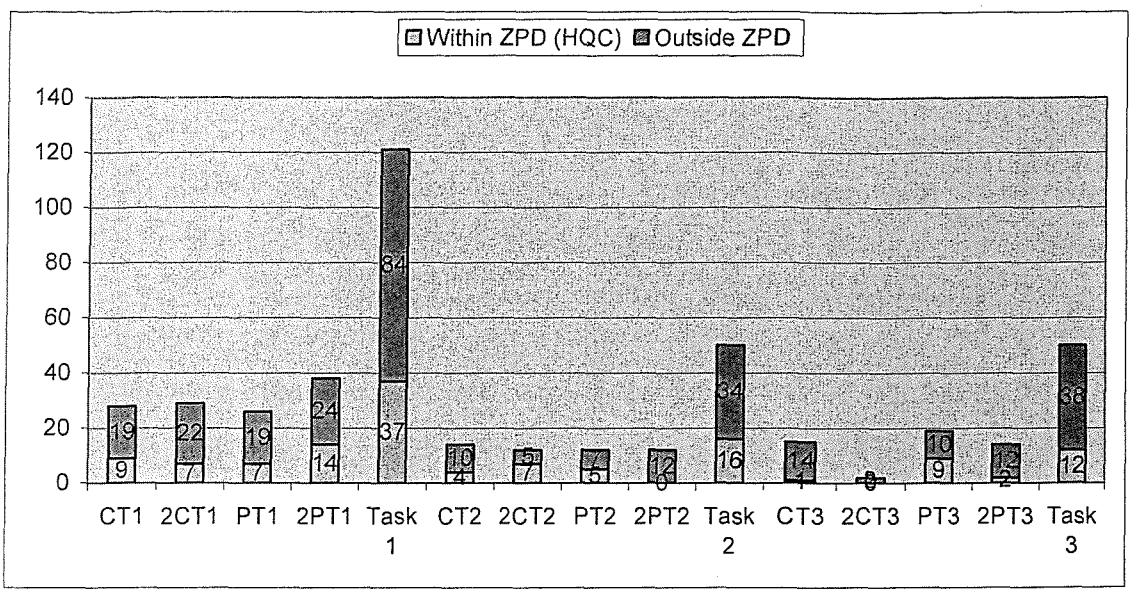
5.1 Introduction

In the first part of the presentation and discussion of results (chapter 4) I presented the results in relation to the degree of collaboration across the tasks and mediums of implementation, and the analysis of semiotic mediational mechanisms deployed in collaborative activity. In this chapter, I firstly present and discuss the degree of engagement in High Quality Collaboration (HQC), and the analysis of language related activity and microgenesis. Secondly, section looks at the role and impact of the computer in collaborative activity; and finally, section presents a final review of the three tasks to include specific aspects that were not discussed in previous sections.

5.2 Degree of engagement in High Quality Collaboration (HQC)

For the purposes of the present study I have defined High Quality Collaboration (HQC) as collaboration where learners, working within a zone of proximal development (ZPD), are able to co-construct language related knowledge. This can be achieved through what Donato (1994) has called "collective scaffolding", which is collaboration where several "novices" are able to empower each other by achieving as a dyad or group what they could not achieve individually; or by an individual "expert" providing the necessary assistance required by a "novice" to achieve any kind of language related development. In order to identify HQC, all language related episodes (LREs), that is episodes where learners "talk about language they are producing, question their language use, or other - or self-correct their language production" (Swain and Lapkin, 1995), were identified and categorised (see below). For comparative purposes across the three tasks and delivery mediums, the degree of HQC the learners engaged in was measured by the amount of LREs correctly resolved within the learners' zones of proximal development, i.e. LREs where learners achieved, through collaboration, language constructions and/or knowledge which were beyond their individual capabilities as evident at the beginning of the LRE in question (for examples of this refer to Excerpt 17 and Excerpt 18 below). Figure 5 shows raw counts of LREs across the protocols.

Figure 5: Language related episodes across tasks



The amount of LREs per task reflects to an extent the nature of the task learners were working on. Task 1, "Profesionales de hoy" was an interview reconstruction whose core format was gap filling and which therefore, constantly highlighted specific aspects of the target language. This task accounted for the most LREs (121) of the three tasks of which 37 (31%) were considered HQC. Task 2, "Hermanas dotadas" was formatted as a macro problem-solving task embracing micro problem-solving exercises focusing on language. These exercises varied across gap filling, translation, caption writing, and jumbled sentences and, like task 1, provided plenty of guided opportunities for learners to work on the target language. Out of a total of 50 LREs 16 (32%) were classified as HQC. Finally, task 3 "La Ciudad de México", a variation on dictogloss, also accounted for 50 LREs, but only 12 (24%) were HQC. As Figure 5 shows there is considerable variation across individual dyads/triads and this fact will be subsequently explored.

In terms of delivery medium, computer or paper, there are important differences in terms of HQC in tasks 2 and 3, but not in task 1. The percentage of HQC in task 1 did not appear to be greatly influenced by the presence or not of the computer; learners working on paper engaged in a slightly higher degree of HQC (33%) whereas for students working at the computer the percentage was 28%. In task 2, however, learners working at the computer appeared to have benefited from the medium since their HQC percentage

was 42% in contrast to 21% for students working on the paper version of this task. Finally, HQC in task 3 was definitely affected by the medium. There was a mere 6% of HQC in the dialogue of students working at the computer whereas participants working on paper engaged in HQC to a much higher degree, 33%.

Comparing the results shown in section 4.3 related to amount and focus of collaborative talk and the results shown in this section, amount of HQC across the tasks and mediums, it becomes clear that even when learners have more opportunities to focus on the target language, this does not necessarily lead to more opportunities to engage in HQC. For example, in tasks 1 and 2 learners engaged in more collaboration that specifically focused on the target language than learners working on task 3, however, learners in task 3 managed to achieve a very high level of HQC in relation to the amount of language related talk they engaged in.

5.3 Language related activity, HQC, and Microgenesis

The previous sections of this chapter have provided an overview of the amount of general collaboration observed across the three research tasks, and a summary of some of the most prevalent semiotic mechanisms that mediated the collaborative undertaking. In section 5.2 I presented the results reviewing the degree of high quality collaboration (HQC) which learners co-constructed throughout the tasks. This section attends to the degree of HQC identified in the study within the context of language related activity in general, and explores its relevance for the processes of second language learning.

Language related activity as constructed by the participants in the study is best represented as a continuum which ranges from procedural to reflective. Procedural activity encompasses perfunctory interaction where learners do not engage in overt reasoned consideration or reflective action. Reflective activity, on the other hand, is characterised by reasoning –to various degrees. Reflective activity is evident in interaction where learners attempt to overcome problems through language resources such as use of metalanguage, L1, and circumlocution among others. It must be stressed, however, that the distinction between procedural and reflective does not necessarily imply that one kind is "better" than the other in relation to language learning activity.

Learners' inclination towards one kind of activity over the other at any particular moment during collaboration reflects a specific response to situated activity that can only be assessed and understood by means of in depth examination of individual events within the wider contexts of task and activity. The following sections present the major patterns found across the data in relation to language related activity as mapped through the research constructs of language related episodes (LREs), HQC episodes, and microgenesis episodes (MGEs).

5.3.1 Language Related Episodes (LREs)

As seen in section 4.3, out of the total amount of collaborative interaction the learners engaged in across the three tasks, 63.25% (121 LREs) was devoted to language related talk in task 1, 61% (50 LREs) in task 2, and only 25.75% (50 LREs) in task 3. However, the amount of LREs that provided learners with potential opportunities to collaboratively move beyond individual capabilities (i.e. HQC) is considerably lower. In task 1, only 37, out of the 121 LREs were considered HQC; in task 2, 16 out of 50 LREs; and in task 3, 12 out of 50 LREs.

Table 11: Language related episodes overview

	Task 1					Task 2					Task3				
	CT1	2CT1	PT1	2PT1	**Total Task 1**	CT2	2CT2	PT2	2PT2	**Total Task 2**	CT3	2CT3	PT3	2PT3	**Total Task 3**
LREs Correct	19	17	18	28	**82**	12	10	7	8	**37**	12	2	18	11	**43**
LREs Incorrect	9	10	7	9	**35**	1	0	4	4	**9**	3	0	1	3	**7**
LREs Inconclusive	0	2	1	1	**4**	1	0	1	0	**2**	0	0	0	0	**0**
LREs Procedural	16	17	13	28	**74**	10	7	8	9	**34**	12	2	17	13	**44**
LREs Reflective	12	12	13	10	**47**	4	5	4	3	**16**	3	0	2	1	**6**
HQCEs	9	7	7	14	**37**	4	7	0	5	**16**	1	0	9	2	**12**
Total No. of MGEs	3	0	3	2	**8**	2	3	2	0	**7**	0	0	7	0	**7**
Total No. of LREs	**28**	**29**	**26**	**38**	**121**	**14**	**12**	**12**	**12**	**50**	**15**	**2**	**19**	**14**	**50**

Whereas collaborative interaction represents a foundation for potential development (*cf.* Crook, 1994), it is clear that the fact that learners engage in collaborative activity in the language classroom does not necessarily mean that they engage in language related activity. Furthermore, even when learners engage in language related talk, this does not necessarily lead to interaction where at least one of the participants is aided by the collective experience to go beyond his/her original individual capability in terms of language performance (i.e. HQC). One of the objectives of this study has been to investigate and compare –through microgenetic analysis- the degree and quality of collaboration across the tasks and mediums. To achieve this objective, it has been necessary to "map" as it were language related activity incorporating different axis for the analysis, classification and evaluation of LREs, a basic research unit that has now been amply utilised by researchers from the Sociocultural tradition. Table 11 above shows raw counts of the LREs identified in the protocols and classified under different criteria. The first three rows refer to correct, incorrect, and inconclusive outcomes of LREs; the following two rows show the classification of LREs according to a socio-cognitive continuum ranging from procedural to reflective; the next row quantifies HQC episodes, which embody correctly resolved LREs within the learners' zone of proximal development, and can be carried out in either procedural or reflective mode; the seventh row shows a specific kind of HQC episodes, microgenesis episodes (MGEs), where some interlanguage change is visible as a result of the interaction. The final row presents the total amount of LREs per protocol. Table 12 below shows similar information organised in "maps", where column "X" shows the number of LREs which were incorrect, the question mark represents inconclusive ones, and "C" contains the number of correct episodes. All these are shown ranged along the socio-cognitive continuum ranging from procedural to reflective mode, and within or outside the learners' zones of proximal development as established through performance in each LRE.

Table 12: Language related activity maps

Task 1

		Procedural			Reflective			LREs
		x	?	c	x	?	c	Total
CMT1	Within ZPD			4			5	9
	Outside ZPD	6		6	3		4	19
2CTTI	Within ZPD			3			4	7
	Outside ZPD	2	2	10	8			22
PMT1	Within ZPD						7	7
	Outside ZPD	3		9	3		3	18
2PTT1	Within ZPD			6			8	14
	Outside ZPD	7	2	13	1		1	24

Task 2

		Procedural			Reflective			LREs
		x	?	c	x	?	c	Total
CMT2	Within ZPD			1			3	4
	Outside ZPD		1	8	1			10
2CMT2	Within ZPD			2			5	7
	Outside ZPD		1	4				5
PMT2	Within ZPD							0
	Outside ZPD	1		8	3			12
2PTT2	Within ZPD			2			3	5
	Outside ZPD	3	1	1	1		1	7

Task 3

		Procedural			Reflective			LREs
		x	?	c	x	?	c	Total
CMT3	Within ZPD			1				1
	Outside ZPD	3		8			3	14
2CMT3	Within ZPD							0
	Outside ZPD			2				2
PMT3	Within ZPD			7			2	9
	Outside ZPD	1		9				10
2PTT3	Within ZPD			2				2
	Outside ZPD	3		8			1	12

Mapping language related activity supported a deeper understanding of the nature of HQC. As the maps show, a further aspect in the classification of language related activity was the socio-cognitive tendency observed while learners were tackling language related problems. Procedural activity (refer to section 5.3) was prevalent across the three tasks and mediums; 61% of the total amount of LREs in task 1 was carried out in procedural mode, in task 2 the percentage was 68%, and 88% in task 3. In terms of medium of implementation, the percentage of procedural interaction was 64% for participants working at the computer *versus* 73% for paper-based learners. In spite of the fact that in the general field of education "cumulative talk" (similar to *procedural* in this study) is not considered as valuable as "exploratory talk" (similar to what I have called *reflective*) for the "joint construction of knowledge", (*cf.* Mercer, 1996; Mercer and Wegerif, 1999; Wegerif *et* al., 1999), the data in this study indicates that procedural talk in the second language classroom can play an important role for HQC. 43% of HQC episodes were co-constructed through procedural talk. Instances of procedural activity included the *use of L1*, for example to translate a word without getting diverted from the main task; and use of *repetition* for corrective feedback and/or incorporation of corrected language, oral practice of problematic language, and even isolating or marking language for consideration even if reasoning was not articulated.

57% of HQC episodes involved some kind of reflective talk. Semiotic mechanisms such as discourse markers, L1, and repetition were also fundamental in reasoning exchanges. Learners used these linguistic tools to bring about various degrees of reflective activity to their dialogue. They used repetition, and word stressing, for example to make salient key information. Learners engaged in discussion that led to co-construction of language or knowledge about language; and also used metalanguage, either in the target language or in English, to try and achieve informed decisions. Although the majority (53%) of all the reflective LREs led to HQC, reflective consideration in relation to the target language rarely became fully developed. Most often, the key reflective information learners brought into the interaction was enough to produce the necessary regulation for the dyad/triad to overcome the problem they were tackling.

This section provided an overview of language related activity in the corpus and a synthesis of the criteria underlying the classification of LREs that provided the basis to identify interaction where individuals contributed knowledge that led to an empowered

collective. Not only did classification of language related activity provided qualitative information with respect to the research tasks and mediums, but it also allowed me to establish the degree of HQC across the protocols presented in section 5.2. The following two sections focus on a particular kind of HQC, microgenesis, and on the exploration of participants' progress as shown in the pre and post grammar tests, against their involvement in HQC.

5.3.2 Microgenesis Episodes (MGEs)

A fundamental premise within Vygotskian theory of cognitive development is that development first appears in the inter-psychological plane, i.e. through social interaction, and it is then appropriated/ internalised by the individual in the intra-psychological plane. Furthermore, the origins and processes of development are sometimes visible as they unfold during interaction and this is what is known in Sociocultural theory as microgenesis. One of the main objectives in the investigation was to study collaborative activity and to assess its relevance for second language learning. For this purpose, instances of microgenesis, in other words LREs where there were overt signs that some interlanguage restructuring had taken place, were identified and studied. Since microgenesis episodes (MGEs) can only take place in learners' zones of proximal development they are part, by definition, of what I have called HQC (see 5.2). Table 13 shows the number of microgenetic episodes identified in each protocol; all microgenesis episodes identified in the data are shown in appendix six.

Table 13: Number of microgenesis episodes

	Task 1					Task 2					Task 3				
	CT1	2CT1	PT1	2PT1	**Total task 1**	CT2	2CT2	PT2	2PT2	**Total task 2**	CT3	2CT3	PT3	2PT3	**Total task 3**
Total No. of LREs	28	29	26	38	**121**	14	12	12	12	**50**	15	2	19	14	**50**
Total No. of MGEs	3	0	3	2	**8**	2	3	2	0	**7**	0	0	7	0	**7**

As the table shows, there are few microgenetic episodes in relation to the total number of LREs per task, but with a much higher ratio in tasks 2 and 3. Merging the figures of the four protocols per task, task 1 contained the lowest percentage of microgenetic episodes

of the three, with only 7% whereas tasks 2 and 3 mirror each other with 14%. If we compare the mediums, computer versus paper, the results bear a similarity with the comparative results between mediums in relation to HQC in general. In task 1, there was a higher percentage of MGEs in the protocols of learners working on paper (8%) compared to students working at the computer (5%). In task 2, there was a higher percentage of microgenesis in computer-based protocols (19%) against only 8% in paper-based protocols. In contrast, task 3 delivered via the machine did not support microgenesis (nor HQC see 5.2 above) whereas the paper version did. Microgenesis represents 21% out of the total amount of language related activity in these two paper-based protocols.

Like the construct of language related episode (LRE) devised to study language related activity during interaction, microgenetic episodes (MGE) are another research unit that helps us investigate language learning activity and some of the processes underlying it while learners engage in collaboration. However, it became apparent during qualitative analysis of the corpus that although there were very few episodes where change in some aspect of the learners' interlanguage could be observed in the course of interaction, there were other empowering episodes because learners were achieving together, through collaboration, language constructions and/or knowledge even if change was not evident. To exemplify this point the following excerpts can be compared:

Excerpt 17 (CT1): microgenetic episode

98	M	"avanzar" *"go on"* ((reading while pressing button on screen))
99	E	"ahora a la entrevista" *"now to the interview"*
100	M	uhum
101	E	"buenos dias buenos dias en su opinión en qué" ((pause)) *"good morning good morning in your opinion what is"*
102	M	"hoy en" día (.) "hoy en" día *"nowa"days* ((three words in Spanish)) *"nowadays"*
103	E	en qué lo? basa *what is it* ((wrong pronoun)) *based on*?
104	M	"en su opinión en qué" ((pause)) para quién (.) en general o *"in your opinion what is"* ((pause)) *for whom (.) in general or*
105	E	"en qué en qué" se "basa"? *"what is what is"* se ((correct pronoun)) *"based on"*
106	M	si

		yes
107	E	si?
		yes?
108	M	es posible no estoy seguro segura ((laughter))
		it's possible I'm not sure
109	E	si ((laughter))
		yes
110	M	(carambe) ((Spanish expression))

This excerpt shows how the dyad creates a collective window of opportunity which is then cognitively seized by Ellen in turn 105. From turn 98 onwards, they both use reading aloud as a cognitive tool for regulation to try and fill in a gap with a personal pronoun (se). In turn 103 Ellen advances an option –lo- which is not correct, but which nevertheless focuses Mina's mind onto personal pronouns (she had just been working on a noun "día" for a different gap). At the core of this excerpt is Mina's turn 104 when she engages with this particular problem-solving endeavour (she had been working on a different gap as turn 102 shows) and reads aloud part of the sentence as a focus tool and then, after a pause, produces some kind of metalinguistic private speech. The second part of her utterance which we are referring to is a thinking tool for the self; the sort of questioning she is partially uttering bears a relationship with the kind of considerations learners are advised by grammar books and teachers to consider when studying personal pronouns and when dealing with grammar rules in general.

The following are quotes taken from the chapter on pronouns (chapter 10) in the grammar book students have been working with for this class, *Acción Gramática* by Phil Turk and Mike Zollo: "They can also be used standing alone, for example in answer to the question *¿Quién*...? (p.61); "These pronouns are used when the person is the object of the verb..." (p.62); "These are used to denote 'to me/us/him/ them' etc., i.e. the person on the receiving end of the action, but not the actual 'victim'" (p.63). Although we do not have further data, e.g. a retrospective interview with the participants that would throw more light into Mina's processes and thoughts when uttering speech turn 104 nor an insight into what Ellen might have thought made her correct the pronouns, as researchers we need to consider possible sources of influence over activity and the pedagogical materials students use constantly for their language classes are obviously one of them. What we do know from the data is that Ellen's interlanguage is modified immediately after Mina's self-questioning, elliptical utterance in turn 104 which appears to have had certain resonance in Ellen's inner processing. We could best describe this

exchange as an inter-mental continuation of processing or a momentary borrowing of consciousness aided by private speech.

Excerpt 18 on the other hand reflects sharing and co-construction of language knowledge where both learners are benefiting from collaboration through assessment of a language suggestion, key reasoning, and metalinguistic talk. Both individual learners seem insecure about the pronoun needed to complete the sentence. However, their combined knowledge (more intuitive in the case of Mina's and more metalinguistically informed in the case of Ellen's) gives them the collective confidence to accept the pronoun and move on to task completion. Learning might not be overt, but some potential "ingredients" for development are there for the taking.

Excerpt 18 (CT1): HQC episode

65	E	ehhe "qué piensan ustedes acerca de lo que es importante" ((fading voice while reading instructions))
		ehhe "what do you think is important" ((fading voice while reading instructions))
66	M	um (.) ah (.) LE parece? ((pause)) o la A
		um (.) ah (.) to her ((in Spanish indirect personal pronoun "le")) it seems? ((pause)) or the a
67	E	**a** a mi (.) compañera ((pause)) LE si
		to to my (.) classmate ((pause)) le *yes*
68	M	le parece? [si le parece
		to her it seems? [yes to her it seems ((using correct personal pronoun "le"))
69	E	[más?
		[*to her it seems because it's (.) indirect ((pause)) that intelligence is [more?*

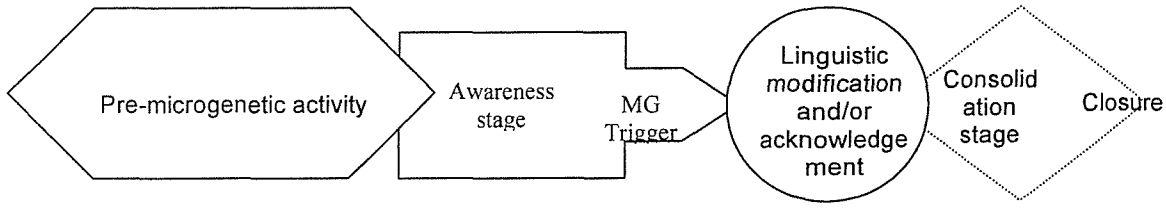
These observations led to the categorisation of both microgenesis episodes, and other episodes such as the one illustrated in Excerpt 18 as HQC episodes; dialogue where learners appeared to be working within a zone of proximal development, even if interlanguage change could not be located for either participant. This, in my mind, raises two questions; firstly, how crucial microgenesis as such is for language learning, and secondly, even in the cases where we can highlight microgenetic episodes, whether we can really demonstrate language internalisation has taken place. Undoubtedly, high quality collaboration appears to be a driving force for language learning, but caution needs to be observed before we are able to claim that a particular instance of microgenesis has been appropriated without –among other considerations- having carried out a longitudinal investigation (see 6.3). Keeping in mind the above concerns, I believe

that microgenesis episodes are an important source of study for SLA researchers to deepen our understanding of collaborative processes in the classroom, and the nature of tasks, as well as to gain an insight into the possible impact of microgenesis upon language learning. In this light, section 5.3.2.1 presents a descriptive analysis of the microgenetic process as observed throughout the data, whereas section 5.3.3 looks at the results of the pre and post grammar tests as an informative source in relation to the possible influence of collaborative activity upon individual achievement.

5.3.2.1 The microgenetic process: an outline

As a fundamental premise in the study was to identify the processes and activity underlying collaboration and language learning, qualitative analysis of microgenetic episodes allowed me to identify certain characteristics and processes involved in this kind of overt co-creation of knowledge in the collaborative language classroom. The process of microgenetic activity that emerged throughout the data was characterised by the phases shown in Figure 7, though not all phases were present in all the microgenetic episodes.

Figure 7: Microgenesis phases



5.3.2.1.1 Pre-microgenetic activity

Pre-microgenetic activity normally entails organisational talk, a noticing stage, and a microgenetic trigger. Organisational talk may refer to learners' speech that is directly related to task preparation, for instance when learners are discussing task instructions and/or how they are going to tackle the task (meta-talk). However, organisational talk is more often talk that mediates the co-creation of a common focus of attention so that the task can be initiated or continued without meta-talk. In these cases, learners make use of

reading aloud –either reading the instructions on the screen or their piece of paper, or reading the exercise they are focusing on, e.g. the sentence to be translated or to be completed.

Of crucial importance in pre-microgenetic activity is what I have termed the noticing stage after the first of Swain's functions of output. Noticing has been associated with the learning processes students need to engage in as part of interlanguage development: "a second language learner will begin to acquire the targetlike form if and only if it is present in comprehended input and "noticed" in the normal sense of the word, that is, consciously" (Schmidt and Frota, 1986:311in Swain and Lapkin, 1994:12). Noticing can be directly related to the task the learners are completing, for instance when they are trying to fill in a gap in a sentence or re-creating a text and they become aware of a lack of linguistic knowledge, or when that lack in linguistic knowledge is made apparent by their partner's output during collaboration, or their partner's correction. Alternatively, noticing might be indirectly related to the task, in other words, learners might notice a gap in their knowledge through input while reading instructions, or while reading the text surrounding the linguistic focus intended by the task designer.

In this study of 22 instances of microgenesis identified in 12 protocols, 10 are related to target items and 12 are not (see Table 14). Two main –interrelated- issues evolve from this fact, first of all, the relationship between task and activity –which has been explored throughout the study - and secondly, the importance of noticing in relation to the students' regulatory stage. Although the main linguistic foci targeted by the design are related to personal pronouns, infinitive verbs, radical changing verbs, and ser / estar, the data show how learners themselves determine what they focus on while completing the tasks according to their own linguistic needs.

Table 14: Linguistic focus in microgenesis instances

MG instance	Targeted? Y / N	Details	Location
1	N	Article (del)	CT1
2	**Y**	**Personal pronoun (se)**	**CT1**
3	N	Vocabulary (éxito)	CT1
4	**Y**	**Vocab (desarrollo intellectual)**	**PT1**
5	N	Vocab (aburrimiento)	PT1

MG instance	Targeted? Y / N	Details	Location
6	N	Vocab (esencial)	PT1
7	**Y**	**Infinitive**	**CT2**
8	**Y**	**Radical changing verb**	**CT2**
9	**Y**	**Gerund**	**CT2**
10	**Y**	**Infinitive + pronoun**	**PT2**
11	N	Vocab (cuidado)	PT2
12	**Y**	**Ser vs estar**	**PT3**
13	N	Spelling (belleza)	PT3
14	N	Morphology (trabajadores)	PT3
15	N	Syntax (los)	PT3
16	N	Syntax (tener)	PT3
17	N	Vocab (historia natural)	PT3
18	N	Morphology (sonrientes)	PT3
19	**Y**	**Personal pronoun (se)**	**2PT1**
20	N	Form of address	2PT1
21	**Y**	**Syntax (to know)**	**2CT2**
22	**Y**	**Gerund**	**2CT2**

This takes us into a core issue in our investigation of collaborative activity. If "... noticing can trigger cognitive processes that have been implicated in second language learning; cognitive processes that generate linguistic knowledge that is new for learners or that consolidate their existing knowledge" (Swain,1995:130), how is it that inter-psychological activity provides the cognitive platform for learners to capitalize on the noticing stage and work further towards the modification of their interlanguage system and achieve internalization? What are the microgenetic triggers and/or affordances upon which learners co-construct further knowledge to gain self-regulation? In other words, how is it that noticing might lead to language learning? What the data show is that not only can collaborative activity provide a suitable platform for noticing, but it further supports cognitive engagement leading to language change and/or learning "routines" (see the post-microgenetic stage below). Once learners' cognitive window gets activated, for example by the noticing stage, learners working within their ZPD and with suitable inter-psychological support can benefit from the collaborative enterprise.

Although the noticing stage and the microgenetic triggers are very closely linked within the process of microgenesis, they are not the same thing. Noticing precedes the microgenetic trigger; noticing precedes linguistic change. The microgenetic triggers visible in the data include private speech; explicit intervention by the expert either in the L1 or the target language (TL); co-constructed speech; the novice's oral output, e.g. a desire to express him/herself in the TL; and the novice's written output, e.g. having to

spell a word or write a sentence. These triggers are analysed in other sections of this chapter.

5.3.2.1.2 Transitional stage

The transitional stage visible in microgenesis normally involves an overt acknowledgement of linguistic change, e.g. reflected through a discourse marker, and/or linguistic modification of the learner's interlanguage. Analysis of the transitional stage in the instances of microgenesis helps us understand the regulatory state of the novice in relation to the developing item or structure. The data show three different patterns related to the vocal saliency of the transitional stage; 1) the transitional stage is overtly marked through a discourse marker such as "oh"; 2) the transitional stage is acknowledged by means of an acknowledgment discourse marker such as "umm" or "yeah"; and 3) the stage is unmarked, the learner just incorporates the linguistic change.

Discourse markers are "sequentially dependent elements which bracket units of talk" (Schiffrin, 1987:31). In the context of microgenesis, they bracket stages of cognitive development; they mark specific moments where interlanguage change is occurring or adjusting. As McLaughlin remarks, the presence of a discourse marker such as "oh" is an overt indication of the 'sudden moments of insight' or 'clicks of comprehension' learners experience (McLaughlin, 1987:138). Therefore, identifying and studying discourse markers is important for microgenetic investigation because they help us understand stages of regulation and relationship dynamics within the dyad. Moreover, they help us understand the processes of microgenesis in collaborative activity because they "simultaneously" mark information backward and forward, they have both an "anaphoric and cataphoric" quality and "they are devices that work at discourse level" (Schiffrin, 1987:37). The latter is particularly relevant to differentiate between markers such as "ah" and "yeah" as being discourse markers that reflect new, and *unexpected* information, or "ah" and "yeah" functioning as acknowledgement markers that reflect new, but *expected* information, for instance. This kind of knowledge aids our analytic understanding of regulation and its relationship to microgenesis processes. Table 15 below summarises the relationship between discourse markers and the level of regulation apparent in the subjects of microgenetic episodes as found in the data.

Table 15: Discourse markers and regulatory levels

MG	Discourse Marker	Acknowledgment Marker	Unmarked	Regulatory Stage
CT1-MG3	oh	um expect		3
CT1-MG1	oh			3
PT1-MG4	ay yeah			3
PT3-MG15	ah			**4**
2PT1-MG19	ah			**4**
2CT2-MG21	entonces			3
2CT2-MG22	ah ... pero			**4**
PT3-MG13		ah expect		3
PT1-MG5		ah ok		3
PT3-MG17		yeah		3
PT3-MG18		um		3
PT2-MG10		yeah um		**4**
PT2-MG11		umm		3
CT1-MG2				4
CT2-MG7				4
CT2-MG8				4
CT2-MG9				4
PT3-MG14				**3**
PT1-MG6				4
PT3-MG16				4
PT3-MG12				**3**
2PT1-MG20				**4**

The assessment of regulatory levels in the microgenesis episodes studied was based on Aljaafreh and Lantolf's "five general levels of transition from inter-mental to intra-mental functioning" (1994:470):

Level 1	The learner is not able to notice, or correct the error, even with intervention.
Level 2	The learner is able to notice the error, but cannot correct it, even with intervention.
Level 3	**The learner is able to notice and correct an error, but only under other-regulation. The learner understands assistance, and is able to react to the feedback offered.**
Level 4	**The learner notices and corrects an error with minimal, or no obvious feedback from the tutor and begins to assume full responsibility for error correction. However, development has not yet become fully intra-mental, since the learner often produces the target form incorrectly and may even reject feedback when it is unsolicited.**
Level 5	The learner becomes more consistent in using the target structure correctly in all contexts. The individual is fully self-regulated.

Note: Levels 3 and 4, my bold

As Table 15 shows, there is no definitive link between the presence of a discourse marker and the level of internalization. In seven microgenesis episodes (3, 1, 4, 15, 19, 21, 22 – refer to appendix six) the transitional stage is marked by a discourse marker

which makes salient either a sense of unexpectedness brought about by the new information provided by the acting expert or the expression of self-realisation resulting from the interaction. Microgenesis episode 15 (MG15 in appendix six) illustrates why I have categorised some of the markers "ah" as discourse markers rather than acknowledgement markers. The level of internalization shown by that novice in episode 15 is higher than in MG13 and MG5; assistance here is minimal and it is not evident that the expert intended to correct his classmate with the recast (t132). The recast seems to be a co-constructive device where more information was added as part of the text recreation task. Importantly, there is a degree of unexpectedness in the novice's sudden realization that he needed the masculine article (t133). The particle "ah" does not appear to be an acknowledgement marker addressed to the partner, but rather a marker addressed to the self and followed by his correction (t133).

There are six episodes (13, 5, 17, 18, 10, 11) marked by acknowledgement markers characterised by a higher degree of expectancy when receiving the new information triggering linguistic change as well as an overt dialogic response to the partner who provided the information. Although the regulatory stage of these novices still requires assistance from the expert (level 3), the level of revelation manifested when receiving the supportive/new information from their expert-partners is less than in the microgenesis episodes where the discourse marker is the prevalent form. The presence of an acknowledgement marker (as opposed to discourse marker) might have been because a) there was some pre-microgenetic activity preparing the learners for the new information; b) the learner was immediately able to map the new information to a known structure which somehow diminished the level of unexpectedness as in the case of episode 17; and c) the learner was more regulated (level 4) as in the case of episode 10.

Finally, the unmarked transitional stage shows a relationship with a higher degree of regulation (level 4) where "the learner notices and corrects an error with minimal, or no obvious feedback" (see internalization levels above). Crucial to the absence of a marker in the transitional stage of these episodes is pre-microgenetic activity and its characteristics. Expertise is co-created through collective scaffolding supporting the novice to take advantage of the environment affordance to obtain the needed knowledge, hence a higher level of regulation. The two examples of unmarked transitional stage and

regulation level 3 are MG14 and MG12. In MG14 the novice is scaffolded through drill pronunciation practice, whereas MG12 is an expanded example of co-constructed help.

5.3.2.1.3 Post-microgenetic activity

Post-microgenetic activity reflects the subtle consummation of applied knowledge. This is the linguistic space where the mastering of the tool becomes dually exercised; used for doing, as in task completion, and used for cognition, to consolidate language learning.

In most of the microgenesis episodes, post-microgenetic activity simply bridges task completion, through the consummation of the communicative act. In other words, having been able to control the language in question, learners are able to complete the exercise they are working on and move on towards the following activity phase. In some microgenesis episodes the discourse of schooling is exercised in a parallel plane in order to consolidate language internalisation. Learners do so through repetition of the word or structure, normally while writing or typing the correct versions (see appendix six microgenesis episodes: 1, 5, 7, 6, 9, 10, 13, 14, 15, and 20). However, some dyads go beyond repetition and engage in either personal or public learning routines. In MG3 and MG11, the novice makes use of L1, private speech, and cognitive statements such as "I don't know", to contextualise the words they have been working on. MG8 and MG18 show a dyadic effort where both novice and expert engage in a complementary drill practice and metalinguistic routine. In MG4 the novice applies his newly gained knowledge to exercise task completion and control through humour.

The analysis of microgenesis processes contributes to our understanding of the potential of dyadic collaborative activity in the language classroom. As we stressed at the beginning of this chapter, studying microgenesis as a series of levels or stages facilitates our insight into learners' activity, but it does not mean that when learners are engaged in the co-construction of knowledge they necessarily follow those levels as separate procedures to achieve regulation. Our data analysis is based on the study of overt inter-psychological activity and certain assumptions about what this activity might generate intra-psychologically following previous SLA research, and what the outcomes of our subjects' interactions are.

5.3.2.2 Microgenesis Affordance[8]

The following section is an analysis of an aspect of microgenesis that appears to be crucial for driving the learner's interlanguage forward, microgenesis affordance. Microgenesis affordance immediately precedes what we have identified as the transitional stage in microgenesis and it entails the processes and/or characteristics of the assistance provided by the more knowledgeable peer, e.g. the acting expert in that particular instance, or the characteristics of the linguistic environment that allow for a learner to capitalize on the affordance to modify and enhance his/her interlanguage. The term affordance refers to "a particular property of the environment that is relevant –for good or for ill- to an active, perceiving organism in that environment. An affordance affords further action (but does not cause or trigger it)" (van Lier, 2000:252). From an ecological approach to language learning as the one advanced by van Lier, affordances are learning opportunities that can be used by an "active and engaged" learner to take action over his/her language.

Microgenesis affordance is an essential characteristic of the microgenetic episodes observed in the data and it embodies the co-creation of common ground upon which opportunity for language learning is offered (e.g. corrective feedback) and/or simply taken by the learners actively engaged in collaborative activity. Microgenesis affordances can be subconsciously created by the two minds acting as an extension of one another as we can see from the examples such as the ones involving private speech (see below), or overtly created by means of assistance either requested or un-requested. 11 out of 22 microgenesis instances identified in the data are characterised by subconsciously co-constructed affordances (from now on referred to as affordances), and 11 are the result of overt assistance (from now on referred to as assistance) 6 requested instances versus 5 un-requested.

[8] "The word Affordance was coined by the psychologist James Gibson to refer to a reciprocal relationship between an organism and a particular feature of its environment (1979)" (van Lier, 2000: 252).

5.3.2.2.1 Assistance as microgenesis affordance

In this section we will analyse the types of assistance encountered in the microgenesis instances and the mediational mechanisms that support the creation of assistance. We will do so by analysing representative episodes of the type of assistance being studied.

Requested Assistance

MG instance	Type of assistance	Definitions	Supportive mediational mechanism(s)
CT1-MG3	Reply	Straightforward answer provided in response to a question.	L1
PT1-MG4	Paraphrase and reply	Learners express the meaning of word/ phrase in question in the TL.	L1
PT1-MG5	Reply and explanation	Provision of additional information to clarify the meaning of the word/ phrase in question.	
PT3-MG13	Reply		
PT3-MG17	Co-construction	Linguistic contributions made by both learners that eventually lead to finding the answer to the question advanced by the novice of the instance.	
PT2-MG11	Reply		

Un-requested Assistance (corrective feedback)

MG instance	Type of assistance	Definitions	Supportive mediational mechanism(s)
CT1-MG1	Recast	"An utterance that reformulates a learner's erroneous utterance. Recasts may contrast with learner utterances phonologically, morphologically, syntactically, or semantically, but are based on the learner's erroneous utterance and maintain semantic contiguity with it. Recasts are immediately subsequent to the utterance" (Ohta,2001:141).	Repetition
PT3-MG14	Recast		
PT3-MG18	Recast		
PT2-MG10	Recast		
PT3-MG15	Recast		

Requested assistance

Three types of requested assistance were identified in the data, a straightforward reply, paraphrase followed by a reply, and co-constructed assistance. Replies were basically translations either from the target language (Spanish) into L1 (English) or *viceversa*; the paraphrase was followed by a reply in the L1; and the co-construction followed an implicit request in the L1. What determines the kind of assistance the expert provides, however, depends on factors that ultimately impact on the learning experience the dyad or group as a whole is undergoing. The most important of those factors is the sensitivity shown by the expert towards a) the partner requirements; b) the task goals; and 3) personal objectives. The result is a dialogic opportunity for both learners that arise from an asymmetric situation. We will illustrate the above assertions through a contrastive analysis of microgenesis episodes and the choice of help provided by the learners taking part in those exchanges.

L1 Reply

Use of L1 might not appear to be a very desirable habit for second or foreign language learners, however it can prove to be a very effective mediational mechanism if investigated within its situated context. Two of the episodes that involve use of L1 in the provision of help exemplify how the experts' choices are affected by what is going on in the collaborative act. The first episode (MG3) illustrates Mina's ability to provide the requested assistance by Ellen in an effective, economical way that did not disrupt the overall focus of task implementation.

Excerpt 19 (CT1): MG3

148	e	"en los" (.) "en cuanto a" ((reading very very quietly)) que ah ((pause)) talking of technology *"in the" (.) "in relation to" that ah ((pause)) talking of technology*
149	m	umm ah ((soft laughter))
150	e	"qué tan importante" es "el" *"how important" is "the"*
151	m	si (.) es el (.) es el *yes is the is the*
152	e	es el (.) es el éxito? o ((pause)) no? *is the is success? or ((pause)) no?*
153	m	no en tec tecnología?

no in tec technology?

154 e no se no se qué sign significa su "éxito en el poder el dinero" (.) éxito es
I don't know what success means in "power money" success is

155 m success

156 e oh ((pause))

157 m "poder" ((pause)) um "qué tan importante" (.) how important "es el es el el "
"power" ((pause)) um "how important" (.) how important " is the is the the"

158 e how important's success in "your" work? I don't know

159 m el poder
power

160 e um?

161 m el poder
power

162 e [typing] poder
power

163 m no es tecno tecnología no es ((pause)) computador? ((pause))
no it's techno technology no is it ((pause)) computer?

The fact that Mina simply replies in the L1 (t 155) facilitates the provision of help without losing focus on the task goal, e.g. filling in a particular gap. Mina's behaviour reflects a recognition of the dyad's needs both from her partner's point of view - Ellen has been actively trying to learn the meaning of "éxito" - but also from her own point of view. She has been using repetition as a regulatory tool to gain control over the task and would not want to lose that focus by adding cognitive strain to the process. Therefore, paraphrasing or exemplification, for instance was not a viable alternative. In this situation, use of the L1 was an effective tool for the collaborative enterprise as a whole. We can compare this instance with a second microgenesis episode where L1 is also used as a mediational tool for the provision of requested assistance, but whose characteristics are different.

Paraphrase and L1 reply

Excerpt 20 (PT1): MG4

12 L um qué es desarrollo intelectual?
um what's intellectual development?

13 H es umm es como ((pause)) ah (.) que es umm que tu aprende ah durante ah su carrera=
it's umm it's like ((pause)) ah (.) that it's umm that you learn ah during your career=

14 L =ok

15 H intellectual development

16 L ay yeah ((laughter))

17 H ah

18 L no ((laughter)) no ( )

Although in this episode the expert also uses L1 to provide assistance to the novice, the L1 is not the immediate option chosen by Hena. After being asked, in the target language, what the meaning of intellectual development is (t12), Hena resorts to paraphrasing. It has to be noted that, unlike "éxito" in MG3, "desarrollo intelectual" is a working item for the completion of the task, as the learners are trying to hierarchically organise a series of concepts, including intellectual development, according to their own priorities. Understanding the terms in this part of the task would therefore have been perceived as important by both learners. Hena's efforts to explain the meaning of the item in Spanish suggests that she is actively taking this classroom exercise as a learning activity. She is behaving as a language student who is constantly reminded of the importance of using the TL as much as possible - which she consistently does throughout the session - but as importantly she is taking advantage of this affordance, initiated by her partner, to stretch her Spanish interlanguage.

In turn 15, however, she provides the translation of the term into English after the acknowledgement marker "ok" uttered by Liam in turn 14. The fact that Hena uses L1 as a further tool to convey the meaning of the words and provide the required assistance to her classmate strongly suggests that even though she was cognitively engaged in her Spanish performance, she was also sensitively open to and aware of her classmate's needs. Although "ok" would normally mean understanding of the interlocutor's message, we - as analysts - learn through turns 16-18 what Hena - as a committed collaborator and acting expert - immediately perceived in turn 14: that Liam had not really graspped the meaning of "desarrollo intelectual" from Hena's paraphrase. This microgenesis episode is a clear example of how learners acting as experts in a particular situation are able to provide scaffolded help and how an active learner takes advantage of the collaborative situation to engage in a process of learning (stretching her own interlanguage) and teaching (providing the required help) simultaneously. Finally, we also witness the internalization process undergone by Liam who progresses from object-regulated behaviour (verbally pointing at the unknown term), through other-regulated (Hena's assistance), to self-regulation (a linguistic understanding that allowed him to even use humour in turn 18 in relation to the term). Of course, he had access to the term in the L1 and we do not pretend to claim he would be in a position to use the Spanish expression in other contexts and situations in the long term, but what is evident is that the

collaborative situation in which the expert provided graded help was an effective context that allowed for both learners to actively engage in a learning process.

Co-construction

The third type of requested assistance observed during microgenesis is co-construction. According to Ohta (2001), co-construction is an explicit form of assistance "as the peer chimes in with a syllable, inflection, word, or phrase, or completes an utterance started by the peer. Co-construction sometimes results in vertical construction, in which peers collaborate to produce an utterance, alternately providing words or phrases to the growing utterance" (pp.88-89). The example of requested assistance in our microgenesis corpus results indeed in a vertical construction.

Excerpt 21 (PT3): MG17

296	A	[the history museum ((pause))
297	J	eh ah la galeria tate ((pause))
		eh ah gallery tate
298	P	eh um el museo du eh natural de historia,
		eh um the museum of eh natural history
299	J	de histo de ((pause)) de
300	P	historia
301	J	his to ria
302	A	[natural
303	P	[historia
304	A	yeah de historia natural
305	J	that's it ((pause)) y eh

This excerpt is part of an ongoing process of co-construction where the learners (a triad) are creating a text about London which follows the reconstruction of a text about Mexico City. Students are listing places of attraction in London one of them being "the history museum" (t 296) proposed by Alex (who is a French native speaker together with Paul) in English. The expression of the place in English is rightly interpreted by Jack and Paul as a request for assistance and the three of them subsequently engage in the co-construction of the expression in Spanish. This is another example of the use of English as an economical resource that far from compromising the collaborative activity becomes a facilitator for it. The three learners engage in collective scaffolding and achieve together what was beyond individual achievement (see Donato, 1994).

This group performance, moreover, transcends the dyadic interaction and what was originally a collective effort to help Alex, becomes a beneficial experience for the three learners at different levels. While they are all working to co-construct "museo de historia natural", there is an inner cell of help between Jack and Paul in turns 299-301 where Jack is having problems with the word "historia" and Paul produces the whole word for him (t300).

The three examples of requested help analysed in this section provide an insight into the ways learners respond to each other's needs during collaboration as well as how a request for help turns into an affordance for the group. These are clear benefits of the dialogic experience where linguistic actions exceed the individual by having an impact on both participants of an exchange.

Un-requested assistance: corrective feedback

There were five instances of un-requested assistance out of 22 instances of microgenesis. The five cases each involved a recast, which has been defined by Ohta as "an utterance that reformulates a learner's erroneous utterance. Recasts may contrast with learner utterances phonologically, morphologically, syntactically, or semantically, but are based on the learner's erroneous utterance and maintain semantic contiguity with it. Recasts are immediately subsequent to the utterance" (2001:141). Two of the instances were phonological corrections that were followed by pronunciation practice whereas three were recasts of a morphological nature.

5.3.2.2.2 Other types of microgenesis affordances

The purpose of the present section is to analyse microgenesis instances where participants co-create learning affordances which are not based on corrective feedback. We identified eleven such instances in the data. These instances entail characteristics of the linguistic environment that allow for a learner to capitalize on the affordance and thus enable him/her to modify and enhance their interlanguage. I will illustrate this point by means of two examples.

Interwoven consciousness[9]

This first example of microgenesis affordance both helps us understand some of the ways in which learners tackle linguistic problem-solving by making language more manageable, but also how learners benefit from each other's mental activity.

Excerpt 22 (CT2): MG8

114	Henry	"Elisa no es la chica que habla alemán" ((reading the next clue)) ((pause)) que pasó? ((pause)) ok "avanzar" "she had to practise but carried on reading" umm, "*Elisa isn't the girl that speaks German*" ((pause)) *what happened*? ((pause)) ok "*go on*" "she had to practise but carried on reading" umm,
115	Hena	umm creo que es umm *I think it's*
116	Henry	es el antepasado si *it's the anterior preterite yes*
117	Hena	tu
118	Henry	[tuvo
119	Hena	[tuvo
120	Henry	tuvo que practicar, *had to practise*
121	Hena	si ((typing)) prac
122	Henry	pract eh p r a c tiicar *pract eh p r a c tiiise*
123	Hena	pero *but*
124	Henry	carried se seguir? seg she carried on reading pero (.) no se carried on continuar? carried *ca carry*? *car* she carried on reading *but* (.) *I don't know* carried on *to continue*?
125	Hena	si cont *yes cont*
126	Henry	continuó? no se como se dice el pasado continue? ((mumbles and she writes)) *carried on? I don't know how to say the past carried on*? ((incorrect tacit subject))
127	Hena	con ((typing, they smile)) [pero con ((typing)) [*but*
128	Henry	[pero es es el material ((they smile)) [*but it's the material*
129	Hena	pero continuo (.) es el= *but carried on (.) it's the*=
130	Henry	=no s no estoy seguro (.) continuo= =*I'm no I'm not sure (.) carried on*
131	Hena	=[gerundio =[*gerund*
132	Henry	[a leer? [*to read*?

[9] "Consciousness implies language or symbol use, process, and activity in social space" (Roebuck: 2000: 81).

133	Hena	después de [continuar *after to [continue*
134	Henry	[continuar leyendo leer leyendo (.) leyendo?= *[to continue reading to read reading (.) reading?*
135	Hena	=si es leyendo porque es el gerun gerundio average(.) después de seguir y continuar ((she recalls? a grammar point studied in class)) *yes it's reading because it's the gerund* average *gerund (.) after to carry on and to continue*
136	Henry	((he types)) l e y e n d o punto *r e a d i n g full stop*

As we can see from the beginning of the episode learners are collaboratively tackling the translation into Spanish of the sentence "she had to practise but carried on reading". In turn 124 Henry isolates the problematic verb "to carry on" which can be translated both as "seguir" or "continuar". It is relevant to note the various processing strategies that help the learners achieve regulation as they are revealed in that turn and which are common in collaborative activity. First of all, Henry isolates the problematic item "carried", then we witness a memory retrieval process in two stages, first for a syllable, then the whole word: "se seguir?" followed by just "seg" having realised the discrepancy between "carried" (past tense) and "seguir" (which is the correct verb, but in the infinitive form). He uses repetition and code-switching to continue his efforts when he repeats "she carried on reading" as a tool to try and gain control but switches into Spanish for the conjunction "pero" which they already control. After a brief pause followed by his cognitive statement "no se", he tries to regulate again through repetition of "carried on" and produces "continuar?", a synonym of "seguir" still in infinitive.

In turn 125 Hena intervenes to accept "continuar" although she stops short at "cont" presumably because she is also having problems with the past tense. Nevertheless, her intervention makes them both choose "continuar" which enables them to focus on this and resume their efforts. Turn 126 is a hypothesis testing turn for Henry who tries both forms of the past tense "continuó" and "continué", some metalanguage and probably some private speech (which is indecipherable because he is mumbling). After some comments related perhaps to typing problems, Hena rebuilds on Henry's suggestions and types - while repeating - "pero continuó", which is correct, in turn 129.

Finally, she starts her construction of a grammar rule that eventually helps them achieve regulation. Turns 129 to 135 are the product of interwoven consciousness between these

two learners which culminates with Henry's internalization processes - rooted in Hena's metalanguage - and his own production of the correct form "leyendo" (followed by a little learning routine in turn 134). So through turns 129, 131, 133, and 135 Hena retrieves the grammar rule, "it is the gerund, after to continue because it is the average gerund after to carry on and to continue", and by doing so she enables Henry to move from the incorrect form *"a leer" to the correct "leyendo" through the even turns 130, 132, and 134. In this particular instance both learners' contrasting approaches to the task become their strength since Hena approaches this second part of the exercise by retrieving a grammar rule, while Henry makes the complementary attempt to actually try the verb forms.

129	Hena	pero continuo (.) es el=
		but carried on (.) it's the=
130	Henry	=no s no estoy seguro (.) continuo=
		=I'm no I'm not sure (.) carried on
131	Hena	=[gerundio
		=[gerund
132	Henry	[a leer?
		[to read?
133	Hena	después de [continuar
		after to [continue
134	Henry	[continuar leyendo leer leyendo (.) leyendo?=
		[to continue reading to read reading (.) reading?
135	Hena	=si es leyendo porque es el gerun gerundio average(.) después de seguir y continuar ((she recalls? a grammar point studied in class))
		yes it's reading because it's the gerund average *gerund (.) after to carry on and to continue*

Mapping knowledge

Another way in which learners take advantage of the collaborative act to engage in L2 processing is by questioning their partner's output and mapping it against their own knowledge. The following episode involves the co-translation of the sentence "her boyfriend doesn't know how to play the piano."

Excerpt 23 (CT2): MG7

24	Hena	((giggles)) "avanzar"
		"go on"

25	Henry	((quietly reads the instructions on the screen)) su novio ((typing)) *her boyfriend*
26	Hena	novio *boyfriend*
27	Henry	novio *boyfriend*
28	Hena	no *doesn't*
29	Henry	no sabe no *doesn't know*
30	Hena	si no sabe *yes he doesn't know*
31	Henry	no sabe *he doesn't know*
32	Hena	tocar *how to play* ((in Spanish how is not necessary))
33	Henry	tocar si tocar el piano (.) el piano o el *to play yes how to play the piano* ((pause)) *the piano or the*
34	Hena	umm
35	Henry	how cómo tocar? es (.) es sabe tocar ((pause)) no sabe cómo tocar? o tocar? tocar how *how to play? Is it (.) is it he knows how to play* ((pause)) *or knows to play? or to play? to play*
36	Hena	umm
37	Henry	si tocar [el] piano, *yes to play* ((without how)) *[the] piano,*
38	Hena	[el] ((pause)) el piano ((smile)) *[the]* ((pause)) *the piano*

From turn 24 to 32 Hena and Henry proceed with the task of translating the sentence by means of co-construction, that is to say they co-build language by repeating what their partner said and building on it to develop the structure in hand. However, in turn 33 there is a change in Henry's performance. At first, he accepts Hena's suggestion "tocar" as a translation for "how to play" which is the correct form in Spanish, since the "how" becomes redundant, but then he becomes engaged in dialogic thought about the structure, e.g. a pause followed by the repetition of "el piano" and the introduction of the disjunctive conjuction "o" (or) which suggests he is thinking about a different option. The second part of this turn indicates - what becomes apparent later on - that Henry is questioning the need for "como" (how) before the verb "tocar" (to play) even though he just repeats the phrase "el piano". Hena's backchannel cue "umm" in turn 34 encourages him to bring forward his language questioning by making his thought explicit in turn 35 where he reveals he is contrasting the target language structure against the knowledge of his L1.

This process of "matching up" or "mapping" one structure over another can be compared to the processes described by Gass and Selinker (1994) when referring to intake in language learning,

> ...it is that component [intake] where psycholinguistic processing takes place. That is, where information is matched up against prior knowledge and where, in general, processing takes place against the backdrop of the existing inter-segmentation of grammaticization on the basis of perceptual salience or semantic transparency, together with other cognitive principles of storage, mapping and analysis, learners gradually internalize the target structure of the input into the developing language system (in Doughty, 2001:215).

However, what we can see in this microgenesis episode is that some of the processes described by Gass and Selinker as part of the internalisation process are occurring *through* and, importantly, *because of* the regulatory mechanisms brought about by the inter-mental activity in which these two learners are engaged. Henry starts turn 35 being very much object-regulated, having to linguistically "point at" the trouble source and contrast it in both languages, "how cómo tocar? is it he knows to play or knows how to play?" and then goes on, at the end of the turn, being aided by the verbalization sound of "or to play? to play" to finally achieve regulation in turn 37 while uttering the whole correct verb phrase "sí tocar el piano" *(yes to play the piano)*. Although in these last stages of the episode Hena just intervenes twice with backchannel cues (turns 34 and 36), her assistance in the internalisation process, incidental as it might be, is essential. On the one hand, she produces the correct structure in the first place thus triggering Henry's processing, and on the other hand, the session sound recording clearly shows that they are both fully addressing and attending to the other. So Henry's efforts to *communicate* to Hena his questioning of whether they should include "como" (how) as part of the translation are, at the same time, *facilitating* his language internalisation.

This chapter has provided a qualitative insight into the kind of dialogic activity learners engage in to co-construct knowledge. The nature, and main purpose, of the study did not allow for direct correlation between collaborative activity as carried out during research task implementation and individual achievement as shown in grammar tests applied at the end of the academic term. However, the following section reports on the

investigation of possible influence of collaborative activity upon individual achievement as reflected in post-grammar tests (see appendix three) which was carried out as part of the study.

5.3.3 Pre and Post – Grammar tests

Due to absenteeism during the first and last day of the academic term when data collection took place, only eleven out of the eighteen participants took both the pre and post – grammar tests and in this section I refer to these participants. The tests concentrated on four target structures: personal pronouns, infinitive verbs, radical changing verbs, and ser *versus* estar. These structures were also the foci of the research tasks although other language was also included, for instance not all the gaps in gap-filling exercises needed these target structures, and the translation and jumbled sentence exercises naturally contained varied language. During collaborative activity learners themselves chose/ needed to work on language that was part of the context rather than the exercises as such, e.g. instructions, general text in the tasks, their own creative language, etc., all this reflecting the classroom setting of the research project. Table 16 shows the percentage of HQC episodes that were directly related to target grammar structures tested by means of the pre and post – grammar tests.

Table 16: Percentage of HQC episodes relating to target grammar structures

	Task 1				Task 2				Task 3			
	CT1	2CT1	PT1	2PT1	CT2	2CT2	PT2	2PT2	CT3	2CT3	PT3	2PT3
Total No. of LREs	28	29	26	38	14	12	12	12	16	2	19	14
No. & % of HQC episodes	9 32.1%	7 24.1%	7 26.9%	14 36.8%	4 28.5%	7 58.3%	5 41.6%	0	1 6.5%	0	9 47.3%	2 14.2%
No. & % of HQC episodes relating to target items	3 10.7%	3 10.3%	1 3.8%	6 15.7%	1 7.1%	2 16.6%	2 16.6%	0	0	0	2 10.5%	0

As can be observed by means of this raw quantification, although some learners had reasonable opportunities for potential language development these opportunities did not specifically involve the four target structures that were tested in the research tests. Most

of the target language development potential was dictated by the learners' own agendas and needs. This issue has already been identified in the literature and some researchers advocate the development of tailor-made post research task tests (*cf.* Swain and Lapkin, 1998; Spielman-Davidson, 2000) in an effort to specifically investigate the relationship between collaborative dialogue as Swain (1995) puts it and language learning. Table 16 also shows the number of HQC LREs where learners specifically worked on the target structures. Although the percentages are not particularly high, it must be pointed out that learners were constantly exposed to the structures throughout task implementation and focused on them, but they were doing so in occasions when the opportunities for development were not present, either because neither/none of the participants had the knowledge to contribute or because they were competent enough to simply move along the particular exercise without "noticing a gap" in their knowledge. These were the LREs which were not considered HQC. The second issue to emphasise before discussing the pre and post grammar tests results is that, as pointed out in the research design section, learners received formal Spanish lessons -focusing on those target structures - before and after they worked across the 3 research tasks which for the students were simply part of their Spanish language module. However, since their post test was not part of their formal grading, learners were not informed in advance about its administration in order to avoid special preparation before taking it. Table 17 then shows the results of the pre and post grammar tests and the improvement in post-test scores calculated in percentage terms. The table also shows the number of HQC episodes centred on target items in which individual learners participated during the research tasks.

Table 17: Pre and post grammar tests

Participant	Pre-test score	Post-test score	Improvement (%)	Participation in HQC episodes
Fred	6 / 27	11 / 27	83.3	2
Mina	16 / 27	23 / 27	43.7	5
Sue	16 / 27	23 / 27	43.7	6
Jack	15 / 27	20 / 27	33.3	2
Conny	9 / 27	12 / 27	33.3	0
Gill	14 / 27	18 / 27	28.5	3
Jean	14 / 27	17 / 27	21.4	0
Liam	11 / 27	13 / 27	18.1	1
Ellen	19 / 27	20 / 27	5.2	5

Participant	Pre-test score	Post-test score	Improvement (%)	Participation in HQC episodes
Hena	21 / 27	22 / 27	4.7	2
Henry	14 / 27	14 / 27	0	1

Most students –with the exception of Henry who obtained the same result- did better in their post–tests with the two strongest students - Ellen and Hena - showing the least room for improvement. The numerical results and available sets of pre-post tests do not support a specific link between participation in HQC episodes centring on target items and test performance improvement. Fred whose test shows the highest improvement only participated in two target HQC episodes in task 2 (2CT2). Mina and Sue whose percentage of improvement was 43.7, participated in 5 target HQC episodes across 2 tasks (task 1 and 2) (Mina) and 6 in task 1 (Sue). Jack participated in 2 (Task 3) and Conny, whose percentage of improvement was similar to Jack's, did not participate in any HQC episode. Gill (28.5%) was involved in 3 such episodes; Jean, who showed some improvement (21.4%), in none; Liam (18.1%) in 1; Ellen, who only showed a 5.2% of improvement in the post test, worked with Mina across two tasks and co-created the same number of target HQC episodes, 5. Hena (4.7%) participated in 2 across tasks 1 and 2; and finally, Henry who worked with Hena in task 2 and participated in one target HQC episode, did not show any improvement.

In the case of three (Fred, Mina, and Jack) of the eleven students whose pre and post tests were available for comparison there is, however, qualitative evidence that they took part in the co-creation of HQC episodes relating to grammar structures which appear to have been internalised judging by their post–grammar tests. Mina showed improvement in most areas, personal pronouns, use of infinitives, and *ser vs estar* - to a lesser degree. In relation to pronouns, and specifically to the indirect object personal pronoun "le" there appears to be a gradual progress from total absence where she needed it in her pre-test, to a hesitant contribution during a HQC episode in task 1 where her partner Ellen provided metalinguistic reassurance (see Excerpt 18 above), to producing it correctly in her post-test. The second instance relates to the use of the infinitive with the phrase "acaba de" to express immediacy, e.g. "Acaba de comprarlo" (he/she has just bought it). Mina - and this also relates to Fred who was working with her and Ellen in that particular session - was involved in the co-creation of a highly intense and long HQC episode that involved the successful translation from English into Spanish of the above sentence. Both Mina

and Fred progressed from erroneous production in the case of the former, and not even attempting to produce the structure (Fred) in their pre-tests to being able to produce the correct translation of a sentence also requiring "acaba de" plus an infinitive verb. Finally, Jack and his two partners worked together in task 3 and co-constructed a complex microgenetic episode related to the use of "ser" *versus* "estar", his post-test also reflects an improvement in this area. In spite of the fact that it is not possible to accurately assess the degree of influence that collaborative activity exercised upon the appropriation of the structures in question, it is encouraging, from a Sociocultural approach, to be able to witness a process that might have contributed to the students' progression from other to self-regulation.

5.4 The role of the computer

The second research focus was the investigation of the computer as a mediational tool for collaboration in the classroom. Although the role of the computer has naturally been discussed as part of the general issues addressed throughout the chapter, here I present a summary of results that are particularly relevant to the investigation of the computer. Section 5.4.1 discusses the role of the computer across the three tasks and presents a comparative summary of talk foci, i.e. language related talk, task related talk, and off-task. Use of semiotic mechanisms in the CALL tasks is discussed in section 5.4.2 whereas section 5.4.3 focuses on the impact of the machine on collaboration.

5.4.1 Collaborative activity at the computer

Across the three tasks, there were no striking differences between the percentage amounts of talk for language related matters, task related activity, and off-task activity. Learners working on paper engaged in 4% more language related talk than people working at the computer, with virtually no difference (1% more on paper) in terms of task related talk. Students at the computer engaged in 7% off-task conversation whereas paper-based learners in only 2%. The medium influenced off-task conversation in that some of the computer off-task talk was caused by distractions directly related to the computer, and paper-based learners normally engaged in off-task conversation while having to wait for the teacher to check their work. As Table 18 and Table 19 show there

are more important medium related differences across individual tasks both in relation to talk foci and HQC collaboration.

Table 18: *Percentages* of talk foci between mediums

% of text units	CT1	PT1	CT2	PT2	CT3	PT3
Language Related Talk	59.5	67	66.5	55.5	17.5	34
Task Related Talk	31	33	29.5	41.5	75	64.5
Off – Task Talk	9.5	0	4	3	7.5	1.5

Table 19: HQC comparison

	CT1	PT1	CT2	PT2	CT3	PT3
Total No. LREs	57	64	26	24	17	33
HQC Episodes	16	21	11	5	1	11
MG Episodes	3	5	5	2	0	7

These tables and figures are discussed in the following sections.

Task 1: *"Profesionales de hoy"*

In task 1, an interview reconstruction primarily based on gap filling, learners working on paper engaged in a higher percentage (67%) of language related talk than learners working at the computer (59.5%) whereas for task 2 the results were the opposite, there was a higher percentage of language related talk at the computer (66.5%) than on paper (55.5%). There is a sharp difference in task 3 where learners working on paper showed a much higher degree of language related talk (34%) than learners at the computer (17.5%). In task 1 the difference observed in relation to language related talk is more related to the amount of off-task conversation learners engaged in than to the medium itself. One of the computer dyads spent some of the task time socialising because they had never worked together before, and they obviously needed to establish a socio-affective basis before they embarked on the task. The other computer-based dyad who also spent some time off-task also needed to do so, as they got slightly diverted from the

task to talk about how to type in orthographic accents on the computer, and although this was not particularly important for one of the participants, the other one made recurrent efforts to find out throughout the session.

Consistently with the amount of language related talk, more LREs were identified in the dialogue of paper-based learners (64) than in computer-based ones (57, see Table 18 and Table 19 above). Of particular importance, however, is the amount of HQC and microgenetic episodes (MGEs) identified in task 1. Learners working on paper co-constructed 21 HQC episodes (HQCEs) of which 5 were considered microgenesis, and these figures were 16 and 3 respectively for learners working at the computer. The computer played a limited role in the learners' collaborative achievement of HQC. In the case of HQC constructed around targeted items, i.e. pronouns, infinitive verbs, radical changing verbs, and *ser* versus *estar*, learners had access to immediate feedback from the machine, which could be potentially valuable to reinforce the recently constructed knowledge. Furthermore, in a minority of targeted HQC items, negative feedback from the computer made the learners continue working on those items. However, the teacher actually scaffolded 4 out of the 16 HQC episodes at the computer and 7 out of 21 in the paper-based version. There were no significant differences in relation to task-related talk in this task between the two mediums.

Task 2: *"Hermanas dotadas"*

Learners' talk in Task 2, the macro problem-solving task based on micro problem-solving linguistic exercises such as translation, gap filling, caption writing, and jumbled sentences, shows interesting differences between the mediums. The percentage of language related talk (see Table 18 above) was higher at the computer (66.5%) than on paper (55.5%). In spite of this, the amount of LREs is very similar in the two mediums (see Table 19: HQC comparison
), 26 at the computer *versus* 24 on paper). There is, however, a clear difference in relation to HQC with computer-based learners able to co-construct 11 HQC episodes out of which 5 were identified as MGEs. In the case of learners working on paper, they only constructed 5 HQC which included 2 MGEs. The machine played an important role in this kind of task; first of all, the availability of immediate feedback on demand meant that learners did not have to wait for the teacher to check their work and provide

subsequent clues and exercises which was the case for paper-based learners (for a detailed description of this task refer to chapter 3 section 3.3.1.4.1). Secondly, the specific kind of computer feedback provided, combined with the nature of the sub-tasks, encouraged learners to stretch their interlanguage and continue working on erroneous items, which in time led to a considerable amount of *reflective* talk and also contributed to 3 out of 5 MGEs. Precisely because of the importance of computer feedback hereby highlighted, special care needs to be accorded to the kind of feedback programmed in the task since there were also occasions where feedback created some confusion, e.g. the non-acceptance of a sentence because it was lacking a full stop. Finally, this particular task design gave computer-based learners more control and freedom as to how and when they wanted to tackle the macro problem-solving task. Paper-based learners did not have this choice, pace and range of "working tools", e.g. further exercises provided by the teacher, were dependent on the teacher's availability.

In terms of task-related talk, the higher percentage identified in the paper-based protocols (41.5% versus 29.5% for computer learners) was related to the following two main reasons: first of all, learners spent more time trying to figure out what they had to do to carry out the task in spite of having exactly the same instructions as their computer counterparts. Secondly, as outlined above, they spent longer working on the macro problem-solving task than learners at the computer. The indexes of off-task talk were very low in both mediums; the only dyad at the computer that engaged in off-task conversation did so at the beginning of the task because they had not worked together before. Off-task talk in the paper version was caused by learners having to wait for the teacher to provide feedback.

Task 3: *"La Ciudad de México"*

Task 3, was a variant on dictogloss where learners had to *read* a short text about Mexico City, and then reconstruct it. They also had a subsequent sub-task where they had to write a similar text about London. This task was the least successful of the three research tasks, with only one group out of four benefiting from it linguistically. Furthermore, its implementation on the computer fundamentally influenced the nature of activity away from language learning. The percentage of language related talk for the learners working at the computer was low, only 17.5% versus 34% for learners working

on the paper version, and there was only 1 computer-based HQC episode (see Table 18 and Table 19: HQC comparison
). The direct effect of the computer on the way learners interpreted and implemented the tasks was caused by the use of boxes to hold each word. The rationale for the design was to promote the use of key content words, such as the name of city symbols, as the basis for language discussion about grammar words to make sense of the content and recreate the text. However, the appearance of boxes on the monitor encouraged a mnemonic approach throughout the whole session because learners knew they needed to "remember" the text exactly as they had read it for the computer to accept it. Piper reports similar behaviour when referring to the talk of learners working on a COPYWRITE task: "[learners] are seeking to call up the words mainly from their memory" (Piper, 1986:192). This software is based exactly on the same principle as our task 3, learners read a text on screen and then try to reconstruct it with no help, but with dashes representing words. I believe that the fact that learners read the text instead of listening to it, as it is normally implemented in traditional dictogloss, also appealed to a reproduction of a seen "object" from memory rather than a reconstruction of a heard "text" which would be more difficult to reproduce exactly.

The dyad working on the paper version also followed a memory approach –even when they did not worry much about the spaces provided for words on their sheet- and these learners also kept very close to the original text when they wrote their own text about London. Neither of the two dyads at the computer finished the reconstruction task. The triad working on paper approached the task from a more creative perspective which produced the best results, 45% of language related talk, and 9 HQC episodes that included 7 MGEs, more - as a group - than any of the other dyads/groups across the three tasks. The results from this successful triad bear resemblance to the kind of activity reported by Swain and Lapkin (2001), whose dictogloss students focused on form while discussing their language problems, "brought to conscious attention gaps in their own knowledge", engaged in hypothesis testing and built on each other's resources (2001:110).

The fact that language related work at the computer (17 LREs in total, which included 1 HQC episode) did not provide learners with opportunities to stretch their interlanguage and co-create zones of proximal development also reflects the nature of learners'

activity. They were working from the memory of a recently read text, and the language they focused on was either within their memory grasp where they were making spelling corrections, for instance, or simply involved self-corrections. Even the limited amount of LREs (3) where learners engaged in some reflective activity and could have potentially led to some creative use of vocabulary, for instance, was cut short by the sudden recollection of a word in the text, ending thus the creative exploration they had initially embarked on. The delivery of this task via the computer meant a task transformation from "open" - as the paper version was - into "closed" where the gaps of the computer required discrete, precise information (*cf.* Loschky and Bley-Vroman, 1993).

Task-related talk, which represented a large percentage in both modes of implementation, 75% for computer-based and 64.5% for paper-based interaction, was - as language related talk - qualitatively different. Learners at the computer engaged in more meta-task commentary, as well as planning how to tackle the exercise, whereas learners on the paper version engaged in more task-implementation talk. Text reconstruction was supported by cumulative repetition, for instance, without necessarily focusing on form while doing so. Off-task conversation, 7.5% at the computer, was related to keyboard combinations to type orthographic accents, and some socialisation. The minimal off-task percentage among learners working on paper (1.5%) was an interesting mini-discussion brought up by the general topic of cities that was the basis for their activity.

5.4.2 Semiotic mediational mechanisms

Analysis of the amount and ways in which learners deployed semiotic mechanisms such as *repetition*, *L1*, and *reading aloud*, provided more information about the nature of tasks, and the nature of linguistically mediated activity, than about differences between the medium of implementation. However, there are some interesting patterns that emerged in the study. In relation to repetition, there was a total of 678 instances across the data where learners made use of this mechanism, and 58.8% of those instances was found in computer-based protocols. There are some differences among the three tasks, as more repetition was deployed at the computer in tasks 1 (21% *vs* 11.5%) and 2 (21.6%

vs 7.9%), but not in task 3, where paper-based learners percentage was 21.6% *vs* 17% for computer-based ones. I believe these differences are related to the nature of the tasks.

Tasks 1 and 2 were based on a series of sub-tasks, as opposed to task 3 which relied on a single activity frame involving the reconstruction of a text, and the possibility of creating another text based on the original input; however, learners at the computer did not have time to engage in this second part of task 3. I believe that the higher percentage of repetition - and reading aloud - in CALL tasks 1 and 2, is partly related to the fact that learners knew that by pressing a button ("avanzar", *advance*) the current information would disappear to be replaced with a new exercise or sub-task, therefore the necessity to keep the partner(s) aware of the focus of attention was bigger than on paper. The paper tasks involved a less dramatic way of information change, as well as the possibility of seeing more of the whole task at any one time than on the screen - in the case of task 1- and the lack of control to change or move forward anyway for paper-based learners in the case of task 2 since the teacher had the control. Secondly, the data suggests that learners felt a constant need for control sharing while working at the computer, and repetition was a means to achieve this. Piper's description of conversation of students working on a CLOZEMASTER task also records a high deployment of repetition, which she describes as "echoic speech" and suggests might be used as "a gap-filler or given as an operating instruction" (Piper, 1986:194). I must emphasise that there was no competitive behaviour among computer users, nor disputes over control of keyboard and/or mouse; the sharing of control seemed a natural, inter-mental supportive action throughout task implementation with both/all learners deploying the mechanism to share control, not only the learner in charge of the hardware. Finally, learners working at the computer across the three tasks showed a greater need to "keep in touch" with each other than paper-based learners, as reflected in the considerably higher deployment of repetition for socio-affective functions.

The use of repetition in task 3 is quantitatively and qualitatively different. A similar number of repetition instances was identified in both mediums of task implementation, 42 instances at the computer versus 47 on paper. However, learners at the computer deployed this mechanism primarily as a recalling tool, to bring to memory the text they had just read, as they had read it, whereas paper-based learners deployed it to "join forces" semiotically for the re-construction of a text similar, but not necessarily identical,

to the original. Learners used repetition to build up the text co-construction by repeating a learner's suggestion, and adding to it. Not surprisingly, since work on the target language was very limited in the computer version of this task, learners on paper used repetition to a much higher degree for language related purposes.

The use of reading aloud was considerably higher for learners working at the computer in tasks 1 and 2. I believe the reasons for this are similar to the reasons explored above in relation to repetition. However, reading aloud is intensely deployed as a working tool to contextualise and evaluate language, and problem-solving, suggestions. Learners working at the computer appear to have a need for continuous verbal contact with each other. Judging by the complexity of interaction that arises from the dual flow of communication, i.e. between learners themselves, and between learners and computer, I am also inclined to think that the higher levels of repetition and reading aloud in the CALL tasks evolve as a way to integrate the machine as an active "member" during interaction. After all, learners do expect feedback from the computer, receive information from it, etc.

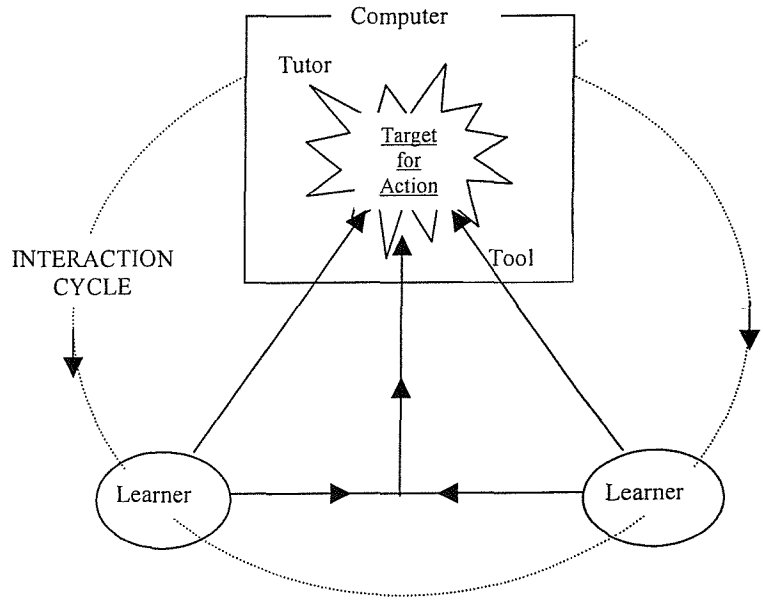
A much higher level of L1 was used by learners working on paper (21%) than by learners working at the computer (11.5%). However, variation across protocols both in relation to amount and functions of English indicates that the use of L1 is more dependent on individual styles than on medium of implementation. As Table 6 in section 4.3.1 shows, in task 1, for example, one of the two dyads (Joe and Gill) working at the computer deployed a much higher percentage of L1 (29%) than the other (5%), and a similar situation is recorded for paper-based learners where a triad's percentage of L1 use is 24% whereas the dyad working on paper deploys a lower 13%. Furthermore, when Joe worked on paper-based task 2 with Nora, another high user of English, they used the highest L1 percentage for task 2 (36%) whereas in the other three protocols the percentages are 7% in both computer-based groups, and 12% for the second paper-based partnership. Finally, in task 3, Nora worked with Jean (high user of English as well, see Table 9: Amount of English use by individual students) on the paper version of this task, and their L1 percentage is 37%, whereas in the other three protocols the percentages are 7% again for both computer-based groups, and 6% for the second paper-based partnership. Therefore it appears that learners who are inclined to use L1 would do so with or without the machine.

5.4.3 Impact of the computer

Due to the fact that the study was designed to support a comparison between two mediums of task delivery, computer and paper, a compromise was necessary. The use of potentially powerful computer features such as multimedia and hypertext that could have led to an unbalanced comparison of collaborative activity was avoided. However, assets of the computer, such as the possibility of integrating immediate and tailored feedback and features such as drag and drop, random jumbled sentences, etc., were deployed because the presence of the teacher to provide requested feedback and assistance meant that learners working on paper were not inherently disadvantaged. The impact of the computer hereby discussed, therefore relates to some intrinsic characteristics of the machine, although it could be argued these are also more limited in scope.

To learn about the impact of the computer in dyadic collaboration, it is necessary to examine its role as part of the situated interactive process, and then consider what aspects - and to what degree - can be generalised to 1) further our understanding of CALL; 2) assess its potential as a pedagogical tool; and 3) support further research into the field. Figure8 below represents the different dimensions considered for data analysis:

Figure 8: Interaction Cycle at the Computer



The interaction cycle above reflects the complexity embedded in the study of the computer's roles in the processes of collaboration since those roles are dependent both on design of the materials, and also on the situated relationships that emerge during activity. The solid arrows represent the flow of communication from students – individually and as a dyad/group- towards the computer whereas the discontinuous line represents both the effects that actions bring back to the learners as well as the "response" of the computer towards learners' output, e.g. in the shape of computer feedback. CALL researchers such as Meskill (1999), Mohan (1992), Chapelle (1997, 1998, 1999, 2001), Crook (1994), to mention but a few, have long been calling for the investigation of key issues relating to the computer in the classroom that I have summarised by means of the following questions:

1. How do students make use of the computer as a tool for mediation both between themselves, and/or between actions and knowledge?

2. How do students approach the computer in its role as tutor, e.g. as a provider of information? as a provider of answers to their questions?

3. How is the presence of the computer manifested throughout interaction, e.g. physically, mentally? Does the computer shape or transform either physical or mental processes? In other words, does the computer make a difference in the processes of collaborative activity?

5.4.3.1 The computer as tool and target

The computer has a dual role throughout activity: it is both the enabling tool for action and the target for that action. Some aspects of this dual role can be identified and isolated for analysis purposes, but in the language classroom, the duality becomes a unified entity during the processes of collaborative activity. As a tool, the computer facilitates activity and interaction, as a target for action, it becomes the physical mediational means and the mental focus of attention. Unsurprisingly, the intrinsic qualities of the monitor as such appear to have a stronger visual impact than information delivered on paper. Learners working at the computer, for instance, tended to show more attention to gaps on the screen than on paper; this "attention" was evident in direct allusions to the presence of gaps and talk related to them, e.g. when talking about the number of words that each gap might hold.

As well as the high rates of repetition and use of other semiotic tools throughout interaction (see section 5.4.2), the output of learners working at the computer - particularly those working on the dictogloss task - was characterised by the use of deictics and "fragmented" or "incomplete" utterances that were linked to the presence of the screen. This kind of exchange is illustrated in Excerpt 24 below:

Excerpt 24 (CT3): Focus on the screen

206 M los mujeres
women ((using wrong definite article))
207 E las
the ((correct definite article))
208 M no no aqui creo
no no here I think
→ 209 E oh aqui?
oh here?
210 M creo si las mujeres umm e (.) tienen
I think so women umm e (.) have
→ 211 E pero tenemos [una junta aqui
but we have [one together here
→ 212 M [los ah si,
[the ah yes
→ 213 E entonces
then
214 M ah si claro
ah yes of course
→ 215 E piensas que es
do you think it's
216 M lo siento
I'm sorry
217 E no no las mujeres si? tienen los [ojos
no no women yes? have eyes
218 M [tienen los ojos grandes ((e laughs)) recuerdas?
[have big eyes ((e laughs)) do you remember?

Discussing the role of semiotic mediation in the processes of internalisation, Crook (1994) points at the possibility of exploiting prolepsis as an aspect of communication that may aid the construction of effective instructional dialogue. Prolepsis "...refers to communication in which interpretation of the message requires some grasp of the speaker's presuppositions - understandings which are left unstated" (1994:85) and occurs on regular basis during conversation. As can be observed in Excerpt 24, the presence of the screen during the dialogic activity of the couple mediates the listener's need to

cognitively complete the apparently "incomplete" utterances of the speaker. From turn 211, Ellen makes use of the screen to complement a partially developed proposition whose objective is to make Mina re-think her suggestion for the text reconstruction that does not correspond to the number of gaps they have on the screen. The "unstated" premise can, however, be interpreted by Mina by visually completing what is verbally missing. In turn 211, Ellen omits the word "palabra" (word) or "caja" (box/gap), but verbally guides her classmate to the screen –and consequently what she means- with the deictic "aquí" (here). Although she goes on to develop her idea in turns 213 and 217, Mina is already mentally ahead as can be seen by her expressions of agreement in turns 212 and 214. What we are witnessing through this type of exchange is the co-construction of meaning by the two participants *and* the computer. Furthermore, the use of deictics emphasises the prominence of the screen in interaction since by "pointing at" the machine, the learners are making it a co-participant in the exchange. Both these aspects are practically absent in the paper-based protocols. The scarce use of deictics suggests the paper is simply a means of task delivery. Particularly in task three, interaction and cohesion are sustained through a sense of narrative created by the learners with expressions such as "the paragraph was/is about..."; then.."; the last phrase..." as well as repetition and other semiotic means.

5.4.3.2 The computer as tutor

The "teacher in the machine" (*cf.* Hubbard, 1996) was not conceptualised in the design of the research tasks as a provider of grammar tutorials or drill practice. The computer as tutor was seen by the teacher/researcher mainly as an organiser of collaborative activity and provider of supportive feedback. As an organiser of activity, the computer provides the learners with a rather fixed path for progression during task implementation. Although in theory learners could have skipped sections and then manoeuvred their way back by means of the toolbar in tasks 1 and 2 (task 3 only had one working screen frame) none did. However, there is no evidence in the protocols that learners working on the paper versions of the tasks followed a different path either, nor was there any evidence that learners wanted to get a sense of the whole task (e.g. read the whole text) before starting to reconstruct the interview, for instance.

Where the computer appeared to have more obvious resonance was in the pace of task completion. The pace of interaction in the computer-mediated tasks can be described as "controlled" by the dyad/group. The learners worked at their own pace and "interrogated" the computer, i.e. requested feedback in their own time. Once they had the feedback the students decided how to proceed either by continuing work on their mistakes until they could obtain accurate answers, or by skipping mistakes and proceeding with the rest of the task. On the other hand, paper-based learners were more restricted by the teacher's availability both to provide feedback and also to provide more working materials, especially in task two where the sequence of exercises and clues was provided by the teacher upon successful completion of a previous section. In terms of motivation, the computer appears to be a successful intrinsic motivator for task completion. This fact does not seem to be related to the computer as a novelty machine since according to the questionnaires learners completed at the beginning of the course (refer to appendix four) with the exception of two (out of thirteen that completed the questionnaire) the rest of the students possessed a computer and used it on regular basis, and everybody had easy access to a computer. Furthermore, the majority regarded the computer as a helpful tool to improve their Spanish grammar and an interesting source for work in the classroom.

The value of immediate feedback from the computer

Potentially, one of the most significant characteristics of computer feedback is that it can be provided immediately, and exactly when learners request it. This might be cognitively crucial because intervention takes place when learners' attention is actively focused on a particular form that has been identified as relevant and, therefore, feedback is provided within a pedagogical "window of opportunity" (*cf.* Doughty, 2001:257) or in a zone of proximal development. Excerpt 25 illustrates such computer-learner interaction:

Excerpt 25 (2CT2): immediate feedback

22 E "al concierto pues"
"to the concert since"
23 F "no pudo ir"
"he couldn't go"

24	E	umm era, "enfermo" *umm *was, "ill"*
25	M	"pues" (.) fue era *"since" (.) *went, *was*
26	E	fue fue? *went went?*
27	M	no se *I don't know*
28	E	fue *went*
29	F	fue ((someone types)) *went* ((someone types))
30	M	oops ((they laugh)) ay caramba *oops* ((they laugh)) *good grief*
31	E	fue *went*
32	M	fue *went*
33	E	corregir? *correct?*
34	M	uuu era ((typing noises)) *uuu *was* ((typing noises))*
35	E	oh ((pause)) pudo es (.) es pretérito si? y era *oh ((pause)) could is (.) is preterit yes? and was*
36	M	pues (.) estaba? ((pause)) estaba "enfermo" ((pause)) ((typing noise)) pistas *since (.) was ((correct form)) was "ill" ((pause)) ((typing noise)) clues*
37	E	una pista *a clue*
38	M	pistas ((they smile)) "e" *clues ((they smile)) "e"*
39	E	oh
40	M	otra pista (.) eee *another clue (.) eee*
41	E	estaba? *was?*
42	M	estaba! ((pause)) ((typing)) *was*! ((pause)) ((typing))
43	E	o no
44	M	perdón el *sorry the*
45	E	si aahh *yes aahh*

In turns 22 and 23 Ellen and Fred deploy reading aloud both to recruit attention to the problem they are dealing with, e.g., a particular gap, and also isolate and make salient chunks of language that hold semantic clues to solve the problem. In turn 24 Ellen advances a first alternative "*era" (*was) which is assessed and compared by Mina in turn 25 with her own proposal (*fue / went). As a good collaborator Ellen integrates Mina's alternative into the dialogue in turn 26 and from turns 27 to 32 the three learners

use repetition to focus on language and assess the option which happens to be incorrect. In turn 33 Ellen suggests they "ask" the computer to give its opinion on the alternative they have typed in the box, i.e. the verb "*fue" (went), by pressing the correction button. The only action produced by this button is either to integrate the written answer into the text if it is correct or to leave the box with what learners wrote in it if the answer is not correct so that they can continue working. Upon discovery that their answer is erroneous, Mina expresses some disappointment and returns to Ellen's original suggestion,"*era" (was) in turn 34. They ask the computer again and receive the same response. However, in turns 35 and 36 the participants get involved in the kind of reflective behaviour that was intended by the teacher/researcher when designing the tasks. In other words, they pause, think, use metalanguage, and indeed arrive at the correct answer, "estaba" (was). More importantly, the dialogue between learners and computer evolves strategically and they go beyond the correction button that they had utilized twice and select the "pistas" (clues) alternative instead before typing their latest option, "estaba". This is important because the learners successfully integrate the machine into their own interactive and reflective dialogue, albeit the computer contributions are at a very basic level. So from turns 37 to 40 they request two clues that prompt and eventually (turn 45) confirm their answer "estaba" as correct. The process hereby described enables learners to move forward in the task, it also provides them with a sense of achievement and closure before they continue work on the next gap, and importantly, the machine helps to dissipate any doubts regarding the accuracy of their answer. What each of the three learners might gain from the particular event they co-constructed depends on their individual states of development and is beyond the present discussion, but the role of the computer as an expert that provides requested assistance and in the end "knows" the correct answer is a valuable asset that can be exploited in the language classroom.

Two main problems, however, were identified regarding computer feedback across the tasks, one being that the machine feedback might induce or encourage learners to get engaged in *procedural* talk –as opposed to *exploratory* talk- and secondly the possibility of problems of a technical nature. Interference caused by either technical faults or by the difficulty of predicting every single possibility when programming the array of acceptable answers was sporadic across the data, but a couple of instances were identified. Particular attention, therefore, needs to be paid to the programming of this

feature so that all possible answers are accepted by the machine to avoid confusion and frustration among learners. This computer feature can be a powerful feature for collaborative activity, and section 6.2.2 explores some of its pedagogical implications.

5.4.3.3 The nature of activity and the computer

The study of linguistic mediational tools throughout the corpus has thrown light upon a fundamental issue in dyadic interaction; the nature of activity itself. The study of semiotic tools reflects the progression of situated behaviour in accordance to how the perceptions, motives, and goals of the dyad are modified as a response to both the changing requirements of task implementation and the influence of the computer upon activity. In terms of the computer's impact upon collaborative processes, the machine appears to have had an effect in the case of task 3. Not only did the medium change the nature of activity (see section below, "from collaboration to co-operation"), but it also seems to have interfered with inter-psychological reflection on the target language as evident in the limited amount of reflective activity throughout language related episodes. In this kind of task, meaning making was considerably constrained, depriving the learners of a space to exercise linguistic creativity.

From collaboration to co-operation

Two excerpts from computer-based task 3 (Excerpt 26 and Excerpt 27) contribute essential information in relation to inter-psychological activity as reflected by the deployment of repetition and its rich roles during activity. Furthermore, they represent pivotal moments in terms of strategic behaviour to complete the task. Excerpt 26 takes place almost at the beginning of the session, after a long pause while students were reading the text on the computer screen. After the text automatically disappeared the learners embarked on the following interaction:

Excerpt 26 (CT3): framing collaboration

6	E	lo leí *I read it*
7	M	una vez

		once
8	E	una vez
		once
9	M	si
		yes
10	E	tu también,
		you too,
11	M	si
		yes
12	E	vamos a leer otra vez o vamos a empezar?
		are we going to read it again or shall we start?
13	M	a empezar
		let's start
14	E	a empezar, ok
		let's start, ok
15	M	si [o no?
		yes [or not?
16	E	[si si si si podemos leerlo [una vez en cinco minutes
		[yes yes yes yes we can read it once in five minutes' time
17	M	[bien bien
		[right right
18	E	esta? ((laughter)) tres, dos, uno
		ready? ((laughter)) three, two, one,
19	M	vamos
		let's go
20	E	vamos ahh
		let's go ahh

From turns 6 to 11 students begin the creation of a common space upon which they can start tackling the task. They do so by assessing each other's position in relation to task performance, and adjust their individual attention foci towards a common point of departure. Once they have checked what they have both done - read the text once - they negotiate how to proceed (turns 12 to 17). Finally, in turns 18 to 20, the dyad gets ready to begin the reconstruction upon an equal regulatory basis, so much so they even count down to begin the task together.

Allo-repetition functions as a substitute for overt and explicit planning as to how they are proceeding with task implementation whereas self-repetition (turns 16 and 17) is deployed by both participants as a socio-affective tool that provides reassurance to the other. Subsequent interaction involves an attempt by students to reconstruct –as agreed- the text they had just read on the computer screen. However, the learners' reconstruction attempt is not successful, they cannot *remember* the text. They set out the task to try to co-retrieve the text as a memory exercise; the rigid layout on the screen (boxed blanks)

for each of the necessary words does not promote a focus upon the creation of meaning through language, but upon an inflexible and literal reproduction of the text. The students express their views on the task in terms of difficulty and their inability to remember. This interaction between machine and learners alters the dyad's initial approach towards the task and, therefore contributes to the subsequent change in the nature of their activity as reflected in Excerpt 27 below.

Excerpt 27 (CT3): from collaboration to cooperation

83	M	leer otro vez o *to read again or*
84	E	si *yes*
85	M	si quizás tu lees el primero párrafo *yes perhaps you read the first paragraph*
86	E	si?= *yes*?=
87	M	=y yo le eh leo *=and I rea eh read*
88	E	leemos los dos [solamente el primer párrafo *we both read [just the first paragraph*
89	M	[el segundo? si hay tres creo *[the second? yes there are three I think*
90	E	si hay tres *yes there are three*
91	M	pero um el último es (.) muy pequeño *but the last one is (.) very small*
92	E	si *yes*
93	M	tú lees el primero? *you read the first one?*
94	E	si *yes*
95	M	yo (.) leo el segundo *I (.) read the second one*
96	E	si *yes*
97	M	yyy [los dos el tercero *aaaand [both the third one*
98	E	[y los dos el tercero vale *[and both the third one ok*
99	M	ay
100	E	vale *ok*
101	M	vale *ok*

Excerpt 27 illustrates an intersubjective characteristic of scaffolding whereby the two participants 1) have to re-adjust their approach to the way they are tackling the task; and 2) do so by negotiating a strategy that eventually leads them to share the same understanding of that strategy. As was observed in Excerpt 26, they first try to tackle the task collaboratively, but then they have to modify their approach due to their struggle to *remember* the text.

What we witness in Excerpt 27 is then a metacognitive episode where students plan how to tackle the task after the difficulties they have experienced so far. At the beginning of the episode Mina takes control over the task strategically by advancing a suggestion as to what to do next and how to modify their approach to task. Negotiation takes place from turns 87 to 96 and finally, learners achieve a shared perspective and agreement throughout turns 97 to 101. As seen in Excerpt 26, repetition becomes again the semiotic means that enables learners to re-think their approach to task. Repetition plays three crucial roles in this episode. First of all, it is deployed by Mina as a cohesive device in turn 93 to clarify her proposed strategy after a brief negotiation exchange. When Mina proposes a subdivision of work by distributing the memorization task between the two there is some discrepancy as to which paragraph will be read by whom, so Mina uses repetition to regain dialogic cohesion. Secondly, repetition is deployed throughout as a cognitive tool for establishing a framework that allows them to gain regulation over the task. Finally, overlapping repetition and mirror repetition both reflect the process of *projection*[10] Ellen - as a good listener - is engaged in, and help the learners achieve shared strategic regulation and a high degree of mutual agreement towards the end of the episode, turns 97 to 101. It is clear here that the learners have established their plan of action and, as they did in Excerpt 26 above, they echo each other in total agreement previous to action.

However, Excerpt 27 represents a turning point in the nature of activity which becomes predominantly cooperative rather than collaborative. In the words of Roschelle and Teasley,

[10] The process of *projection* in conversation refers to the listener's work "to [not only] understand what has been said [but also] map along with the utterance in progress while moving beyond to consider what may follow... the listener anticipates what might come next in the speaker's production, making predictions about how the utterance may continue" (Ohta, 2001: 78)

> [there is] "...a distinction between 'collaborative' versus 'cooperative' problem-solving. Cooperative work is accomplished by the division of labour among participants, as an activity where each person is responsible for a portion of the problem-solving. ... collaboration [is seen as] the mutual engagement of participants in a coordinated effort to solve the problem together" (1994:70).

From this moment, the dyad's consciousness becomes temporarily individualised in terms of task implementation. The collaborative effort becomes disrupted until the learners gradually re-build it to focus together on the reconstruction of the third and final paragraph of the text. Most importantly, from a CALL perspective, the influence that the computer has upon the way the learners perceive, interpret and re-interpret the task is evident throughout activity, but can also be specifically observed during critical moments such as the ones underlined above.

5.4.4 Conclusion

The study has shown that, throughout activity, the computer's presence - as a sophisticated technological tool - in the language classroom becomes a catalyst where the teacher/ designer's conceptualisation of task becomes realised, and necessarily transformed by the learners' own personal and educational histories. Therefore, assessing the impact and potential benefits of the machine is best served by detailed analysis of the learners' activity.

Although the study suggests that some intrinsic qualities of the machine can have an effect upon collaborative activity, e.g. exposure to a monitor, and immediate feedback, further research needs to be carried out in order to be able to make more specific and generalisable comments. However, I believe the theoretical framework underlying this study represents another step away "...from asking which medium was a better teacher to a concern with which 'attributes' of media might combine with learner traits under different task conditions and performance demands to produce different kinds of learning" (Clark, 1983:473 in Dunkel, 1991:21). Well designed CALL tasks can add a dimension to collaborative activity by exploiting its potential without undermining the fact that high quality collaborative activity is, in the end, what learners co-construct with the help of physical and psychological tools.

As above shows, in relation to interaction, the role of the computer is a complex one; interaction is carried out in a bi-dimensional plane. The screen becomes a participant in interaction as reflected sometimes by elliptic qualities in the learners' language, and its presence is reflected through prolepsis, for example. The fact that the computer offers information at the physical level of students' sight, and the cursor keeps flashing as if in expectation of some action, etc. appears to influence the learners' attitude towards the machine, as the constant need to "talk" to it and the high use of repetition suggest. The computer is a constant, if unstated, presence between the learners. Communication can be permeated by the computer since the machine is both its tool and its target simultaneously. Ideas and hypotheses about language are sometimes communicated between, and/or co-created by learners *through* the computer while they are, at the same time, together "communicating" *with* the machine. Although this might potentially add cognitive load during the processes of knowledge construction, there is no such evidence in the corpus; percentages of HQC, for instance, seem to depend more on other factors, for example task characteristics, learners' motives, goals, and styles, etc. What is clear through analysis is that the computer permeates interaction in a way that paper does not.

5.5 The tasks: a final review

This section briefly discusses some findings that have not been addressed above, for example some specific notes on the observed impact that structural, cognitive, and sociocognitive characteristics of the tasks might have had . Section 5.5.3 presents a global overview of the tasks and some pedagogical implications.

5.5.1 Structural characteristics

The three research tasks were designed on a problem-solving basis to different degrees and with different foci. The tasks were also based upon three different structural designs. Task 1, "Profesionales de hoy" was based on a simple, predetermined linear structural principle. Task 2, "Hermanas dotadas" required work on sub-tasks so that a more global task, a macro problem-solving task, could be completed. The structure was more complex than that of task 1, and learners were also given the freedom to decide whether they wanted to interweave work on the main problem-solving exercise with the

target language sub-tasks, or whether they wanted to leave the main problem until they had finished the language sub-tasks. Task 3 "La Ciudad de México" had a freer open-ended structure with the aim of reconstructing a text.

These structural characteristics had some repercussions in terms of activity. The low levels of meta-task activity appear to be related to the predetermined structural nature of the tasks; learners did not have much choice as to the order in which they were going to carry out the tasks. Planning and evaluation were not naturally supported, particularly for tasks 1 and 3, although higher levels of meta-task activity were expected for task 2. Surprisingly, it was task 3, as implemented by a computer dyad, where a clear change in strategic approach to task was observed as a direct result of the medium (see section 5.4.3.3). Repetition and reading aloud were mechanisms that supported meta-task procedures.

The data also suggest that when tasks are less structured, for instance task 3, learners do not need as much use of bonding tools, e.g. reading aloud or repetition, to signal awareness and acknowledgement of the other. This might be the case since they are working actively together in the reconstruction of the text. There was a difference in tasks 1 and 2 where learners seemed to need to keep signalling where they were focusing, and also that they were aware of the other's presence.

5.5.2 Cognitive and Sociocognitive characteristics

All the tasks were based on familiar formats such as gap-filling, jumbled sentences, translation exercises, and freer writing; the combination of transformation exercises, completion, production, and organisational sub-exercises did not present problems. However, task two presented the learners with a more challenging problem-solving endeavour, which led to some confusion. Familiarity with the topical content of the tasks did not appear to have overloaded learners cognitively; some vocabulary was unknown to the students, but this was considered a supportive feature for interlanguage development and motivational challenge.

The tasks did not necessarily require collective decision making, nor was information necessary for task completion distributed among individuals so that they had to work

collaboratively. At the beginning of each session learners were asked to work collaboratively and they were also reminded of this through the instructions, but all the necessary information was available to the dyad/triad as a group at all times. As we have pointed out throughout the study, learners constantly worked in partnership.

5.5.3 Conclusion and pedagogical implications

Variability across the dyads/groups in terms of performance highlights the need to evaluate and discuss tasks as blueprints for activity (*cf.* Coughlan and Duff, 1994). The results of this study reflect the activity that took place among specific learners under specific circumstances. I hope, however, that the observations that emerged throughout the study in relation to task and medium of implementation are a relevant source of information for teachers, designers, and other researchers to make their own judgments as to the applicability of these findings for their own practice.

Keeping the above observations in mind, I believe the dictogloss was the least successful of the three tasks, and when implemented at the computer was a very limited source for language related activity. In its paper version, however, the motivation and creative approach of a group of participants made of the task a meaning making experience. Task 1 proved to have certain useful features, such as the opportunity for learners to explore their own ideas and stretch their interlanguage in order to express them; the main gap-filling format provided opportunities for form focused discussions even when this type of exercise could have led to its individual resolution. A downside of this task was the requirement for learners to work on gap-filling for too long; this, I believe, undermined learners' efforts to make a better use of the semantic and syntactic context surrounding the gaps. The integration of macro and micro problem-solving endeavours in task 2 showed mixed results. Most learners did not find the macro problem-solving task relevant to their language class and therefore relegated it as an exercise to do after the "proper" work on language; however, learners who worked on this did so mainly in Spanish. Based on this study and other reports on the use of problem-solving tasks that are not obviously language oriented (see comments about "Lemonade Stand" in Abraham and Liou, 1991) I also believe caution needs to be observed not to cognitively overload learners to a degree where the concern for linguistic activity is overshadowed.

In relation to the micro problem-solving tasks based on language, the translation and caption writing exercises were the most successful in task 2, with jumbled sentences being the least linguistically motivating. Even when learners are expected to work at syntactic level in order to create meaningful sentences, there is very little evidence that they do so, and the drag and drop facility (very popular in commercial CALL programmes) when this task is implemented via the computer invites, in my view, a trial-and-error approach.

6 Conclusions: Theoretical and Pedagogical Implications

6.1 The processes of collaborative activity: theoretical implications

Sociocultural theory postulates that knowledge is created inter-psychologically, not conceived as a pre-existing product to be exchanged, and that the co-construction of knowledge is always mediated by either physical or psychological tools. Learning takes place as a collaborative act where zones of proximal development are created by the participants, who are agents with their own social perspectives and histories, goals, and attitudes; learning is a situated activity "therefore it unfolds in different ways under different circumstances" (Donato, 2000). Throughout this investigation we witnessed the mediated co-construction of knowledge by the participants. The learners made use of semiotic mechanisms to different degrees and for different purposes thus reflecting their tasks perceptions, and their particular goals and needs. Although variation across the protocols reflects the situatedness of activity, it was also possible to establish a comparative assessment of the tasks value to support collaborative activity, as well as investigating the role of the computer as a mediational tool during collaboration.

6.1.1 Co-created knowledge

The research framework supporting the investigation proved to be an effective way to study both the shared mental space where intersubjectivity was conducive to problem-solving activity, and the specific ways in which learners co-created knowledge through collaborative dialogue with and without the computer. The three research tasks provided the students with different degrees of support for language learning and through analysis of the recorded transcription of their dialogues, it was possible to gain a reasonable idea of the amount of collaboration, high quality collaboration, and use of semiotic tools involved in each of the tasks. I believe that this study also represents a useful step forward in the area of CALL where the few studies (Piper, 1986; Windeatt, 1986;

Mydlarski, 1987; Abraham and Liou, 1991; Mohan, 1992) that have attempted to assess interaction at the computer have limited their investigation to comparisons based on turn length, frequency of negotiations, limited functions, etc. Important as these issues are, those studies have failed to realise that what Piper defines as "...data which show that the learners spend a lot of time thinking aloud and talking to themselves without reference to anyone else" may be one of the most useful tools learners possess to gain task and language regulation; and that "apparently incoherent [discourse] where learners are thinking aloud and a more coherent one where they are exchanging information" (Piper, 1986:194) may actually be the basis for the co-construction of knowledge. Thus, and fundamentally, microgenetic analysis allowed us to observe collaboration and co-construction of knowledge as they unfolded during activity. A particular strength of this study was the detailed qualitative analysis of interaction as a whole which allowed me to make some informed inferences in relation to learning processes students engaged in through collaborative activity.

6.1.2 Mediated activity

Learners in the study made use of specific semiotic mechanisms such as repetition, use of L1, reading aloud, and discourse markers for the creation of common ground upon which to tackle the task (Crook, 1994) to engage in linguistic problem-solving endeavour. These tools also mediated the implementation of the tasks, and language related activity helping learners achieve specific goals. Repetition was deployed as a socio-cultural tool not only for the sharing of knowledge, but also for the symbolic sharing of physical activity. Collaborators therefore engaged in co-participation – through repetition- and tried to balance the axis of control even when there were physical constraints such as one keyboard, one mouse, or one paper pad. They also deployed this semiotic tool for practical matters such as task management, and pace control when (type)writing. Repetition became a focus tool to aid concentration upon particular challenges and a mnemonic aid.

L1 was also used for socio-affective purposes, task implementation and language related work. It was a facilitator for task management and to gain task control; translation was a cognitive facilitator and a way to make use of thinking abilities developed in the L1.

English is a mediational mechanism that provides an indirect access route to the L2, and is "...the language through which [learners] can objectify the target language as a system and negotiate the relationships between forms and intended meanings [within] the tasks [and contexts] in which they are used" (Wells, 1998:343).

Reading aloud is a tool that depends upon the kind of task learners are carrying out - and upon medium of implementation - to a greater degree than repetition and L1. As a socio-affective aid, it helped participants to maintain intersubjectivity, particularly when working at the computer, while deploying it to indicate to each other where the focus of attention was at any particular moment. In terms of language related activity, it was mainly deployed to isolate chunks of language for reflexive purposes so that they could evaluate and assess linguistic options in context, and to make language suggestions in a contextualised way.

The participants also made use of other linguistic tools such as discourse markers, and interjections, both in their L1 and in the target language to mediate socio-affective and task implementation activity. Furthermore, Spanish in general was used in varied and creative ways to carry out the tasks, socialise, and engage in language learning.

In relation to the computer as a mediational tool during task implementation, its presence appeared to have had an influence both on the interaction between the learners themselves, and also between the learners as agents in that interaction and some specific actions they took to complete the tasks. Not only did the computer have a physical impact upon activity, but it was also a prevalent presence in the learners' thoughts as expressed both by students working on computer-based tasks, as well as their paper-based counterparts who sometimes expressed their desire to be working with the machine since it was considered a facilitating tool.

6.1.3 Pedagogical routines as situated activity

Motivated learners working in collaboration with their peers exploited occasions for learning by engaging in the kind of activity they had experienced throughout their educational life either in teacher-fronted classes or when given the opportunity to work

with other students. Activity in the classroom often involves participation in pedagogic routines between expert and novice. Learners in the study showed sensitivity to their partners when facing linguistic problems, they assisted each other to make problems manageable, provided scaffolded assistance through corrective feedback, and language practice after modelling, provided -within their means - explanatory tutoring and engaged in language reflection to different degrees. They used repetition, for instance, to focus on form, and to isolate problematic language from its context in order to help their partners - or themselves - make use of key information. They engaged in routines to activate their memory for vocabulary retrieval and search. Students exploited the collective space to experiment with language, and to hypothesise about the target language while appealing to their classmates for feedback. They took advantage of collective co-construction to match up information against prior knowledge and attend to selected language. Finally, by engaging in pedagogic routines, they were able to take control of their learning while attending to their situated needs. Analysis of the data showed that when there is an "expert" in a group, he/she naturally offers the kind of support that a tutor would. Furthermore, not only does collaborative activity benefit the "novices" in a particular situation, but it potentially benefits the acting "expert" by providing learners with opportunities to activate their linguistic knowledge to assist a weaker classmate, or simply contribute to dialogic activity.

6.2 Pedagogical implications

This section discusses some possible practical implications of this study for the foreign language classroom. The relatively small scale of my work limits the scope for generalisation to other contexts. However, I offer here some suggestions that might prove useful to other teachers, and/ or materials designers. Section 6.2.1 relates to the wider area of collaboration in the classroom whereas section 6.2.2 concentrates on specific considerations in relation to the role of the computer in the CALL classroom.

6.2.1 Collaborative activity

The main objectives of the study were to determine the value of the tasks as pedagogical instruments to support collaborative activity in the foreign language classroom, to reflect

on the value of collaborative activity, from a Sociocultural perspective, as a means to enable interlanguage development, and to investigate how learners were making use of language to mediate collaborative activity and knowledge building in relation to the target language.

6.2.1.1 The tasks as pedagogical instruments to support collaborative activity

Although variation across protocols constantly reminds us of the need to consider tasks as pedagogical opportunities for learners to engage in their own activity, the study showed certain trends, which allow for some generalisation emerging from the dynamics between task and activity. I will discuss discrete task concepts that proved particularly supportive - or not - during interaction, within a more global view of the tasks.

Giving learners the opportunity to discuss concepts freely, e.g. the hierarchical exercise in task 1, before more structurally controlled work, appeared particularly useful to initiate a semantic basis upon which learners could explore thoughts and feelings relating to the topical framework of the task, while providing them with opportunities for interlanguage stretching without much pressure on accuracy. This kind of work also helped them to begin the co-construction of a communal ground to tackle the rest of the task. Particularly useful for these reasons was the provision of an open-ended space, i.e. the box "otro" (*other*), which - having stimulated semantic connections - allowed for learners to capitalise on them. If this is implemented via the computer, it is important to ensure, however, that learners have the physical capabilities to type in the box.

The gap-filling format, which was the basis for task 1, and one exercise in task 2, achieved high indexes of language related activity. I think, however, that learners could have achieved higher percentages of HQC had they been made aware of the value of exploratory / reflective talk. Although focus on linguistic form rather than on meaning, and the use of "inauthentic" materials such as this kind of exercises are highly controversial among some researchers and practitioners (*cf.* Skehan, 1998, 2001; Chalhoub-Deville, 2001; Robinson, 2001), the study showed that there might be a place

for them as part of a broader problem-solving format, and as a means to raise language awareness. Firstly, different learners' goals, histories, etc. need to be catered for. As some of the participants in the study actually expressed, they specifically wanted and expected to focus on grammar as part of their Spanish lessons; and secondly, deriving from the previous point, some learners consider this kind of task an "authentic" task (see also Backer, 1995; Egbert and Jessup, 1996).

The translation exercises (part of task 2) were successful in directing the learners' attention to specific aspects of the target language whereas the least successful exercises were the jumbled sentences, which are also very popular in commercial software. In general, writing longer passages, even a couple of sentences, appeared to promote work at semantic and syntactic levels. Both the text re-construction (task 3) and the free writing that followed it provided learners with good opportunities when implemented on paper, but the computer was too restrictive for this kind of work.

Finally, I would like to stress the importance of encouraging learners to work with different partners. The study suggests that strong learners tend to take advantage of any opportunity to engage in language learning activity and are not very likely to be affected by weaker learners whereas weaker learners seem to benefit from the stronger ones, particularly when a weaker learner works with two stronger classmates. The literature reveals contrasting findings in this respect; Swain and Lapkin (1998) do report sporadic occasions when learners co-construct erroneous forms and then use them individually in their post-tests. In this study, there were many occasions when learners agreed together on erroneous forms and because there was no expert available at the moment of co-construction, not all errors were subsequently corrected. Ohta (2001) on the other hand, reports that her "34-hour classroom corpus does not contain any examples of learners collaboratively agreeing on an incorrect form" (Ohta, 2001:117). What is crucial is that learners always have access to an expert, e.g. the teacher, and/or, potentially the computer (see sections 6.2.1.2 and 6.2.2 below).

6.2.1.2 The value of collaborative activity to enable interlanguage development

The study demonstrated that giving learners the opportunity to work collaboratively across the different tasks promotes their involvement in pedagogic routines. These routines often entail the learners' engagement in processes that have been found supportive of second language learning. Learners also empowered each other through peer assistance, and when necessary - and possible - they sought help from a more knowledgeable other, e.g. teacher and/or computer.

Access to input

Giving learners the opportunity to read and listen (even from their classmates' reading aloud) target language forms is a way to receive positive input that contains new and/ or targeted forms in the foreign language. Collaborative activity also provides input from corrective feedback.

Producing output while engaging in peer collaboration

Giving learners the opportunity to interact with their peers during task implementation promotes the production of output, which according to Swain (1995) "may stimulate learners to move from the semantic, open-ended, non-deterministic, strategic processing prevalent in comprehension to the complete grammatical processing needed for accurate production" (Swain, 1995:128). Output, according to Swain serves three functions, the 'noticing/ triggering' function, hypothesis testing function, and metalinguistic function. As we saw throughout the study, learners' dialogues were rich in examples where they stretched their interlanguage through the production of modified output.

During collaborative activity it is essential, however, that feedback is available when learners require it, i.e. at "cognitively opportune times" (Doughty, 2001:227). Even when working at the computer the teacher needs to be a supportive presence in the classroom. The machine does not always provide the needed support for learners to

maximise their opportunities and, as mentioned above, learners might co-construct incorrect language.

6.2.1.3 Language as a mediational tool for knowledge building in the processes of collaborative activity

The way learners use language, and other semiotic means such as gestures, as mediational mechanisms for the construction of knowledge and communication is greatly dependent on personal histories and styles. However, teachers can help learners become aware of specific practices that might be beneficial for them such as 1) the benefits of engaging in reflective / exploratory dialogue, which has proved to have a positive influence in the area of education (*cf.* Mercer and his colleagues, 1996, 1999) and, as we saw in the study, can support the co-construction of HQC; and 2) the advantages of working with different partners throughout the course.

In relation to the more specific mechanisms studied in this project, our data corroborates what other pedagogues have advocated referring to the use of L1, for example. It might not be advisable to actively promote its use during peer interaction, however, to try and ban it or prohibit it could deprive learners of a valuable tool for task and language regulation. Reading aloud and repetition were successfully deployed as elicitation means, focus tools, means to engage in pronunciation practice, and to create socio-affective links among learners. The data showed that these mechanisms are more common when learners are working at the computer, therefore if teachers consider their learners might benefit from these practices, perhaps using the machine for certain tasks would be productive.

6.2.2 The computer in the classroom

I believe that Sociocultural theory and research can provide a foundational platform to drive CALL forward, not by patiently waiting for artificial intelligence to deliver the quasi-human behaviour that has long been promised by computer technology developers, but by making the most of the already powerful capabilities of the machine to empower

learner-learner interaction in CALLaborative environments. The computer can play an invaluable role in collaborative activity if it can provide the learners themselves with at least some component behaviours of mediated instruction, and become part of those behaviours, for example the provider of scaffolded assistance. The following is an example of the kind of CALLaborative environments I am advocating. Its characteristics are based on Lidz's (1991) "Twelve component behaviours of adult mediating instruction" (cited in de Guerrero and Villamil, 2000).

A CALLaborative environment should:

1. provide *intentionality*. As highlighted throughout the study, the computer monitor is an inherently powerful magnet for the learners' attention, which can easily recruit interest and focus on the task.
2. support *meaning* by promoting target language understanding through simple, but effective means to highlight crucial / relevant linguistic, semantic, etc., information, as demonstrated in the work of CALL researchers such as Hegelheimer and Chapelle, 2000. "Noticing" can be supported by currently common features used in CALL such as glossing; meaning elaboration and provision of further relevant information can be easily implemented through the use of hypertext, potentially conducive to learner-learner meaning-making development and co-creation of knowledge.
3. help learners make *connections*. The screen should provide hyperlinks, for instance, that encourage and support grammatical, semantic, etc., connections.
4. be capable to interact with the learners and "show" *joint regard*. The computer should "respond" to the learners' inquiry and linguistic curiosity through branching capabilities and/ or use of hypertext; in these ways the machine can provide support taking into account the learners' output, and / or the learners' own linguistic inquiry about what they are already focusing on.
5. promote the *sharing of experiences*. CALL tasks should either promote, or allow for learners to develop, socio-cognitive spaces where they are able to share and explore individual experiences collectively.
6. be conducive to constructive and effective *task regulation*. The computer should support the learners' control over task by facilitating problem-solving. This can be achieved by providing support ranging from basic features such as clear,

straightforward task instructions, and friendly human-computer interfaces, including easy and unobtrusive special character writing, e.g. accentuated vowels in Spanish, to encouraging and guiding learner-learner strategic thinking, and explorative talk (to use Mercer's term, 1996). Simple programming of so called Socratic questions that learners could either request from the machine when experiencing problems, or the machine automatically provide in reaction to learners' output, should be effective in leading learners to the kind of strategic thinking and exploratory talk advocated.

7. provide *praise / encouragement*. It is of paramount importance (*cf.* Swain and Lapkin, 1998) that the expert, i.e. the computer or the teacher, make sure that learners know they have achieved a linguistic (or task related) goal, and their output is correct as well as why, when appropriate. Praise need not, and perhaps should not, be patronising, as is still common in CALL materials which make use of bell ringing and clapping sounds, for instance to indicate an exercise has been correctly completed; intelligent and even informative correct feedback can easily be programmed, even in platform based authorware such as Hot Potatoes.
8. provide adequate *challenge*. As with any kind of pedagogical instrument, CALL tasks need to provide the right level of challenge, so that learners –with the support of the machine- are able to work within their zones of proximal development. The study shows that when learners perceive a task, or an exercise within the main task, as too difficult, they might want to give up, or be unable to keep focused; the machine has the capabilities to provide the needed support. learners should also have the control to work with more challenging materials if the level of challenge is too low. I believe this is one of the many areas where the computer can make an important difference in the classroom, where dyads/groups can benefit from having access to an "expert" at all times, and from being able to control their own activity independently of the rest of the class.
9. support *psychological differentiation*. This component directly relates to the human expert keeping in mind that he/she is the facilitator for the novice's learning, and should therefore avoid competitiveness with him/her. In this study none of the participants showed the desire to get involved in competitive behaviour either with the other participants nor with the computer, even in the case of the dictogloss task, which could have encouraged some memory competition. Younger learners or different contexts of CALL work might show

different results. CALL materials designers should make sure that collaborative work at the computer supports the joint co-construction of knowledge, and not competitiveness.

10. provide *(contingent) responsivity.* I believe the computer is still limited in this area; to my knowledge, the machine - or at least the kind of computer available in ordinary language classrooms - cannot even attempt to compete with the human capabilities to read and respond appropriately to the learners' complex behaviours, not to mention the human constant "reading" of body language and gestures. However, the kind of support I have been advocating here should empower the learners themselves to achieve their goals. Furthermore, the teacher is part of the collaborative experience in the CALL classroom, not only to deal with technical, or programming, problems that might occur, but also because learners see the human as an expert above the machine.
11. promote *affective involvement* and task enjoyment. As seen through the analysis of the use of semiotic mechanisms in the study, learners make constant use of mechanisms such as repetition, reading aloud, and L1 to establish and maintain a socio-affective environment; repetition and reading aloud proved to be particularly important for learners working at the computer to "keep in touch" with each other. Although deployment of language for socio-affective purposes occurs spontaneously, CALLaborative environments can be designed to support learners in the creation of inter-mental spaces where they feel comfortable (Crook, 1994). This kind of activity is normally carried out by teachers in the form of warm-up exercises, for instance, to prepare learners linguistically and affectively for further work. Research task 1 in this study worked particularly well in this respect by allowing learners to explore their own ideas, feelings, priorities, etc. in the hierarchical sub-task (based on drag and drop), and even through the simple sub-task based on a gap filling format where learners had to learn about each other in order to be able to complete two sentences. CALL has enormous potential to support the "tuning of minds" before learners start working on the target language as such; at least one screen to focus together on imagery to explore, and discuss language related topics and/ or situations, as well as the use of multimedia, should not be too complicated or time-consuming for teachers to implement. Caution, of course, must be exercised not to fall into the trap of gimmicks lacking substance or purpose.

12. communicate *change*. Both learners and teachers must be aware of progress achieved during CALL work. Computer software has for a long time (*cf.* Jones, 1984, "Storyboard II") offered the possibility to monitor this kind of information through tracking devices and availability of activity reports.

Feedback is a driving force in language learning, and the computer already has the potential to deliver it in a highly sophisticated way by encouraging learners to notice, focus, think, discuss, etc. In my opinion, one important area in which the computer can empower the CALL classroom is through the provision of feedback based on a regulatory scale such as the one proposed by Aljaafreh & Lantolf (1994). Here is an example: after learners have completed an exercise, piece of writing, etc. they are prompted to re-read it and check it for possible mistakes; the computer highlights a whole sentence or chunk, where there is a problem and prompts learners to discuss; the computer indicates a more specific section where a problem persists; a series of graded questions become available for learners to discuss and try to solve the problem; the computer provides a more specific identification of the problem; the computer provides clues to help learners achieve the correct form; the computer provides the correct form, and prompts learners to discuss whether they then know why that is the correct form; the computer provides explanations, and further examples where the form is used. Another way to empower learners would be to give them choices as to the kind, and degree of help they would like to access, so that they have plenty of opportunities to interact with the machine and their partners while gaining control over language and task.

This section has provided general ideas that arise from this study and which I believe represent some possibilities to move forward in the CALL classroom. I think the computer can be used to help learners discuss, explore, make connections; throughout the study we witnessed many moments where learners realised their potential through collaboration, but many other times when they stopped short of doing so because there was no expert available during those crucial moments. The computer, a potential expert, was there all the time; we must learn to take full advantage of it.

6.3 Study limitations and future directions

One of the main objectives of studying collaborative activity in the language classroom was the identification and investigation of microgenesis as a means to observe language learning while the process was taking place during interaction. This goal was achieved; I was able to observe microgenesis and other kinds of high quality collaboration as well as some of the processes leading to, and evolving from it. Importantly, HQC was studied in a contextualised way, as part of its evolution along task implementation. I believe future research can benefit from incorporating introspection techniques to further investigate these processes and learn more about learners' perceptions of different aspects of collaboration. However, a crucial issue that has been eluding Sociocultural SLA researchers remains inconclusive: is it possible to claim that the interlanguage restructuring observable during interaction does become internalised? It was not within the scope of this study to provide such evidence, but I believe it is important for future research from this theoretical stance to accurately establish the long-term effect that microgenesis has in the learners' interlanguage.

A limitation of the study, which is not uncommon within the Sociocultural tradition, was its relatively small scale. The kind of in-depth qualitative analysis required to study situated activity has repercussions for its generalisation scope.

Comparative research between CALL and other modes of instruction has repeatedly been criticised among the academic community (*cf.* Doughty, 1992; Chapelle, 2001; Levy, 2001; Dunkel, 1991) for issues varying from CALL evaluation that results in gross comparisons between the computer as "the most precise and sophisticated modern tool" and "the most crude and outdated educational research methods" (Pederson, 1987 quoted in Chapelle, 2001: 44) to CALL studies that cannot be generalised or replicated. In an effort to investigate the impact of the computer in the classroom in conditions as fair as possible for the two different mediums being compared, and based on a research design which would allow for replicability, I had to accept the need for some compromise. I believe that understanding the intrinsic qualities of the machine as a tool for mediation, and its impact in dyadic collaboration through comparative analysis represents an important step forward into serious CALL research. Although some powerful features of

CALL such as hypertext and multimedia were avoided so that a more realistic comparison could be established with the paper-based tasks, this study provided a valuable, if by no means comprehensive, insight into computer-mediated activity from a Sociocultural perspective. In my opinion, understanding the intrinsic impact of the machine as a physical and psychological tool is one way forward into further research that attempts to explain the impact of more sophisticated applications, individual and collective cognitive processing, etc. As highlighted in the study, the computer adds a further dimension to interaction. Learners in the study interacted with each other, and with the computer simultaneously; further research is needed to assess, in more precise ways, and varied conditions, the degree to which the computer, as another participant in interaction, adds to the co-construction of meaning, and impacts on learners cognitively, for instance.

CALL research is in its infancy; I believe that one way forward in this area is to develop and research the kind of CALL environments I described in section 6.2.2. The true potential of the computer needs to be maximised and freed from the limited delivery of one-dimensional, software packages that are constantly being produced by just adding or modifying interface gimmicks, but whose pedagogical principles are still founded on behaviourist or pseudo communicative approaches.

6.4 Conclusion

As it became evident from the analysis of the corpus, answers to the questions we posed at the beginning of the study could not be reduced to a series of statistics and quantifications of products of interaction. It was demonstrated through qualitative analyses that not only did the learners that participated in the study engage in collaborative activity, but importantly, they engaged in HQC. Quantification of some aspects of the data was carried out in order to gain a perspective on the phenomena in question in relation to the overall picture being presented. The degree to which they engaged in the kind of collaboration that might be potentially conducive to development of their interlanguage, however, varies. Variation depends upon factors such as individual preferences, e.g. use of L1 and other mediational mechanisms, but task characteristics and the medium for task implementation were also pervasive.

Analysis of microgenesis and LREs qualitatively allowed us to observe some of those processes and mechanisms otherwise overlooked when research only investigates the product of interactions. As our data showed, providing the right answers is not necessarily an indication of development. Right answers might just mean the task was not challenging enough, or the "expert" dominated the interaction, but the "novice" did not gain much. On the other hand, quantification provided parameters that enabled us to place qualitative observations against a broader perspective.

In her investigation of the conversational spin-off generated among learners working in groups on tasks based on similar programmes to the ones that formed the basis for the tasks deployed in this study, e.g. cloze, text reconstruction, jumbled sentences, etc. Piper concluded that

> "In carrying out CALL tasks of this kind, there is apparently a great deal going on in the learner's 'black box' which it is very difficult to investigate. It is therefore hard to assign a specific value to such tasks, and on the basis of this study all we can manage to say is that their spin-off in terms of target language conversation is limited. To go any further, however, and to actually criticize them for this limitations is not logical, since to do so would be to imply that foreign language learning only takes place through conversational interaction."
>
> Piper, 1986:198

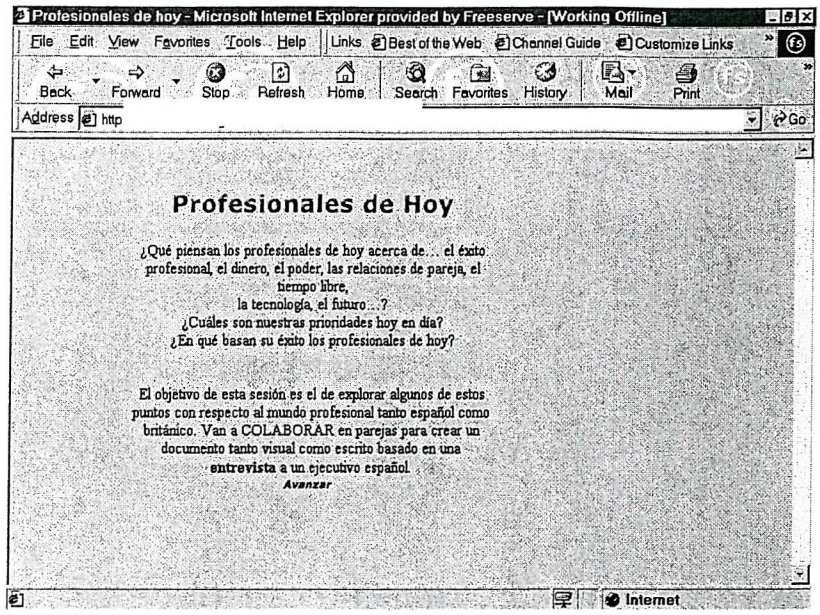
I hope that this study has shown that by listening to the learners' conversations through a Sociocultural earpiece, we might be able to learn more about that "great deal going on in the learner's 'black box", and that some of those conversations seemingly "limited" are actually the inter-psychological seeds for second language learning, and a rich source for SLA researchers to learn about language acquisition. Language learning does not "only take place through conversational interaction", but interaction certainly holds important clues about social influences upon language learning processes, not least because social interaction is a path to development.

Appendix one: SP193 Proficiency requirements

1 Understanding
Listening
* Recognise and understand common vocabulary and sentence structures relating to a variety of everyday situations and topics
* Understand the gist of spoken information/interaction relating to everyday context when delivery is familiar or standard speech
Reading
* Understand gist and some detail of short authentic texts in common genres
* Extract information, ideas and opinions relating to a select number of everyday situations and topics
2 Production
Speaking: interaction
* Initiate, maintain and close conversations and discussions relating to most everyday contexts
* Ask for and give facts and information on topics of personal interest and brief descriptions, simple reasons and explanations of ideas and events
Speaking: production
* Manipulate language dealing with personal interests and experiences using short, connected sentences
* Express opinions, ideas and simple concepts with some grammatical accuracy
Writing
* Construct short written texts in appropriate style in order to communicate information, narrative and description relating to a variety of situations and topics
* Express opinions and ideas with some grammatical accuracy and textual coherence, but limited by first language structures
Communication Strategies
* Clarify and confirm meaning appropriately with another TL speaker on familiar topics
* Initiate and maintain interaction on familiar topics
* Use a limited range of formulaic expressions appropriately to aid interaction
Language knowledge and awareness
* Identify and approximate individual TL sound/sound sequences and intonation patterns
* Be aware of some forms of language use which vary according to social relationships, situations and media of communication
* Know sufficient metalanguage in English or student's first language to understand and construct simple grammatical descriptions
* Know the basic and some complex grammatical structures of the TL and a range of vocabulary in everyday situations and on familiar topics
* Begin to understand the ways in which the TL is different from their first language
Knowledge and understanding of the target language and culture
* Have an outline knowledge of key areas of the target language culture, such as the use of the language in the world, basic geography, significant people, places, events, arts and the media

Appendix two: Task 1 Profesionales de Hoy

Frame 1



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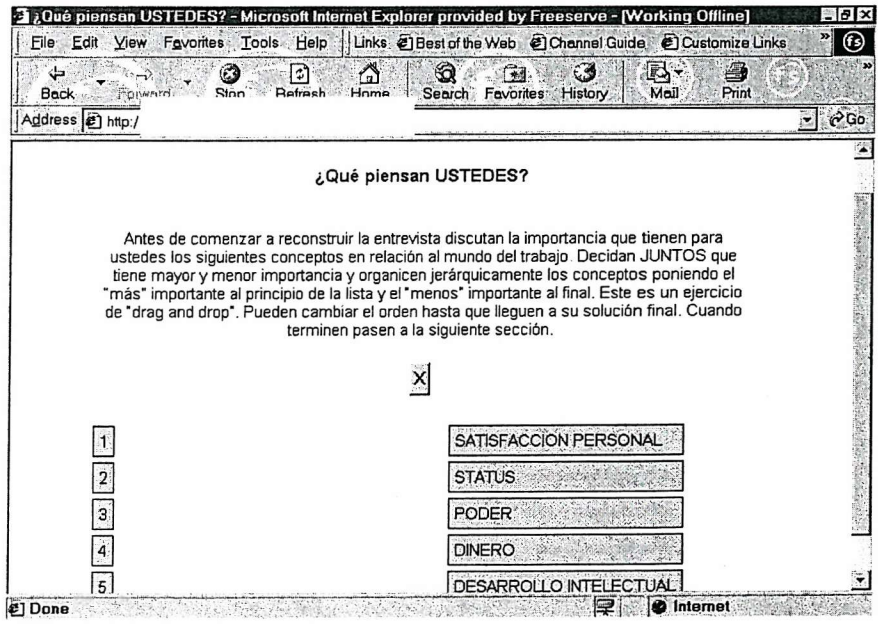

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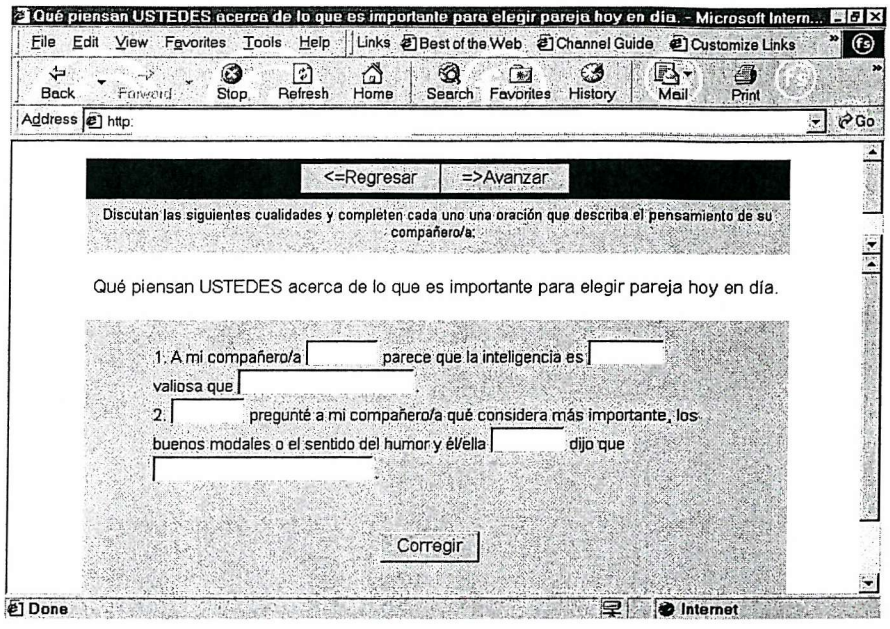

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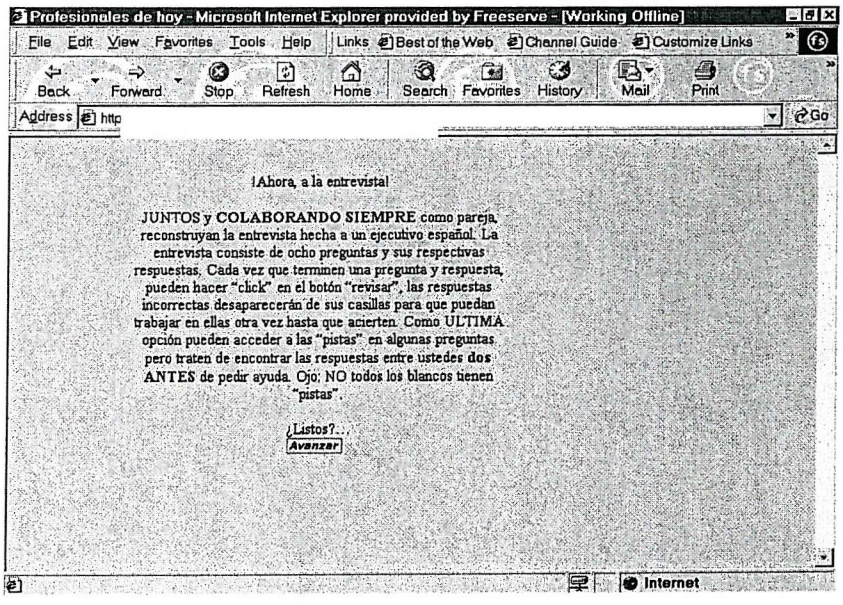

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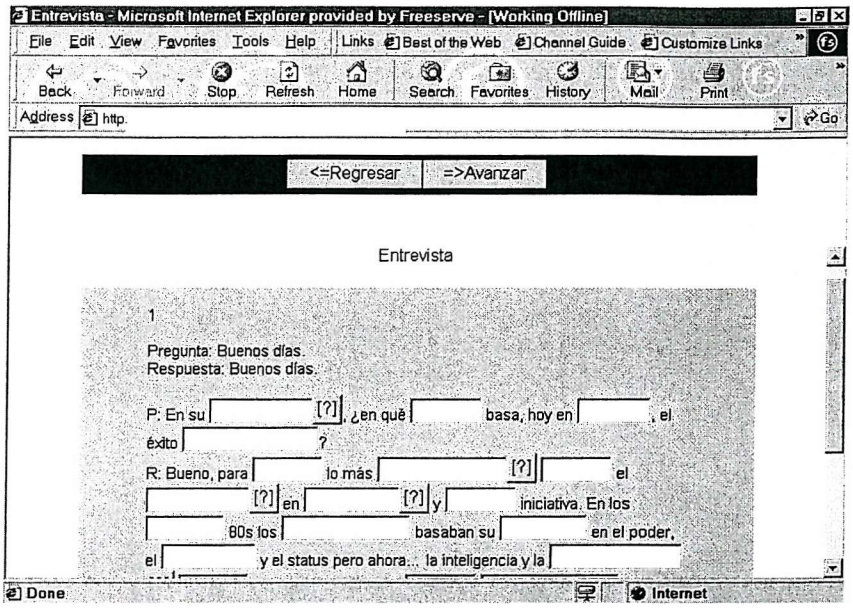

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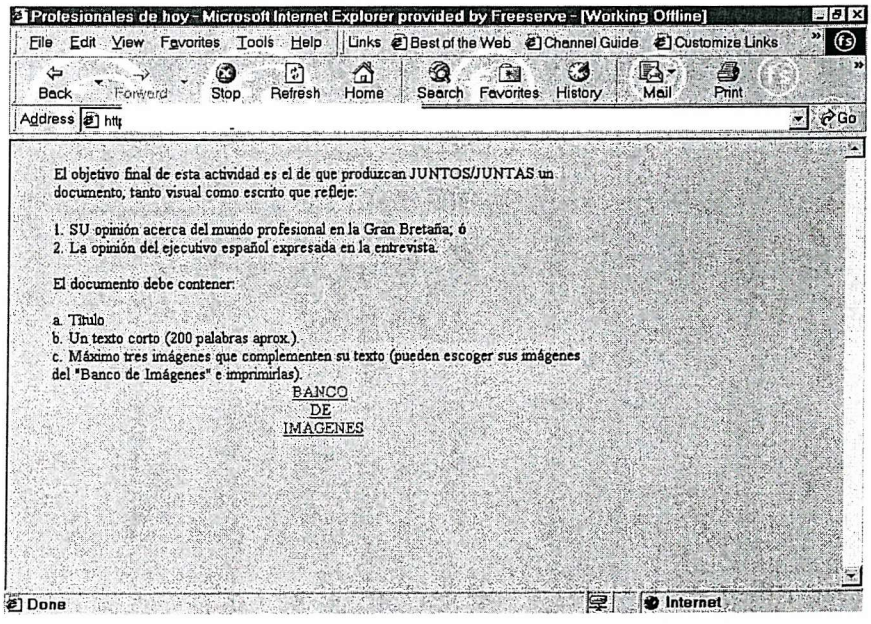

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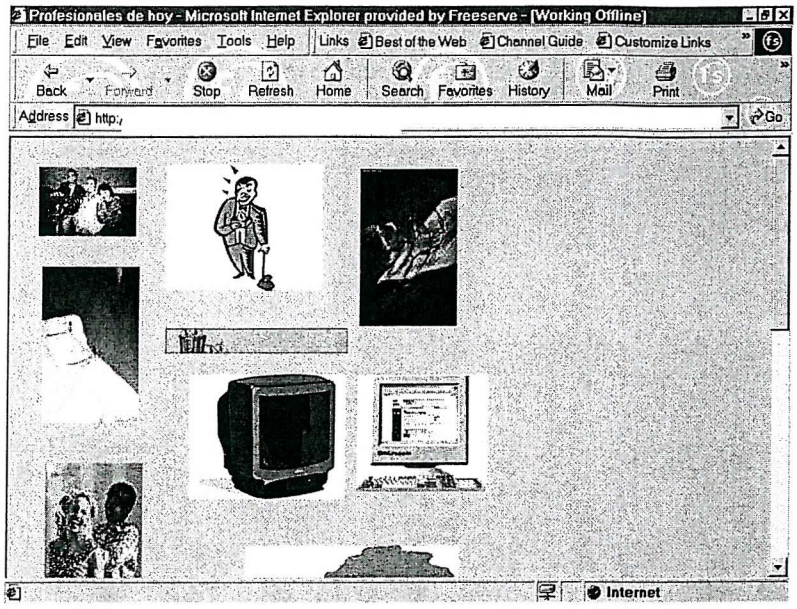
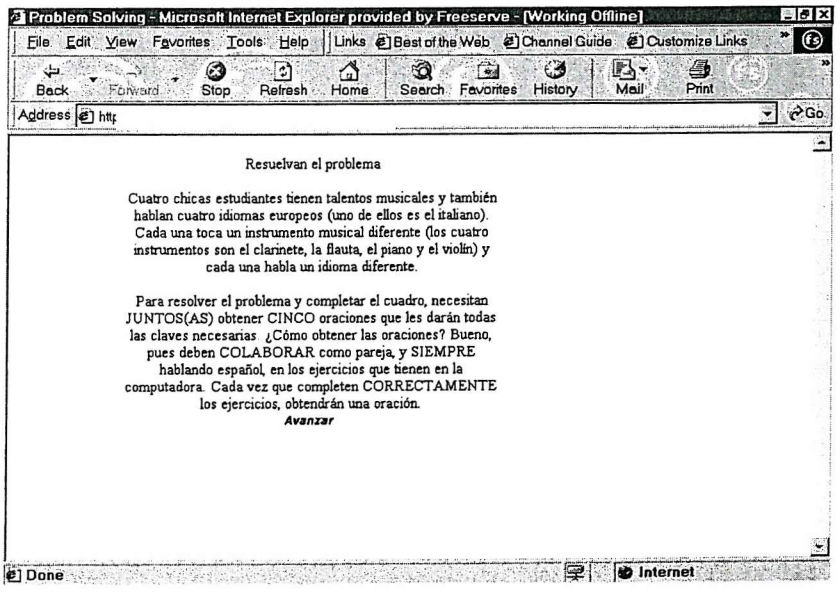


Task 2: Hermanas Dotadas

Frame 1



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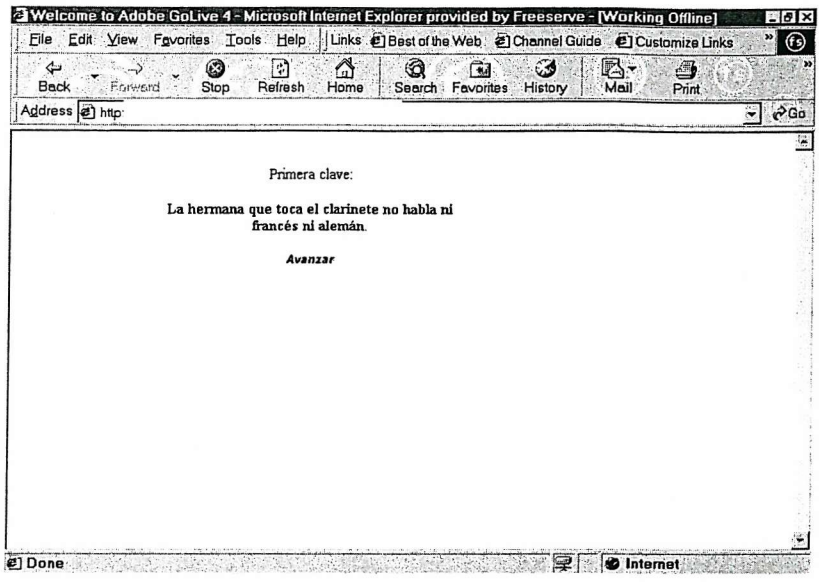

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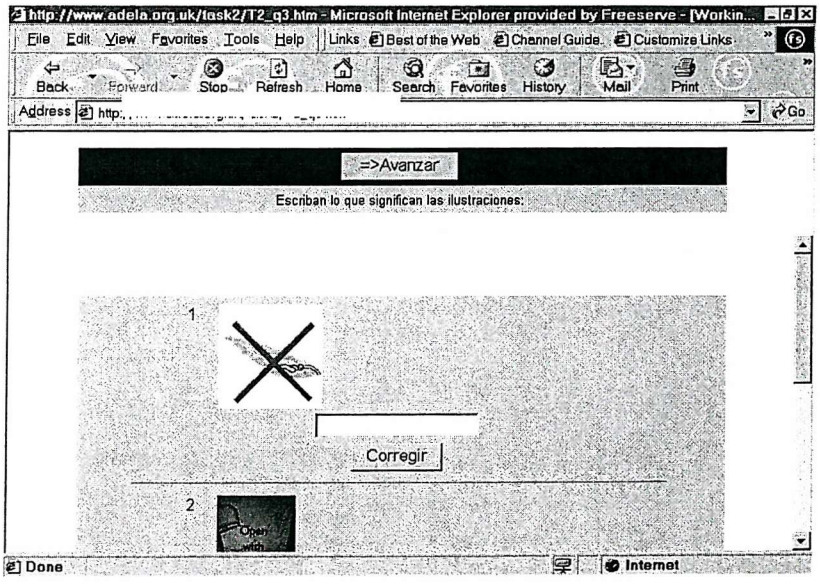

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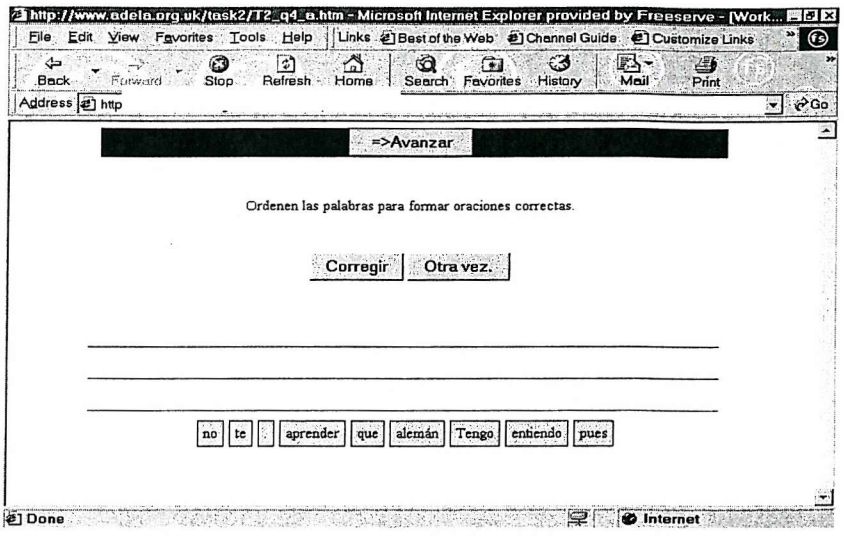
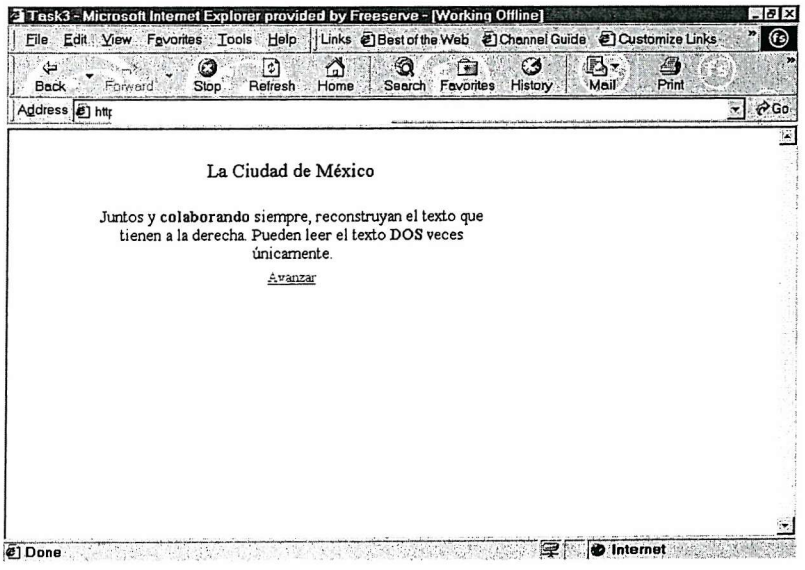


Task 3: La Ciudad de México

Frame 1



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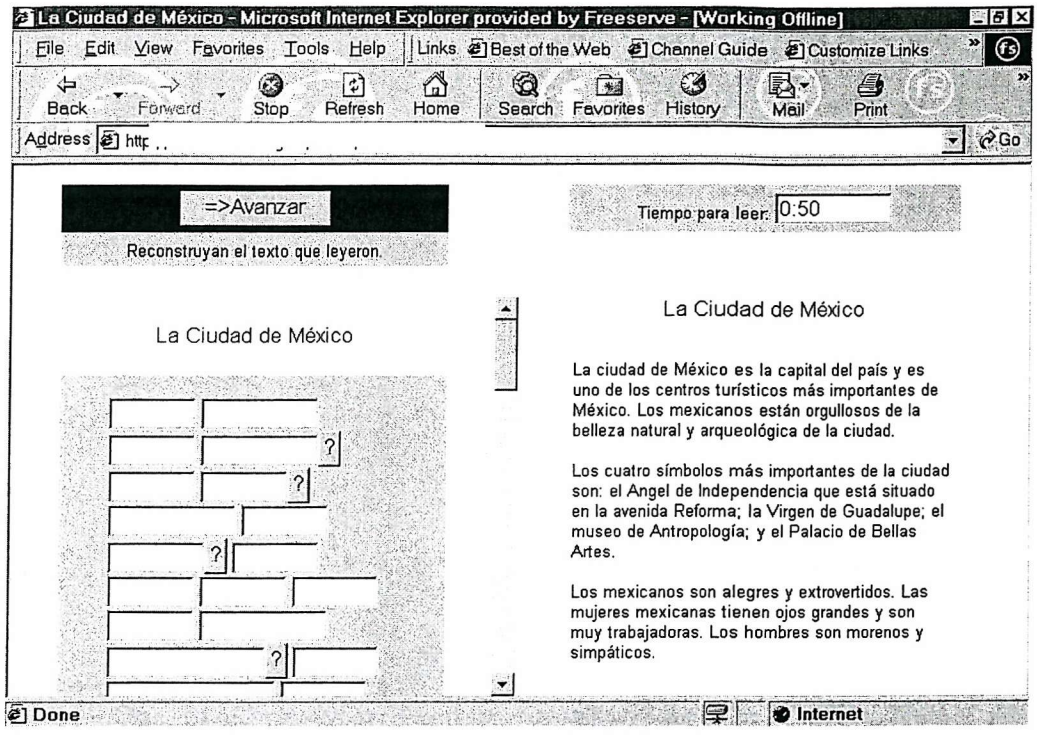

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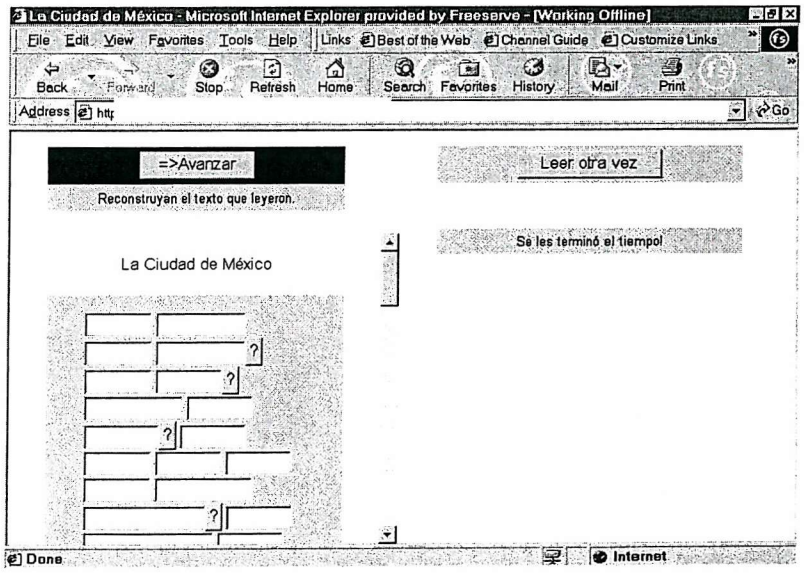

Appendix three (pre / post research test)

NOMBRE_____FECHA_____GRUPO_____

I. Traduce al ESPAÑOL las siguientes oraciones:

Where are my books? I left them on the table yesterday, but I can't see them now.

_____

_____

_____

-Did you write to your friends?
-Yes, and I also sent my brother a postcard.

_____

_____

(Talking about a maths problem)
Show it to me. Maybe I can explain it to you.

_____

_____

Have you been able to find them? (Talking about sunglasses)

_____

_____

They're going to have a coffee.

_____

_____

6. She's just left.

_____

_____

7. I've cleaned the windows for you.

_____

_____

8. You should read this book, I can lend it to you.

_____

_____

II. Completa los espacios con "ser" o "estar" en el tiempo adecuado.

García Márquez _____ un escritor Colombiano, nació en Arataca, un pueblo que _____ situado en Colombia. García Márquez _____ muy inteligente y siempre _____ informado de lo que sucede en el mundo político. Sus novelas _____ famosas en todo el mundo y _____ llenas de imágenes latinoamericanas. García Márquez y otros escritores latinoamericanos siempre _____ dispuestos a luchar por sus ideales que _____ la paz y el desarrollo de América Latina.

Appendix four: Questionnaires

Questionnaire A: Attitudes Towards Using Computers

Name _____ Age _____

Degree being studied _____

Year in university _____ Group _____ Date _____

Please rate your knowledge of computers:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Do you have your own PC? ◇ yes ◇ no

Do you have easy access to a computer? ◇ yes ◇ no

On average, how many hours a day do you spend using the computer? _____

Have you ever used a computer to do the following?:

Word processing	◇ a lot	◇ a little	◇ never
E-mail	◇ a lot	◇ a little	◇ never
World Wide Web	◇ a lot	◇ a little	◇ never
Grammar exercises	◇ a lot	◇ a little	◇ never

Indicate the extent to which you agree or disagree with the following statements.

1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree

Computers keep people isolated from each other	1	2	3	4	5
E-mail helps people learn from each other	1	2	3	4	5
I am worried that I might make the computer "crash"	1	2	3	4	5
I don't like working in pairs	1	2	3	4	5
I enjoy the challenge of using computers	1	2	3	4	5
Computers make people weak and powerless	1	2	3	4	5
I enjoy using the computer to communicate with people	1	2	3	4	5

1 = strongly disagree 2 = disagree 3 = neutral 4 = agree 5 = strongly agree

Using the computer gives me a feeling of accomplishment	1	2	3	4	5
I think we should use the computer more often in class	1	2	3	4	5
I am more afraid to contact people by e-mail than in person	1	2	3	4	5
Computer-assisted grammar exercises are useful	1	2	3	4	5
I feel more independent when I use the computer	1	2	3	4	5
I get nervous using the computer in class	1	2	3	4	5
I like using word processing better than other ways to write	1	2	3	4	5
Computers are usually very frustrating to work with	1	2	3	4	5
I think we can make better use of class time than working at the computer	1	2	3	4	5
I am worried that I would have more difficulty using the computer compared to my classmates	1	2	3	4	5
My classmates' mistakes have a bad influence on my Spanish	1	2	3	4	5
I plan to continue using the computer to practise grammar	1	2	3	4	5
If I have a question or comment, I would rather contact my teacher in person than by e-mail	1	2	3	4	5
I think in the future computers will be used more in the language classroom	1	2	3	4	5
Working in pairs usually benefits both people	1	2	3	4	5
I think using the computer in class is interesting	1	2	3	4	5
Computer feedback is frustrating	1	2	3	4	5
I want to use a computer in my Spanish classes	1	2	3	4	5
I think learning Spanish grammar is important	1	2	3	4	5
When I write using the computer, I pay more attention to grammar	1	2	3	4	5
I feel that I learn better when I work on grammar individually	1	2	3	4	5
It is difficult to use the computer	1	2	3	4	5
Computer-assisted grammar exercises are boring	1	2	3	4	5

Post-Task Questionnaire B: Today's computer-assisted session

Name _____ Date _____

Today I worked with: _____

I have worked with this partner before ◇ yes ◇ no

Please rate today's computer-assisted session in general:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Please rate today's computer-assisted task:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Please rate today's collaboration with your partner:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Would you like to do a similar computer-assisted task in the future? ◇ yes ◇ no

Do you think you learned anything by means of the computer-assisted task? ◇ yes ◇ no

If yes, did you learn... about computers? ◇ yes ◇ no
about Spanish grammar? ◇ yes ◇ no
new vocabulary? ◇ yes ◇ no
anything else? _____

Would you rather have done this task without the computer? ◇ yes ◇ no

Would you rather have done this task individually? ◇ yes ◇ no

Please feel free to add anything you would like in relation to this computer-assisted session:

Post-Task Questionnaire C: Today's session

Name _____ Date _____

Today I worked with: _____

I have worked with this partner before ◇ yes ◇ no

Please rate today's session in general:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Please rate today's task:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Please rate today's collaboration with your partner:

◇ poor ◇ fair ◇ good ◇ very good ◇ excellent

Would you like to do a similar task in the future? ◇ yes ◇ no

Do you think you learned anything by means of this task? ◇ yes ◇ no

If yes, did you learn... about Spanish grammar? ◇ yes ◇ no

new vocabulary? ◇ yes ◇ no

anything else?_____

Would you rather have done this task at the computer? ◇ yes ◇ no

Would you rather have done this task individually? ◇ yes ◇ no

Please feel free to add anything you would like in relation to this session:

Appendix five (a): functional categories: definitions and exemplification

Category definitions for REPETITION

Socio-Affective Functions
Socio-Affective functions are characterised by the use of repetition to establish inter-personal rapport through the expression of agreement, acknowledgement, providing support and reassurance to each other or simply keeping in contact with the interlocutor by showing attention to their partner's expressions. This function of repetition also includes the expression of emotions such as relief and humour.

Agreement / Acknowledgement
Learners make use of repetition to express a mutual understanding and/or acceptance of the other's opinion:

44	m	ah ((pause)) eh status
45	e	status
46	m	si y [poder

To express attention towards the other's comment, suggestion, truth, etc. This use of repetition is therefore, a tool for maintaining inter-personal contact throughout activity:

15	g	um um qué qué año? *um um what what year?*
16	j	segundo *second*
17	g	ah segundo *ah second*

Control management, e.g. while (type)writing

A function of repetition that helps learners to verbally "share" and/or manage the writing or typewriting task. Although it is normally the learner who is writing that tends to repeat the text being reconstructed or created, sometimes the other participant also repeats as a way to become an active co-participant in the task. This function of repetition also helps learners to control the pace of activity by verbally signalling where their writing is at any particular moment and thus stopping a dictation overload:

71	f	si si si si no sabe tocar el piano *yes yes yes yes doesn't know how to play the piano*
72	m	t o c a r ((typing)) el *p l a y ((typing)) the*
73	e	el *the*
74	m	el piano? *the piano?*
75	e	si *yes*
76	m	el ((typing)) pia no (.) *the ((typing)) pia no (.)*

Emotional (e.g. relief/ humour)

Use of repetition to convey / express feelings of relief, surprise, humour etc.:

234	m	((laughing)) oh oh oh
235	f	oh oh oh
236	e	oh oh oh dar, ((referring to cues on screen)) ( )
237	f	I told you ((pause)) no,
238	m	no
239	f	no oh man

Meta-Task Functions

Repetition supports learners in the creation of the infrastructure upon which task implementation can be carried out in which I have categorised as *Meta-Task* functions of repetition. Meta-task functions include repetition as a tool for generating content language, as an organisational tool, e.g. to delimit the contents of different sections of a text, signal task progression, etc.; and as a tool for evaluating their task efforts.

Content generation

This is a function of repetition that enables the learners to generate ideas in relation to the content of the text they are producing before actually carrying out the writing task as such:

2	p	si el primero párrafo trataba de la ciudad *yes the first paragraph was about the city*
3	j	ciudad de mexicó *city of mexico*
4	p	decía que méxico es la capital (.) del país (.) la capital de méxico ((pause)) y uno de los centros turísticos más importantes de méxico *it said that mexico is the capital (.) of the country (.) the capital of mexico ((pause)) and one of the most important tourist centres of mexico*
5	j	uno de los centros turísticos *one of the tourist centres*
6	p	si *yes*
7	j	más importantes *most important*
8	p	(importantes) (*important*)
9	j	después (trata) de los mexicanos *then (it's about) mexicans*
10	p	si *yes*
11	j	los mexicanos son orgullosos= *mexicans are proud=*

Organisational

Repetition that forms the basis for task tackling procedures. Organisational repetition concerns issues such as discerning what the tasks objectives are, planning how to tackle the task, organising the contents of their text, etc.:

6	e	lo leí *I read it*
7	m	una vez *once*
8	e	una vez

once

9 m si
yes

10 e tu también,
you too,

11 m si
yes

12 e vamos a leer otra vez o vamos a empezar?
are we going to read it again or shall we start?

13 m a empezar
let's start

14 e a empezar, ok
let's start, ok

Task evaluation

Repetition that denotes judgemental comments in relation to the learners' perception of the task:

40 l necesitamos un otra vez necesitamos un otra vez de una hora ((pause)) una hora por favor
*we need an again we need an again *for an hour ((pause)) an hour please*

41 f uno,
one,

42 l hora
hour

43 f una hora,
one hour,

44 l si más fácil [que un minuto
yes it's easier than a minute ((referring to the time the text appears on screen))

Task-Implementation Functions

Task-Implementation functions involve the deployment of repetition to carry out the task as such. To facilitate analysis, I have distinguished the use of repetition for task-implementation from its use specifically in relation to work on the target language (*Language Related Functions*). Although the latter is at the core of learners' activity, the students co-create –by means of language- a socio-cognitive infrastructure that allows them to perform the task as problem solving endeavour on the one hand, and concentrate on the target language when necessary, on the other.

Attempting consensus

Repetition deployed when learners are trying to achieve agreement in relation to opinion, gap filling, etc.:

139 g si

140 c si yo te he

141 g si yo lo te he dicho?

142 c si ((sounds in doubt))

143 g no se ((laughter)) si

Correction

Repetition functions as a tool for self or other-correction related to task implementation caused by mishearing or accidental misspelling, e.g. typo correction, or correction related to text reconstruction that is not part of a language related episode:

109	m	importantes
110	e	si? ((typewriting what e is dictating from memory in the text reconstruction task))
111	m	importantes (.) si (.) no importan**TES**
112	e	importantes? ah ok

Focus tool

Repetition that functions as a problem-solving tool which might or might not be deployed as a mnemonic device. Repetition as a focus tool can simply be deployed to maintain concentration upon a particular aspect of the text learners are working on through the strategy of sounding a word or phrase, allowing them thus to carry out the task. Self-repetition as a focus tool can also be a mnemonic device for the retrieval of text, or allo-repetition can be deployed as mnemonic assistance targeted to the other's mind rather than the self:

220	c	Elisa ((pause))
221	g	Elisa (.) Elisa es ((pause)) español francés alemán *Elisa (.) Elisa is ((pause)) Spanish French German*
222	c	Elisa no es la chica que habla alemán ((pause)) *Elisa isn't the girl that speaks German ((pause))*

Text co-construction

Repetition used as a tool for co-constructing and/or reproducing text exactly as it appears in the task materials the learners have been or are being exposed to, e.g. the *dictogloss*, or jumbled sentences. The function of repetition to *co-construct text* does not involve the creation of the learners' own generated language (see *Language Related Functions/ language construction* function below). *Text co-construction* is normally achieved through repetition plus addition:

301	e	tengo que *I have to*
302	f	um tengo que *um I have to*
303	e	[aprender *[learn*
304	f	[aprender (.) no tengo que aprender no, *[learn (.) I don't have to learn no,*
305	e	alemán *German*
306	m	tengo que aprender *I have to learn*
307	e	alemán *German*
308	m	alemán *German*
309	e	pues no te entiendo *since I don't understand you*
310	m	aha pues no te entien do y punto ((they laugh)) *aha since I don't unders tand you and period ((they laugh))*

To gain task control

Although gaining task control is an ongoing process throughout activity during task implementation, self-repetition –not unusually combined with reading aloud, use of English, and/or discourse markers- is often deployed for this purpose. This category

refers to those instances of self-repetition when learners are using language as a means to overcome a particularly demanding action while carrying out the task, for example while making sense of contextual meaning so that they can then tackle a gap. This function of repetition becomes evident in times of cognitive struggle, thereby the recruitment of other semiotic tools such as L1 simultaneously or in the same utterance:

216	hel	una no no me entiendo el structura del (.) oración es es sentence oración? *a I don't don't understand the structure of (.) sentence is is sentence sentence?*
283	l	="no no le o o" de yo yo lo yo "leo solamente los" sport or *="no no I rea d d" of I I lo ((correct direct obj pron)) I "read only the" sport or*

To re-establish task implementation

Repetition deployed to re-establish task implementation when there has been a disruption as in the case of computer interference in activity. When learners are distracted from the primary task of reconstructing the text due to either technical problems or simply discussion as to how to typewrite orthographic accents repetition becomes a tool that enables them to cohesively regain task control:

32	e	tiene mayúscula y por ejemplo de **méx**ico de ah dónde están los *it's got capital letter and for instance of méxico of ah where are the*
33	m	ahh
34	e	acentos, *accents,*
35	m	ay ah um no recuerdo umm m m ((they try some keys on the keyboard)) no umm ah ah no recueerdoo ((pause)) e es lo más difícil ah *ay ah um I don't remember umm m m ((they try some keys on the keyboard)) no umm ah ah I don't rememberrr ((pause)) i it's the most difficult ah*
36	e	de **méx**ico ah ok la ciudad de méxico ((pause)) qué es está bien? *of méxico ah ok the city of méxico ((pause)) that is is that right?*

Language Related Functions

Language Related functions of repetition involve the use of this mechanism to address an issue specifically concerning the target language. In other words, repetition in this category reflects a foreground focus on the L2 with the problem-solving task acting as the background for activity. *Language related* functions contrast thus the functions of repetition as defined in the *task-implementation* functions where this semiotic tool is deployed as an enabling mechanism for learners to carry out the task as such.

Corrective feedback

Corrective feedback refers to allo-repetition that shows a disparity with the previous erroneous or inaccurate learner's utterance:

206	m	los mujeres
207	e	las

Feedback acknowledgement

Repetition signalling the acceptance of a language correction:

91	e	el sentido ((typing)) de humor
92	m	DEL humor (.) del
93	e	oh (.) del humor ((pause while typing)) ella=

Language construction
Repetition plus addition of language to generate new text, as opposed to the reproduction of a model text (e.g. in the dictogloss task):

8	j	tú que haces que? *what do you do what?*
9	g	qué licenciatura, *what BA,*

Language practice
This functional category for repetition refers to the verbal practice of language mainly to gain prosodic regulation, but –as the second example illustrates- can also be deployed as an aid to internalise language beyond pronunciation:

350	e	ejer cicio *ex ercise*
351	m	ejer *ex*
352	e	ejer cicio *ex ercise*
353	m	ejercicio *exercise*
354	e	ejercicio (.) ha ((smiling)) ejercicio *exercise (.) ha ((smiling)) exercise*
355	m	muy difícil (.) hacer ejercicio= *very difficult (.) to take exercise=*

366	m	um (.) el imperfecto de tener (.) qué es? *um (.) the imperfect of to have (.) what is it?*
367	e	ah tenía *ah had*
368	m	tenía *had*
369	f	tenía *had*

Language reflection
Repetition deployed as a non-explicit metalinguistic / focus-on-form tool. This function of repetition assists learners in the process of implicit (sometimes complemented by explicit) consideration of the language they are working on. Repetition as a tool for language reflection is prevalent when learners are dealing with processes of linguistic selection, e.g. lexical, grammatical, or syntactic:

362	l	se
363	c	se "preocupa"
364	l	si it wouldn't be te ((pause))
365	c	se "preocupa" ((pause))

67	e	**A** a mi (.) compañera ((pause)) LE si
68	m	le parece? [si le parece
69	e	[le parece porque es (.) indirecto ((pause)) que la inteligencia gencia es [más?

Self-correction
Repetition is deployed for self-correction when a learner notices an error and modifies it within the same utterance:

61 J yeah ((pause)) en el en la (.) avenida ((pause)) I reckon is de la constitución but I'm not sure

Semantic inquiry or clarification
This kind of repetition takes place either when learners are searching for a word to convey meaning and are, indirectly, seeking help from their partners, or when they are seeking clarification of a term used by their partners:

91 l statue
92 f statute
93 t es una es una estatua pero se llama the angel of independence
it is a statue but it's called the angel of independence

47 g um el el otro um ((pause)) variab variable
um the the other umm ((pause)) var varied
48 j variable,
varied,
49 g umm (.) you know wide ranging lots of things um

Other Instances of Repetition
This category contains repetition instances which do not carry a functional quality as such, but that might be a personal way of expression brought about by indecision, for example. The following examples taken from three different protocols illustrate this kind of instances:

436 M: [o no no no no si

185 H: no se ((pause)) no se qué es basa

280 J: what else? hamlyn's hamlyn's the toy shop I don't know

Appendix five (b): functional categories: definitions and exemplification

Category definitions for LI

Socio-Affective Functions
Socio-Affective functions are characterised by the use of English to establish inter-personal rapport through the expression of agreement, acknowledgement, providing support and reassurance to each other or simply keeping in contact with the interlocutor by showing attention to their partner's expressions. English is also deployed to engage in off-task conversation.

Agreement/Acknowledgement

Particles such as "yeah", "yes" and "ok" were used by participants to express agreement to their partner. Sometimes they are used simultaneously, sometimes they are preceded or followed by the affirmative adverb "si" in Spanish:

138	h	siii ((reading again? silently)) *something* ok ((pause)) se basa ((pause))
139	l	yeah si

Particles such as "yeah", "yes" and "ok" were used to express attention towards the other's comment, suggestion, truth, etc. This use of English is therefore, a tool for maintaining inter-personal contact throughout activity:

13	h	es umm es como ((pause)) ah (.) que es umm que tu aprende ah durante ah su carrera=
		it's umm it's like ((pause)) ah (.) that is umm that you learn ah during ah your career=
14	l	=ok
15	h	intellectual development

General reply / comment

This functional category contains all those instances where learners use English to respond to a question their classmates or teacher made (example a), or a general comment which is not off-task conversation (example b):

Example a

85	j	y es el centro, ((pause))
		and it is the centre, ((pause))
86	n	I don't know (what's wrong but)

Example b

228	f	umm ((pause)) dar? no ((they laugh)) it's a crazy language
229	m	la la la la
230	f	anything fits

Inter-personal contact / attention

This wider category includes any expressions in English which help learners to establish a social environment where they can express emotions (e.g. "oh dear"), apologetic feelings (e.g. "sorry") and automated responses (e.g. "bless you") that are part of our everyday life spontaneous linguistic behaviour:

163	H	entonces=
		then=
164	h	=pero no pero no toca la fluta (.) a la hermana que sorry a la hermana que habla español le gusta mucho su instrumento pues no tiene que cargarlo a sus clases de música
		=but no but doesn't play the flute (.)the sister that sorry *the sister that speaks Spanish likes her instrument very much since she doesn't have to carry it to her music lessons*

Off-task conversation

Instances of dialogue where students are discussing issues which are not related to the task (e.g. social conversation):

342	g	do you know where's the (.) qué es la (.) email address ah (.) para leer tus emails?
343	j	la que viene aquí?

344 g si pero do you know what the email address is to read ah if you are at home on the internet
345 j ah no

Meta-Task Functions
I have categorised as *Meta-Task* mediational mechanisms that support learners in the creation of the infrastructure upon which task implementation can be carried out is what. In relation to use of English, only one category was identified throughout the data, *task evaluation / comment.*

Task evaluation / comment
Repetition that denotes judgemental comments in relation to the learners' perception of the task:

Example a

105 n oh it looks a mess already (.) I'll write it again

Example b

112 n avenida ((pause))
113 j de la constitución ((they smile)) I'm not sure about that (.) umm

Task-Implementation Functions
Task-Implementation functions involve the deployment of English to carry out the task as such. To facilitate analysis, I have distinguished the use of English for task-implementation from its use specifically in relation to work on the target language (*Language Related Functions*). Although the latter is at the core of learners' activity, the students co-create –by means of language- a socio-cognitive infrastructure that allows them to perform the task as problem solving endeavour on the one hand, and concentrate on the target language when necessary, on the other.

Content discussion
Use of English to express opinions and thoughts about topics emerging from the task content, e.g. discussing the importance of concepts in a hierarchical exercise that reflected students' preferences / priorities:

34 c con el boyfriend es más importante (.) tener dinero o (.) moral o (.) sense of humour qué es qué es lo más importante (.) todo=
35 l =eh [si
36 s [si ((they laugh)) uhum el sen ti do del [humour creo es más importante

Task management
This function denotes the use of English to handle the task, to establish communication between the dyad/group to move the task along:

Example a

216 j flamantes no sabes, qué significa esa palabra
shining do you know, do you know what that word means
217 g no se (.) si si we'll try ((she smiles))
I don't know (.) yes yes we'll try ((she smiles))

Example b

21	g	si ((typing)) index dot html ((pause))

To gain task control

Although gaining task control is an ongoing process throughout activity during task implementation, English –not unusually combined with other semiotic mechanisms including markers such as "right" and "OK"- is often deployed for this purpose. This function of English becomes evident in times of cognitive struggle, thereby the recruitment of other semiotic tools either simultaneously or in the same utterance:

Example a

332	j	los fines de semana, *weekends*,
333	g	aaaah
334	j	so a dónde va eso aquí o aquí? so *where does that go here or here*?

Example b (discussing task instructions)

216	h	una no no me entiendo el structura del (.) oración es es sentence oración? *a no no don't understand the structure of (.) sentence it's it's* sentence *sentence*?

Language Related Functions

Language Related functions of repetition involve the use of this mechanism to address an issue specifically concerning the target language. In other words, repetition in this category reflects a foreground focus on the L2 with the problem-solving task acting as the background for activity. *Language related* functions contrast thus the functions of repetition as defined in the *task-implementation* functions where this semiotic tool is deployed as an enabling mechanism for learners to carry out the task as such.

Confirmation request

Use of English to request confirmation upon a target language query:

160	c	lo isn't it?

Language question

Use of English to make a language inquiry:

57	c	do you know what it is, se parece?

Language reflection

English deployed to focus-on-form. This category contains instances where learners use English to reflect on the language they are working on. Focusing on form might involve the use of metalinguistic terms (example a), but it does not necessarily require them (example b). English as a tool for language reflection is prevalent when learners are dealing with processes of linguistic selection, e.g. lexical, grammatical, or syntactic:

Example a

→ 406 j is he talking about adjetivo
407 g adjetivo
408 j un
409 g pienso que (.) no, (.)

Example b

173 l I bet it's a way of saying that **THEY** are
174 h umm
175 l I think you've got to put it twice in Spanish don't you?

Spelling correction
Only one example of English deployment to correct spelling was found in the data:

205 n silen z,
206 j *no with an o*

Translation
This functional category for English as a mediational mechanism specifically refers to the translation of language learners encounter in the tasks' text to facilitate task control:

145 e "en los" (.) "en cuanto a" ((reading very very quietly)) que ah ((pause)) talking of technology

Vocabulary translation
Translation of vocabulary in order to provide help to a classmate or request a confirmation when learners are not positive they know the meaning of a word:

9 e amm ((pause)) des que es desarrollo intelectual?
10 m am [intellectual] development
11 e [desarrollo ah

Word search
English deployed as an aid for the self to recall or to elicit from their partner a word in Spanish that might express the meaning they are trying to convey:

35 e pero también de avanzar um tus ((pause)) skills umm artes artes? si? (.) puedes=

Other Instances of English
This category contains instances where learners express themselves in English for no obvious reason (e.g. code-switching) or where the context in which the instance occurred did not allow me to identify its function. I have also included examples of private speech here because without post-task interviews it is not possible to discern with confidence whether this language apparently addressed to the self was being deployed as a tool to gain control over the task as such or whether learners were internally working on a language issue, for instance.

Code-switching
Use of English for no apparent reason:

39 g umm ((pause)) status, desarrollo,

40	j	desarrollo [desarrollo y power

Private Speech
Instances in which learners' use of English do not appear to be addressed to their classmate(s), but to the self as a mediational tool for thought. A typical expression that denotes language apparently addressed to the self is "I don't know" when it is uttered not as a result of a partner's question, but rather as a self response when facing problem-solving challenges. Other examples include:

Example a

69	j	what is it, "los mexicanos están orgullosos de la belleza natural y" ((pause)) yyy yyy (.) yyy ((smiles)) hang on (.) ar que o lo gía uh de

Example b

244	m	el color?
245	e	el si física ((pause)) física ((pause)) no se porque no *hold on*
246	m	no se

Unidentified
Instances where the context / audio-data does not allow for a categorization (e.g. inaudibility):

77	h	solo solo ((pause while they think?)) tener?
78	H	tener
79	h	no *perhaps that's* (con ser)
80	H	umm ser! estar,

Appendix six: Microgenesis Episodes

CT1-MG1

80	m	no que ((laughter)) ahm ((pause)) q (.) buenos modales qué qué significa buenos modales?
		no that ((laughter)) ahm ((pause)) q (.) good manners what what does good manners mean?
81	e	buenos
		good
82	m	mo
83	e	modales
		manners
84	m	morals,
85	e	oh (.) si si si ((last two "si" said quietly))
		oh (.) yes yes yes
86	m	no [el sentido] del humor
		no ([sense of humour
87	e	[el sentido
		[sense
88	m	si
		yes
89	e	y me dijo que EL sentido?
		and she told me that sense
90	m	si
		yes
91	e	el sentido ((typing)) de humor
		sense ((typing)) of humour
92	m	DEL humor (.) del
		of humour (.) of
93	e	oh (.) del humor ((pause while typing)) ella=
		oh (.) of humour ((pause)) she=
94	m	=si
		=yes
95	e	me dijo que [el] sentido del [*humor*
		told me that sense of humour
96	m	[si] [si corregir
		[yes] [yes correct
97	e	yeeeee ((expression brought because they had all their answers correct))

CT1-MG2

98	m	"avanzar"
		"*go on*" ((reading while pressing button on screen))
99	e	"ahora a la entrevista"
		"*now to the interview*"
100	m	uhum
101	e	"buenos dias buenos dias en su opinión en qué" ((pause))
		"*good morning good morning in your opinion what is*"
102	m	"hoy en" día (.) "hoy en" día
		"*nowa*"*days* ((three words in Spanish)) "*nowadays*"
103	e	en qué lo? basa
		what is it ((wrong pronoun)) *based on*?
104	m	"en su opinión en qué" ((pause)) para quién (.) en general o
		"*in your opinion what is*" ((pause)) *for whom (.) in general or*
105	e	"en qué en qué" se "basa"?
		"*what is what is*" se ((correct pronoun)) "*based on*"
106	m	si
		yes

107	e	si? *yes?*
108	m	es posible no estoy seguro segura ((laughter)) *it's possible I'm not sure*
109	e	si ((laughter)) *yes*
110	m	(carambe) ((Spanish expression))

CT1-MG3

148	e	"en los" (.) "en cuanto a" ((reading very very quietly)) que ah ((pause)) talking of technology *"in the" (.) "in relation to" that ah ((pause)) talking of technology*
149	m	umm ah ((soft laughter))
150	e	"qué tan importante" es "el" *"how important" is "the"*
151	m	si (.) es el (.) es el *yes is the is the*
152	e	es el (.) es el éxito? o ((pause)) no? *is the is success? or ((pause)) no?*
153	m	no en tec tecnología? *no in tec technology?*
154	e	no se no se qué sign significa su "éxito en el poder el dinero" (.) éxito es *I don't know what success means in "power money" success is*
155	m	success
156	e	oh ((pause))
157	m	"poder" ((pause)) um "qué tan importante" (.) how important "es el es el el " *"power" ((pause)) um "how important" (.) how important " is the is the the"*
158	e	how important's success in "your" work? I don't know
159	m	el poder *power*
160	e	um?
161	m	el poder *power*
162	e	[typing] poder *power*
163	m	no es tecno tecnología no es ((pause)) computador? ((pause)) *no it's techno technology no is it ((pause)) computer?*

PT1-MG4

12	l	um qué es desarrollo intelectual? *um what's intellectual development?*
13	h	es umm es como ((pause)) ah (.) que es umm que tu aprende ah durante ah su carrera= *it's umm it's like ((pause)) ah (.) that it's umm that you learn ah during your career=*
14	l	=ok
15	h	intellectual development
16	l	ay yeah ((laughter))
17	h	ah
18	l	no ((laughter)) no ( )

PT1-MG5

52	l	a sensibilidad? *a sensibility?*
53	h	es lio (.) piensa ((pause)) que *it's mess (.) think ((pause)) that*
54	l	la sensibilidad es importante? *sensibility is important?*
55	h	si

yes

56 l (undistinguisable)

57 h (undistinguisable]

58 l *intelligence* (de)

59 h ah ((pause)) pienso que el la inteligencia
ah ((pause)) I think that intelligence

60 l a en el trabajo es importante?
a at work is important?

61 h si umm
yes umm

62 l ah ok

63 h no se o
I don't know or

64 l la sensibilidad un poco
sensibility a little

65 h umm

66 l *not too much though* (.) la inteligencia ((murmurs something in English)) la inteligencia
not too much though (.) intelligence ((murmurs)) intelligence

67 h es [importante
it's important

68 l [importante sentido del humor *sorry* () ((not giving her enough time to write?))
[important sense of humour sorry

69 h ((she smiles)) es importante en (.) el (.) trabajo ((writing))
it's important at (.) work

70 l um el sentido del humor es más importante
um sense of humour is more important

71 h ((writing)) umm pero el sentido del humor es más [imp] impor [tan] te
umm but sense of humour is more important

72 l [para] [si] para evitar el aburr aburri
[to] [yes] to avoid bore

73 h el
the

74 l *boredom*? aburr? aburre ((asking teacher))

75 teacher uhumm si bueno *boredom* es aburrimiento aburrido es yo estoy aburrido [o ella está aburrida
uhumm yes well boredom is boredom to be bored is I'm bored [or she is bored

76 l [ah ok

77 h el aburri
bore

78 l aburrimiento
boredom

79 teacher si aburrimiento
yes boredom

80 h aburrimiento
boredom

81 l si
yes

82 h punto (.) umm
full stop (.) umm

PT1-MG6

83 l qué pienso?
what do I think?

84 h pi[enso
I think

85 l [piensas sorry
[what do you think sorry

86 h ((laughter)) pienso que ((pause)) la situación económica es [muy importante (.) ah (.) LO más importante pero buenos modales son muy muy muy importante qué es l'otro palabra para

importante?
I think that ((pause)) the economic situationj is very important (.) ah (.) the most important but good manners is very very very important what is the other word for important?

87 l [si] ah no se
[yes] ah I don't know

88 h ah no se si ah debe debo um (.) escribir en el tercera persona o
ah I don't know if ah must I must um (.) write in the third person or

89 l si
yes

90 h pienso (.) que ((pause)) que el el el mundo (.) profesional ((pause)) la situación económica (.) ((writing)) es es es **lo** más the most important*(I think (.) that ((pause)) that the the the professional world ((pause)) the economic situation (.) ((writing)) is is is the most the most important*

91 l si
yes

92 h LO más pero (.) importante ((writing)) pero ((pause)) son ((pause)) um (.) el otra palabra [para importante?
the most but (.) important ((writing)) but ((pause)) are ((pause)) um (.) the other word [for important?

93 l [para importante también
[for important too

94 h son esen esencial o
are esen essential or

95 l ah si
ah yes

96 h um (.) son
umm (.) are

97 l umm

98 h oh importante también
oh important too

99 l es muy difícil
it's very difficult

CT2-MG7

24 H ((giggles)) "avanzar"
"*go on*"

25 h ((quietly reads the instructions on the screen)) su novio ((typing))
her boyfriend

26 H novio
boyfriend

27 h novio
boyfriend

28 H no
he doesn't

29 h no sabe no
he doesn't know

30 H si no sabe
yes he doesn't know

31 h no sabe
he doesn't know

32 H tocar (*how to play*) ((in Spanish how is not necessary))

33 h tocar si tocar el piano (.) el piano o el
to play yes how to play the piano ((pause)) *the piano or the*

34 H umm

35 h how cómo tocar? es (.) es sabe tocar ((pause)) no sabe cómo tocar? o tocar? tocar
how *how to play? Is it (.) is it he knows how to play* ((pause)) *or knows to play? or to play? to play*

36 H umm

37 h si tocar [el] piano,
yes to play ((without how)) *[the] piano,*
38 H [el] ((pause)) el piano ((smile))
[the] ((pause)) *the piano*

CT2-MG8

114 h "Elisa no es la chica que habla alemán" ((reading the next clue)) ((pause)) que pasó? ((pause)) ok "avanzar" "she had to practise but carried on reading" umm,
"Elisa isn't the girl that speaks German" ((pause)) *what happened*? ((pause)) ok *"go on"* "she had to practise but carried on reading" umm,
115 H umm creo que es
umm *I think it's*
116 h es el antepasado si
it's the anterior preterite yes
117 H tu
118 h [tuvo
119 H [tuvo
120 h tuvo que practicar,
had to practise
121 H si ((typing)) prac
122 h pract eh p r a c tiicar
pract eh p r a c tiiise
123 H pero (*but*)
124 h carried se seguir? seg she carried on reading pero (.) no se carried on continuar?
carried *ca carry*? *car* she carried on reading *but* (.) *I don't know* carried on *to continue*?
125 H si cont
yes cont
126 h continuó? no se como se dice el pasado continue? ((mumbles and she writes))
carried on? I don't know how to say the past carried on? ((incorrect tacit subject))
127 H con ((typing, they smile)) [pero
con ((typing)) [*but*
128 h [pero es es el material ((they smile))
[*but it's the material*
129 H pero continuo (.) es el=
but carried on (.) it's the=
130 h =no s no estoy seguro (.) continuo=
=I'm no I'm not sure (.) carried on
131 H =[gerundio
=[gerund
132 h [a leer?
[*to read*?
133 H después de [continuar
after to [continue
134 h [continuar leyendo leer leyendo (.) leyendo?=
[*to continue reading to read reading (.) reading*?
135 H =si es leyendo porque es el gerun gerundio average(.) después de seguir y continuar ((she recalls? a grammar point studied in class))
yes it's reading because it's the gerund average *gerund (.) after to carry on and to continue*
136 h ((he types)) l e y e n d o punto
((he types)) *r e a d i n g full stop*
137 H esta difícil
it's difficult
138 h tenia que a lo mejor entonces
had to maybe then
139 H si ((they type to change answer)) tenia que
yes ((they type to change answer)) *had to*

140	h	si ((pause)) pero *yes ((pause)) but*
141	H	es ( ) *it's* ( )
142	h	si carried carried on ((pause)) si seguia? no se como se dice seguir *yes* carried carried on ((pause*)) yes carried on? I don't know how to say carry on*
143	H	es *it's*
144	h	seguir (.) o no se como se escribe vamos a ver como seguir ((pause)) pero tengo este libro s e ((she types)) *carry on (.) or I don't know how to spell it let's see how carry on((pause))but I have this book s e*
145	H	es *it's*
146	h	si, ( ) seguia (.) seguir es siguio(.) no es i o *yes ( ) had carried on carry on is carried on (.) no it's i o*
147	H	es i o pero *it's i o but*
148	h	no? tenia que practicar ((pause)) pero siguio leyendo es correcto? a vale tenía que practicar ((pause)) pero siguió leyendo es correcto? a vale ahh *no? had to practise ((pause)) but carried on reading is it correct? ah ok had to practise ((pause)) but carried on reading is it correct? ah ok ahh*

CT2-MG9

129	H	pero continuo (.) es el= *but carried on (.) it's the=*
130	h	=no s no estoy seguro (.) continuo= (=*I'm no I'm not sure (.) carried on*)
131	H	=[gerundio =[*gerund*
132	h	[a leer? [*to read*?
133	H	después de [continuar *after to [continue*
134	h	[continuar leyendo leer leyendo (.) leyendo?= [*to continue reading to read reading (.) reading*?
135	H	=si es leyendo porque es el gerun gerundio average(.) después de seguir y continuar ((she recalls? a grammar point studied in class)) *yes it's reading because it's the gerund* average *gerund (.) after to carry on and to continue*

PT2-MG10

158	n	acaba ((pause)) a ca baa *has just ((pause)) has juuust*
159	j	( ) I don't know
160	n	acaba de *has just*
161	j	both perhaps (.) oh aa acaba
162	n	comprarlo *bought it*
163	j	comprarla es comprarla with bought *bought it* ((wrong object pronoun)) *it's bought it* with bought
164	n	es el libro though *it is book* though
165	j	yeah um perdón yeah um *sorry*
166	n	acaba de comprarlo ok eh *she's just bought it ok eh*
167	j	(siguiente)

(next one)

168 n um "la hermana que toca el clarinete no habla ni" the keey come on
um "the sister that plays the clarinet doesn't speak either" the keey come one

169 j acabo de comprarlo ((just repeating while they wait for teacher)) ( ) what was the name?
she's just bought it ((repeating while waiting)) ( ) what was the name?

180 n acaba de comprarlo sí?
she's just bought it yes?

181 j sí creo que sí
yes I think so

PT2-MG11

198 j ok this is quite easy it seems silencio umm no se no se puede nadar si no,
ok this is quite easy it seems *silence umm no swimm no swimming yes isn't it,*

199 n umm ((pause)) fragil what was it, ya no me acuerdo
umm ((pause)) fragile what was it, *I don't remember anymore*

200 j sorry?

201 n abierta con cui dado
open with care

202 j (move with) care

203 n fragil cuidado
fragile care

204 j silencio ((pause)) yy no se puede nadir
silence ((pause)) aand no swimming

205 n silen z,
silen c,

206 j no with an o
no with an o

207 n silencio
silence

208 j that's right ( ) y no se puede nadir
that's right ( ) *and no swimming*

209 n no se puede
no swimming

210 j nadar n a d a o I don't think that's right though

211 n that's care fragil ( ) abierto con
that's care *fragile* ( ) *opened with*

212 j I don't know what care is

213 n I don't know ((pause)) care es cuidado (clumsy)

214 j umm

215 n ((she smiles))

216 j to take care cuidar (.) ok I don't know if that's right

PT3-MG12

11 j los mexicanos son orgullosos=
*mexicans *are proud=*

12 a =orgullosos de
=proud of

13 j la capital de méxico es lo más importante es donde está situada,
the capital of méxico is the most important it's where it is located,

14 p ( )

15 a uno de más
one of most

16 j es
it's

17 a UNO de los más importantes

one of the most important

18 j centros turísticos
tourist centres

19 a y aah los habitantes son muy um ((pause)) orgullosos
*and aah the inhabitants *are very um ((pause)) proud*

20 j los mex mexicanos
mex mexicans

21 p los mexicanos
mexicans

22 j so los mexicanos eh ((pause)) estás orgu orgulluso?
so *mexicans eh ((pause)) are pro proud?*

23 a orgu[llosos
proud

24 p [son
[**are*

25 a están? [están
are? [are

26 ( ) [yeah

27 j son no son es que=
**are isn't it *are it's that=*

28 a =importante también hay una población
=important too there is a population

29 j son orgulosos
**are proud*

30 a están un aspecto de de la población
it's an aspect of of the population

31 j orgulosos?
proud?

32 a sí
yes

33 p sí
yes

34 j umm de

35 a umm de este [estado de factor ((smiles))
umm of sta state of fact ((smiles))

164 a los mexicanos están orgullos de la ciudad ((pause)) las religiones sssh ssh ((just a sound)) belleza natural ((pause))
mexicans are proud of the city ((pause)) religions sssh ssh ((just a sound)) natural beauty ((pause))

183 a =la característica de una población ((pause)) pero una característica general
=the characteristic of a population ((pause)) but a general characteristic

184 teacher ok si dices los mexicanos qué pasa? obviamente puedes decir los SON orgullosos o los mexicanos ESTAN orgullosos cuál es la diferencia?
ok if you say mexicans what happens? obviously you can say are proud or mexicans are proud what is the difference? ((teacher is pointing out the possibility of using ser and estar))

185 a eeeeh todo el tiempo son orgullosos
eeeh all the time are proud

186 teacher uh hum es algo qué?
uh hum it's something what?

187 j ah los mexicanos eh eh están orgullosos ah en este momento ((pause)) y
ah mexicans eh eh are proud ah at this moment ((pause)) and

188 teacher ok

189 j en este momento
at this moment

190 p pueden estar orgullosos de de hacer un cosa ( )

they can be proud of of doing something ( )

191 teacher uh hum

192 p pero si son orgullosos es una característica del caracter
but if they are proud it's a characteristic of their character

193 teacher uh hum es algo que está describiendo el cómo son no?
uh hum it's something that is describing how they, isn't it?

194 p si si
yes yes

195 teacher entonces vean en ese contexto qué es lo mejor son o están orgullosos
then look at the context what is better are or are proud

196 a depende de de [( )
it depends on on [( )

197 j [si ok ((pause))

198 p están no?
are isn't it?

246 a y los londrineses son están orgullosos ((pause)) de
*and londoners *are are proud ((pause)) of*

247 p de su [de su reloj ((smiles))
of their clock ((smiles))

248 a [de su belleza de ((smiles))
[of their beauty of ((smiles))

249 j las ciudadanos um es um están ((pause)) ((writing?)) orgullosos de big ben?
the citizens um ar um are ((pause)) proud of big ben?

266 a son orgullosos de las culturas mezcladas
**are proud of the mixed cultures*

343 a están orgullosos de su
are proud of their

PT3-MG13

37 p de la bella
of the beaut

38 a de la de la de la
of the of the of the

39 p de la belleza de
of the beauty of

40 a de la belleza
of the beauty

41 p belleza
beauty

42 j de la ciudad
of the city

43 a de la ciudad si
of the city yes

44 p de los
of the

45 j what

46 a de la de la belleza b e
of the of the beauty b e

47 p b e

48 a si b e
yes b e

49 j cómo se escribe?

how do you spell it?

50 p eh b e double l ((pause)) e z a

51 j ah belleza
ah beauty

52 p belleza
beauty

PT3-MG14

113 a tranb tranbajan?
wor they work? ((it should have been trabajan))

114 p trabajan,
they work,

115 a son tranbajadoras ((pause))
they are hard working ((still wrong verb form)) ((pause))

116 j traba ((pause)) trabojodores ((some pronunciation problems and wrong gender))

117 a [traba jadores
[hard wor king ((wrong gender))

118 j [tra ba ja dores tra ba ja [dores
[ha rd wor king ha rd wor [king ((wrong gender))

119 a [doras si ((gender correction))

PT3-MG15

131 j =las las mexicanos
=**the* **the mexicans* ((wrong gender for the needed article))

132 a los mexicanos [son morenos
the mexicans are dark-skinned

133 j [ah los mexicanos
ah the mexicans

PT3-MG16

136 teacher son?
are?

137 p están
are

138 a tienen
have

139 j tienen
have

140 p [tienen
[*have*

141 a [tienen
[*have*

142 j tienen ojos grandes ((pause sound of paper))
have big eyes

PT3-MG17

296 a [the history museum ((pause))

297 j eh ah la galeria tate ((pause))
eh ah gallery tate

298 p eh um el museo du eh natural de historia,
eh um the museum of eh natural history

299 j de histo de ((pause)) de

300 p historia

301	j	his to ria
302	a	[natural
303	p	[historia
304	a	yeah de historia natural
305	j	that's it ((pause)) y eh

PT3-MG18

325	j	um, ((pause)) el tercero párrafo los ah las ciudadanes um *um ((pause)) the third paragraph the ah the citizens um*
326	p	son um ((pause)) sonrientes, *are um ((pause)) smiling,*
327	j	son sonrentes, *are smiling,*
328	p	sonrientes *smiling*
329	a	sonrientes *smiling*
330	j	um sonrientes, *um smiling,*
331	p	son ri en tes es sonreír son ri en tes *smi ling it's to smile smiling*
332	j	sonrientes *smiling*
333	a	sonrientes *smiling*
334	p	si ((pause)) *yes* ((pause))

2PT1-MG19

253	s	"como" podemos "mantiene informado" *"how" we can "keep informed"*
254	l	umm ((pause))
255	s	no puedes? *you can't?*
256	l	no cause it would be mantener no cause it would be to keep
257	s	uhum
258	c	ah "como" se "mantiene" yeah how do you keep yourself= ah "how" se ((reflexive pronoun)) "keep" yeah how do you keep yourself=
259	l	=se man mantiene *=se ((reflexive pronoun)) kee keep*
260	c	yeah how do you keep yourself informed
261	l	"informado" yeah *"informed" yeah*

2PT1-MG20

262	s	lees? *do you read?* ((informal address))
263	l	umm
264	c	yes (.) oh but it's formal
265	s	oh
266	c	lee *do you read?* ((formal address))
267	s	lee *do you read?*

268	c	is that formal?
269	s	creo que si *I think so*
270	l	lee *do you read?*
271	c	double e?
272	l	umm
273	s	si ((pause)) *yes* ((pause))

2CT2-MG21

59	m	vale avanzar "traduzcan al español" oh "her boyfriend doesn't know how to play the piano" eh *ok advance "translate into Spanish"* oh "her boyfriend doesn't know how to play the piano" eh
60	e	su novio *her boyfriend*
61	m	su novio ((typing)) ay umm tildes? *her boyfriend* ((typing)) *ay umm written accents?*
62	f	estas umm no umm (.) no sabe cómo *these umm no umm (.) doesn't know *how* ((how not needed in the Spanish form))
63	e	cómo tocar *how to play*
64	f	cómo tocar si (.) no sabe cómo tocar el (.) piano, *how to play yes (.) doesn't know *how to play the (.) piano*,
65	m	sabe es (.) *to know is* (.)
66	e	cómo (.) no, *how (.) isn't it*,
67	m	saber significa how to no, *to know means* how to *doesn't it*,
68	e	entonces su novio no sabe tocar (.) no sabe tocar *then her boyfriend doesn't know how to play (.) doesn't know how to play*
69	m	claro si *of course yes*
70	e	si, *yes*,
71	f	si si si si no sabe tocar el piano *yes yes yes doesn't know how to play the piano* ((correct sentence))
72	m	t o c a r ((typing)) el *p l a y* ((typing)) *the*
73	e	el *the*
74	m	el piano? *the piano*?
75	e	si *yes*
76	m	el ((typing)) pia no (.) *the* ((typing)) *pia no* (.)

2CT2-MG22

350	m	de leer reading hold on *of to read* reading hold on
351	e	conti continuó leer *cont continued *to read*
352	f	continuo *continued*

353 e to read continued to read
354 f continue a a leer
continue to to ((preposition)) to read ((verb in infinitive))
355 e ((typing noises)) sola solamente leer to read porque porque el
((typing noises)) *onl only to read to read because because the*
356 m cómo ((typing))
¿pardon ((typing))
357 e continuo
continued
358 m acento,
tilde,
359 e um sí continuó leer
*um yes continued *to read*
360 m leer solamente leer
to read only to read
361 e creo que si
I think so
362 m um punto
um full stop
363 e ((they smile)) ah ((pause)) um ((pause)) continuar es un verbo
((they smile)) *ah ((pause)) um ((pause)) to continue is a verb*
364 m um um ah (.) sí um um (.)
um um ah (.) yes um um (.)
365 e es un verbo (.) cons cons
it's a verb (.) cons cons

373 e pero ((pause)) leyendo continuó leyendo? no
but ((pause)) reading continued reading? isn't it? ((produces correct form))

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