



HAL
open science

The interplay between nonverbal and verbal interaction in synthetic worlds which supports verbal participation and production in a foreign language.

Ciara R. Wigham

► **To cite this version:**

Ciara R. Wigham. The interplay between nonverbal and verbal interaction in synthetic worlds which supports verbal participation and production in a foreign language.. Linguistics. Université Blaise Pascal - Clermont-Ferrand II, 2012. English. NNT: . tel-00762382v2

HAL Id: tel-00762382

<https://theses.hal.science/tel-00762382v2>

Submitted on 13 Dec 2012

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Thèse présentée

par

Ciara Rachel WIGHAM

en vue de l'obtention du grade de Docteur de l'Université Blaise Pascal – Clermont 2

Spécialité : Sciences du langage

The interplay between nonverbal and verbal interaction in synthetic worlds which supports verbal participation and production in a foreign language.

Le rapport entre le verbal et le non verbal dans des mondes synthétiques et son rôle de soutien pour la production et la participation verbales en langue étrangère.

Volume 1

Membres du jury

Professeur Jean-Claude BERTIN, Université du Havre (Rapporteur)

Professeur Thierry CHANIER, Université Blaise Pascal (Directeur)

Professeur Nicolas GUICHON, Université Lumière, Lyon 2 (Examinateur)

Professeure Marie-Noëlle LAMY, The Open University, Royaume-Uni (Examinatrice)

Professeur François MANGENOT, Université Stendhal (Rapporteur)

Professeure Marie-Françoise NARCY-COMBES, Université de Nantes (Examinatrice)

Docteur Randall SADLER, University of Illinois, Etats-Unis (Examinateur)

Préparée au sein du Laboratoire de Recherche sur le Langage, EA999

sous la direction du Professeur Thierry CHANIER

Ecole doctorale Lettres, Sciences Humaines et Sociales, ED370

Soutenance le vendredi 16 novembre 2012

RESUME

Cette recherche vise à analyser la communication pédagogique multimodale dans des mondes synthétiques (virtuels). L'étude se focalise sur le rapport entre le verbal et le non verbal et son rôle de soutien pour la production et la participation verbales en langue étrangère. Celui-ci est analysé dans une perspective socio-sémiotique de la multimodalité, dans le contexte d'une formation conduite dans le monde synthétique Second Life selon une approche Enseignement d'une Matière Intégrée à une Langue Étrangère (Emile). La formation, 'Building Fragile Spaces' menée dans le cadre du projet européen ARCHI21 a été conçue pour des étudiants d'architecture dont la langue étrangère était soit le français soit l'anglais.

Le rapport entre le verbal et le non verbal est examiné selon trois angles différents. Premièrement, le rôle du non verbal pendant une activité de construction collaborative est analysé au vu des opportunités offertes par des mondes synthétiques pour la co-création de l'environnement et pour la collaboration. A travers cette étude, nous nous demandons si l'utilisation du mode non verbal a un impact sur la participation des étudiants dans le mode verbal et si le rapport entre ces deux modes a une influence sur la production verbale. Deuxièmement, l'utilisation du non verbal pour la construction des identités est abordée et est considérée en rapport avec l'interaction et la participation verbale des étudiants dans la langue étrangère. Finalement, la recherche se concentre sur le rapport entre les modalités audio et clavardage dans le mode verbal. Plus particulièrement, l'étude s'intéresse au rôle du clavardage dans l'interaction puisqu'il est en compétition non seulement avec l'audio mais également avec plusieurs modalités non verbales. La possibilité d'utiliser le clavardage pour la rétroaction est également abordée.

Cette thèse cherche à contribuer aux considérations méthodologiques exigées pour que la recherche concernant la communication pédagogique multimodale dans des mondes synthétiques puisse aller au-delà des exemples spéculatifs et anecdotiques. Une typologie de modalités verbales et non verbales est proposée. Elle sert à étendre une méthodologie proposée pour la transcription des interactions multimodales aux interactions possibles dans les mondes synthétiques. En vue de la problématique plus générale, dans les domaines des Sciences Humaines et des Sciences du Langage, il s'agit de rendre visibles et accessibles publiquement les données utilisées pour les analyses. En effet, cette étude se réfère à un corpus d'apprentissage dans son approche méthodologique. La construction d'un corpus structuré permet d'effectuer des analyses contextualisées des données recueillies lors de la formation 'Building Fragile Spaces'.

Cette recherche propose quelques éléments de réponse concernant l'augmentation de la participation verbale en rapport avec l'organisation proxémique des étudiants, la customisation de l'apparence des avatars des étudiants et l'utilisation importante des actes non verbaux. Concernant la production verbale, l'étude décrit comment, dans le mode non verbal, le mouvement de l'avatar est employé en tant que stratégie pour surmonter des difficultés de communication dans le mode verbal. Ces difficultés concernent, en particulier, l'expression de la direction et de l'orientation. L'étude montre également l'intérêt d'utiliser le clavardage pour offrir de la rétroaction concernant la forme linguistique dans le but de soutenir la production verbale des apprenants dans la modalité audio. Au vu des résultats, l'étude propose quelques considérations concernant la conception des activités pédagogiques pour l'apprentissage des langues dans des mondes synthétiques.

Mots clefs: multimodalité, mondes synthétiques (virtuels), corpus d'apprentissage, communication médiatisée par ordinateur (CMO), Enseignement d'une Matière Intégrée à une Langue Étrangère (Emile)

ABSTRACT

This research focuses on multimodal pedagogical communication in synthetic (virtual) worlds. The study investigates the interplay between verbal and nonverbal interaction which supports verbal participation and production in a foreign language. This is analysed from a socio-semiotic perspective of multimodality within the context of a course held in the synthetic world Second Life, which adopted a Content and Language Integrated Learning (CLIL) approach. The course, entitled 'Building Fragile Spaces', formed part of the European project ARCHI21. It was designed for higher education students of Architecture whose foreign language was either French or English.

The interplay between verbal and nonverbal interaction is examined from three different angles. Firstly, considering the opportunities synthetic worlds offer for the co-creation of the environment through building activities and for collaboration, the role played by the nonverbal mode during a collaborative building activity is investigated. The study questions whether the use of the nonverbal mode impacts on the participation of students in the verbal mode, and whether any interplay exists between these two modes that influences verbal production. Secondly, use of the nonverbal mode by students in inworld identity construction is addressed and considered with reference to their verbal interaction, and participation, in the foreign language. Thirdly, the research concentrates upon interplay between the audio and textchat modalities in the verbal mode. More specifically, the focus is on whether the textchat plays a role during interaction, considering it is in competition not only with the audio modality but also with several nonverbal modalities; and on whether the textchat modality can serve for feedback provision on language form.

This thesis seeks to contribute to the methodological considerations to allow research to move beyond speculative and anecdotal examples of multimodal pedagogical communication in synthetic worlds. A typology of nonverbal and verbal modalities is proposed, and then drawn upon, to extend a previous methodology suggested for multimodal transcription to interactions in synthetic worlds. Considering, within the fields of Social Sciences and Language Sciences, the more general research problem to render research data used for analyses visible and publically accessible, the study adopts a LEarning and TEaching Corpus (LETEC) methodological approach. Constituting a structured corpus allows for contextual analyses of the data collected during the 'Building Fragile Spaces' course.

This research offers insights into how verbal participation increases with reference to the proxemic organisation of students, the customization of students' avatar appearance and an increased use of nonverbal acts. Concerning verbal production, the study shows how avatar movement in the nonverbal mode was used as a strategy to overcome verbal miscommunication when expressing direction and orientation and also the benefits of using the textchat modality for feedback on language form in order to support learners' productions in the audio modality. In light of these results, the study suggests some considerations concerning the design of pedagogical activities for language learning within synthetic worlds.

Key words: multimodality, synthetic (virtual) worlds, LEarning and TEaching Corpora (LETEC), computer-mediated communication (CMC), Content and Language Integrated Learning (CLIL)

REMERCIEMENTS

Tout d'abord, je tiens à exprimer ma reconnaissance à Thierry Chanier pour la confiance qu'il m'a accordée en acceptant de diriger mon travail, pour sa rigueur scientifique et pour sa vision qui fait qu'en tant que doctorant on ne prépare pas uniquement une thèse mais un début de carrière de chercheur. Je continue à apprendre beaucoup.

J'adresse aussi mes remerciements à John Fynn, Richard Ryan et Eric Agbessi qui m'ont encouragée à faire le premier pas vers une thèse : un pas que je ne regrette pas.

Mes remerciements vont aux membres du jury pour leur disponibilité. Je remercie Jean-Claude Bertin et Francois Mangenot d'avoir accepté d'être les rapporteurs de cette thèse. Je remercie également Marie-Francoise Narcy-Combes, Marie-Noëlle Lamy, Nicolas Guichon et Randall Sadler d'avoir pris le temps d'examiner mon travail. Merci également à Muriel Grosbois pour son aide en tant que membre du comité de suivi de ma thèse.

Le stéréotype du doctorant isolé dans son travail est, heureusement, loin d'être vrai au Laboratoire de Recherche sur le Langage. Merci à tous mes collègues doctorants et jeunes chercheurs qui ont partagé leurs journées à la Maison des Sciences de l'Homme avec moi. Merci à vous pour nos échanges scientifiques mais également pour nos joies et peines partagées. Hoby Andrianirina, Aline Auriel, Aurélie Bayle, Juan Luis Moreno Nilo, Mario Laurent, Loïc Liégeois, Blaise Ngandeu, Marcel Pereira, Audrey Rudel, Inès Saddour, Lucia Tomasini Bassols et Hyeon Yun, je suis très contente de vous compter parmi mes amis.

Merci aux enseignants et aux étudiants de l'ENSAPM ainsi qu'aux membres de l'équipe du LRL qui ont participé à ARCHI21. Plus particulièrement à ceux qui ont fait des heures d'enregistrement et de conversion de fichiers lors de la formation *Building Fragile Spaces*. Je remercie Anne-Laure Foucher, Thierry Chanier, Christine Rodrigues, John Fynn, Aurélie Bayle et Annie Quentin. Un grand merci également à Inès Saddour, ingénieur de recherche sur le projet ARCHI21, c'était un grand plaisir de collaborer avec toi. Je remercie aussi Paul Lotin, ingénieur de recherche au LRL, pour ses conseils en informatique et pour les programmes informatiques qu'il a écrits pour m'aider dans mes analyses.

Je voudrais aussi remercier mes collègues enseignants Melissa Thomas, John Czechanski, Miranda Dickenson et Sue Davis pour leur soutien du côté de l'espace langue hypermédia. Thank you.

Je tiens également à remercier Erica Johnson pour son travail de relecture attentif et pour ses nombreux encouragements de type 'you can do it!'. Merci également à mes amis proches et à mon frère qui ont cru en moi.

Enfin, j'adresse tout particulièrement un grand merci à Raphaël Dulier pour son soutien indéfectible et ses mots d'esprit et à mes parents Phyl et Lewis Wigham sans l'éducation desquels cette thèse n'aurait sans doute jamais existé. Thanks for everything.

Contents

Chapter 1. Introduction	10
1.1. Research objectives and context of study.....	10
1.2. Thesis structure	15
PART I – MULTIMODALITY – NONVERBAL AND VERBAL MODES	20
Chapter 2. Multimodality.....	21
2.1. Introduction	21
2.2. A multimodal view of communication.....	21
2.3. Approaches to the study of multimodality	24
2.4. Approach adopted and terminology choices	28
2.5. Application of the socio-semiotic approach to pedagogical contexts	30
2.6. Conclusion.....	39
Chapter 3. Nonverbal mode	40
3.1. Introduction	40
3.2. Nonverbal behaviour or communication?	40
3.3. Communication environment.....	41
3.4. Communicator’s behaviour	48
3.5. Choice of terminology and conclusion.....	72
Chapter 4. Verbal mode	74
4.1. Introduction	74
4.2. Modalities in the verbal mode	74
4.3. Verbal participation.....	81
4.4. Support for L2 verbal production.....	88
4.5. Conclusion.....	105
PART II – SYNTHETIC WORLDS	106
Chapter 5. Synthetic worlds and L2 learning.....	107
5.1. Introduction	107
5.2. Emergence of synthetic worlds	107
5.3. Terminology choice: synthetic world.....	109
5.4. Characteristics of synthetic worlds.....	110
5.5. Distinction between social and gaming synthetic worlds	111
5.6. Perceived affordances of synthetic worlds for L2 learning.....	113
5.7. Studies into multimodality and L2 learning in synthetic worlds	119
5.8. Conclusion.....	122
Chapter 6. Nonverbal and verbal modes in synthetic worlds	123
6.1. Introduction	123
6.2. The multimodal context in <i>Second Life</i>	123
6.3. Verbal mode	124
6.4. Nonverbal mode	130
6.5. Conclusion.....	140
PART III – PEDAGOGICAL APPROACH TO THIS STUDY AND RESEARCH METHODS.....	141
Chapter 7. Content and Language Integrated Learning	142
7.1. Introduction	142
7.2. CLIL overview	142
7.3. Theoretical foundations for CLIL with respect to Second Language Acquisition 146	
7.4. CLIL Pedagogy	159
7.5. CLIL Research	168
7.6. Conclusion.....	172

Chapter 8. Pedagogical Scenario and Study Participants	173
8.1. Introduction	173
8.2. Setting the stage: CLIL and the ARCHI21 project	173
8.3. Pedagogical Scenario	174
8.4. Pedagogical scenario of <i>Building Fragile Spaces</i>	182
8.5. Course participants	204
8.6. Conclusion.....	211
Chapter 9. Research Methodology.....	212
9.1. Introduction	212
9.2. Overview of research methodology	212
9.3. Adopting a LETEC approach to the study	217
9.4. Research Protocol.....	226
9.5. Applying a LETEC corpus approach to the data.....	232
9.6. Overview of data analysis approach and operationalisation	241
9.7. Conclusion.....	251
PART IV – ANALYSES.....	253
Chapter 10. Interplay between the nonverbal and verbal modes	254
10.1. Introduction	254
10.2. Outline of the research questions	254
10.3. Analysis methodology and data coverage	255
10.4. Results and discussion.....	258
10.5. Synthesis of observations	269
Chapter 11. Role of the nonverbal mode in identity construction related to L2 verbal participation and interaction.....	271
11.1. Introduction	271
11.2. Outline of research questions	271
11.3. Analysis methodology and data coverage	272
11.4. Results and discussion.....	273
11.5. Synthesis of observations	285
Chapter 12. Textchat modality related to the audio modality.....	287
12.1. Introduction	287
12.2. Outlining research questions	287
12.3. Analysis methodology.....	289
12.4. Data coverage	293
12.5. Results and discussion.....	295
12.6. Synthesis of observations	310
Chapter 13. Conclusion.....	315
13.1. Aims of this research project.....	315
13.2. Results of this study	315
13.3. Future research perspectives	321
References	325

ABBREVIATIONS AND ACRONYMS

ARCHI21: Architectural and Design based Education and Practice through Content and Language Integrated Learning using Immersive Virtual Environments for 21st Century Skills, Funded by the European Commission as a part of the Education and Culture Lifelong Learning Programme, KA2 Languages, DG EAC/41/09, Iip-eacea-KA2-MultProj-ARDNM

BICS: Basic Interpersonal Communication Skills

CALP: Cognitive Academic Language Proficiency

CEFR: Common European Framework of Reference for Languages

CLARIN: Common Language Resources and Technology Infrastructure

CLIL: Content and Language Integrated Learning

CLIT: Content and Language Integrated Teaching

CMC: Computer-mediated Communication

CMDA: Computer-mediated Discourse Analysis

CSCW: Computer Supported Collaborative Work

CUP: Common Underlying Proficiency

EFL: English as a Foreign Language

ENSAPM: *Ecole nationale supérieure d'architecture de Paris-Malaquais*

FFL: French as a Foreign Language

GA: Avatar group

GL: Land+scapes group

GS: Scenario group

GE: (e)spaces group

GUI: Graphic User Interface

IRCOM: Consortium linguistique "Corpus Oraux et Multimodaux" (Linguistic consortium 'oral and multimodal corpora')

IR-CORPUS: Coopération des Opérateurs de Recherche Pour un Usage des Sources numériques (Cooperation of research stakeholders for the use of numerical resources)

L1: Mother tongue

L2: Second language

LETEC: LEarning and TEaching Corpora

MMORG: Massively Multiplayer Online Role-Playing Game

MUD: Multi-User Dimension

NNS: Non-native Speaker

NS: Native Speaker

OLAC: Open Language Archives Community

SLA: Second Language Acquisition

TOEFL: Test of English as a Foreign Language

XML: eXtensible Markup Language

Chapter 1. Introduction

1.1. Research objectives and context of study

Communication is at the heart of language learning. A sociocultural approach to second language acquisition places importance on the concept of interaction and it argues that this interaction, and thus learning, is mediated through the use of tools and is situated in social interactional, cultural and institutional contexts. From a multimodal perspective of communication, interaction *includes* language rather than *is* language and nonverbal acts are an integral part of communicative activity (Flewitt *et al.*, 2009).

The developments in computer-mediated communication (CMC) have introduced new tools that mediate interaction. They have heightened humans' capacity for meaning making, using a multiplicity of communication modes (O'Halloran & Smith, 2011). However, there is a lack of research that examines the impact of multimodality on interaction in online language-learning environments (Lamy, 2012b; Hampel & Stickler, 2012) in which, although due to the nature of learning, the verbal mode will precede, there are opportunities for learners and teachers to interact using a variety of modes, including the nonverbal.

The focus of this thesis is interaction, from a multimodal perspective, in the context of foreign language learning within the synthetic world *Second Life* (Rosedale, 2011). Often referred to as 'virtual worlds', synthetic worlds are persistent 3D graphical online environments which allow multiple users to connect simultaneously through wide area networks. In the environment, users are represented as avatars; semi-autonomous agents represented in the digital space which can perform actions and a range of nonverbal acts when commanded by the user (Peachey *et al.*, 2010). In this thesis, I examine the interplay between the verbal mode and the nonverbal communication acts that are displayed by the learners' avatars. I question whether the nonverbal mode adds a cognitive overload for language learners to the detriment of verbal participation and production, or if interplay between the nonverbal and verbal modes can support verbal participation and production for foreign language learners, as studies have suggested in face-to-face contexts (McCafferty & Stam, 2008; Gullberg, in press).

While the use of online three-dimensional synthetic worlds for social and entertainment purposes is well-established, their use in educational contexts is developing (de Freitas, 2006;

Falloon, 2010). This is true for both the domains of language education and architectural education amongst others. Regarding language learning, it has been suggested that synthetic worlds may help reduce student apprehension in self expression in the target language (Schweinhorst, 2002) and, thus, disinhibit learners, aiding them to take risks in the target language (Teoh, 2007). Concerning architectural learning, synthetic worlds are believed to offer collective spaces beneficial for the co-existence of generative, analytic, and virtual thinking processes critical to architectural pedagogy (Garner *et al.*, 2011). Gu *et al.*, (2009) also suggest the advantages synthetic worlds may offer for distance synchronous design and design experimentation without real-world consequences.

The setting for my study into interplay between verbal and nonverbal modes brings together architectural learning and language learning in a Content and Language Integrated Learning (CLIL) approach. The context is a hybrid CLIL course entitled *Building Fragile Spaces* which formed part of the European Project ARCHI21¹. In this thesis, I use the pronouns 'we' and 'I' and the possessive pronouns 'our' and 'my' to distinguish between the work of the research team from the *Laboratoire de Recherche sur le Langage* that contributed to the ARCHI21 project (research laboratory members Foucher, Chanier, Bayle, Rodrigues & Fynn and research engineer Saddour) and my individual contributions to the ARCHI21 project and personal research completed within the framework of this thesis. Where I worked in close collaboration with specific laboratory members, I cite their names after the plural pronoun 'we'.

Building Fragile Spaces involved students of architecture at the tertiary level whose foreign language (L2) was either French or English. The five-day intensive course was designed as a response to the need for specialized courses for architectural students to gain the specific language skills necessary for their profession. Currently, in higher education institutions, language courses are often not integrated into the process of architectural design learning (Hunter & Parchoma, 2012). Thus, it is not necessarily clear what is at stake concerning language learning, often leading to student indifference concerning improving L2 skills. Hence the need to find ways in which language educators can help support learners' verbal participation.

¹ Architectural and Design based Education and Practice through Content and Language Integrated Learning using Immersive Virtual Environments for 21st Century Skills'. The project is funded by the European Commission as a part of the Education and Culture Lifelong Learning Programme, KA2 Languages, DG EAC/41/09, lp-eacea-KA2-MultProj-ARDNM.

Perceived affordances of synthetic worlds for architectural and language learning are, firstly, the opportunity that the object-oriented nature of the online environments offers for co-creation of the environment through building activities (Lim, 2009) and, secondly, the potential of synthetic worlds for collaboration (Henderson *et al.*, 2009; Dalgarno & Lee, 2009). In face-to-face and computer-mediated environments, studies have shown that interplay between verbal and nonverbal interaction helps collaboration, particularly concerning the referencing of objects and the provision of procedural information (Fussell *et al.*, 2000, 2004; Piwek, 2007). My first set of research questions are, therefore, as follows.

1A: During a collaborative building activity, are nonverbal acts autonomous in the synthetic world or does interplay exist between the nonverbal and verbal modes?

1B: Do nonverbal acts of communication play the same role as in face-to-face communication?

1C: With reference to participation, how are nonverbal and verbal acts distributed during a collaborative building activity?

Peterson (2010) suggests that the perceived beneficial aspects of interaction in synthetic worlds are reinforced by the presence of avatars. The use of avatars and their communication as the object of learning, as well as the tool in language-learning situations, raises certain questions. As outlined by Lamy & Hampel (2007) these include i) whether and how learners use avatars to develop an identity; ii) what avatar embodiment means for interaction; and iii) the extent to which the character of an avatar influences interactions. Therefore, with reference to the verbal and nonverbal modes a second set of research questions which this thesis addresses is:

2A: Do students construct inworld identities using the nonverbal mode?

2B: Does interplay exist between the students' use of the nonverbal mode for inworld identity construction and their L2 verbal interaction and participation?

The third facet of this thesis concentrates upon interplay within the verbal mode between the audio (voicechat) and textchat modalities. Research into CLIL which focuses on language correction and feedback offered to learners suggests that, whilst content repairs occur systematically, "language problems are not attended to with the same likelihood" (Dalton-Puffer, 2008:153). The focus of discourse in face-to-face CLIL environments remains on the content rather than the linguistic form. One affordance of the textchat modality, in monomodal environments, is that it portrays some of the same language benefits for second

language acquisition (SLA) as in face-to-face interaction, including opportunities for self-repair, negotiation of meaning and corrective feedback which lead to modified output (Blake, 2000; Pellettieri, 2000; Kitade, 2000; Noet-Morand, 2003). In examining the interplay between the audio and textchat modalities, I investigate whether, in synthetic worlds, the textchat will act only in adjunct to the voicechat, because the textchat is equally in competition with several nonverbal modalities, or whether the textchat can play a role in the CLIL interaction and serve for feedback provision on language form, thus helping learners in their verbal production. Concerning this entry point into the study of multimodal interaction in synthetic worlds, my research questions are the following:

3A: Is there the place for textchat to play a role in the communication in synthetic worlds or does the textchat act only in adjunct to the voicechat, considering it is equally in competition with several nonverbal modalities?

3B: What stance do the tutors adopt *vis-à-vis* the textchat? Do they accord importance to this modality, amongst the others, or not?

3C: What is the role that the textchat plays in terms of discourse functions?

3D: If in synthetic worlds, the textchat plays a role in the interaction, can it serve for feedback provision, as in monomodal textchat environments or, because students and tutors are required to manage communication across multiple modes, will they not be able to pay attention to feedback due to potentially being cognitively overloaded?

3E: If the textchat is used for feedback, will the type of errors leading to feedback reflect results found in monomodal environments and what strategies are used to provide feedback?

3F: Given the multimodal nature will students, having to deal with multiple communication channels, be able to respond to feedback in the textchat? When, and in what modality, will responses occur?

The way in which the above three sets of research questions are treated is a research problem in itself, and is addressed in this thesis. Much of the current research examining synthetic worlds with respect to language learning, although limited in number of studies, is highly speculative and frequently draws upon researchers' impressions. Studies often are based upon anecdotal examples of inworld² interactions, or solely on learner questionnaire

² In the synthetic world.

data. This thesis offers some original contributions to the establishment of a methodology for researching interaction in synthetic worlds. I propose a typology of nonverbal and verbal modalities in synthetic worlds. In accordance with the methodology suggested by the Mulce project (Mulce, 2011a) for multimodal transcription (Chanier, Ciekanski & Vetter, 2005; Ciekanski, 2008), I use the typology to extend the methodology proposed by the latter researchers to cover interactions in synthetic worlds. I believe the transcription framework offered in this thesis contributes to the methodological considerations needed to render research into interaction in synthetic worlds more systematic, in order to achieve measurable observables and increase the validity of findings.

The methodology adopted in this thesis is also situated within a more general research problem being addressed in Social Sciences and more specifically Language Sciences. Currently, there is an evolution concerning the importance of rendering research data visible and publically accessible and, in doing so, increasing the scientific validity and usability of research publications (Reffay, Betbeder & Chanier, in press). For example, the recent undertaking by the Ministry of Humanities and Social Sciences in France to put into place the research infrastructure IR-CORPUS (Coopération des Opérateurs de Recherche Pour un Usage des Sources numériques³) and the consortium IRCOM (Consortium linguistique "Corpus Oraux et Multimodaux"⁴). This consortium aims to organise and develop oral and multimodal corpora in linguistics and promote the visibility and accessibility of existing corpora. It also aims to improve the interoperability of corpora concerning their integration within international networks. These include the Common Language Resources and Technology Infrastructure (CLARIN) and the Open Language Archive Community (OLAC).

In line with these recent developments in Social Sciences and Language Sciences, for the study presented in this thesis, a LEarning and TEaching corpora (LETEC) methodological approach (Chanier & Ciekanski, 2010) is adopted. This required that the data collected during the *Building Fragile Spaces* course be organised and structured before being published as open-access corpora which are registered in OLAC (Chanier & Wigham, 2011; Chanier, Saddour & Wigham, 2012a-g and Wigham & Chanier, 2012). Constituting structured corpora allowed for contextual analyses to be performed on our data to investigate the research questions of this thesis. The corpora will also allow for other processes of scientific enquiry to be performed, as advocated by the IRCOM movement, amongst others. For example, the re-

³ Cooperation of research stakeholders for the use of numerical resources. My translation.

⁴ Linguistic consortium for oral and multimodal corpora.

analysis of our data, the replication of the study accomplished within the framework of this thesis or the verification or refutation of the findings of this study,

Employing multimodal transcription and corpus methodologies helps this thesis to offer some insights into the interplay between verbal and nonverbal modes in the synthetic world *Second Life* and to suggest how these might support verbal participation and production in a foreign language, whilst also contributing to the methodological considerations needed to study such interactions. This thesis, thus, seeks to contribute to the growing body of literature which is concerned with better understanding the impact of multimodality on interaction in online language-learning environments and, more specifically, interaction in synthetic worlds.

1.2. Thesis structure

Following this introductory chapter, in **Part I**, I present the key concepts relevant to my investigation of the multimodal characteristics, with respect to the verbal and nonverbal modes.

Chapter two concentrates on the theoretical context in which my study is situated. Firstly I provide an overview of the four theoretical concepts upon which the multimodal view of communication is based. I then present two different research approaches to multimodality: the multimodal interaction analysis approach and the socio-semiotic approach. I outline applications of the socio-semiotic approach to face-to-face pedagogical situations, before turning to detail several studies which have investigated the interplay between modes in synchronous computer-mediated communication (environments with reference to language-learning contexts). The terminology related to multimodality that I adopt in this thesis is defined. This chapter entitled ‘Multimodality’ allows me to situate this research within a theoretical approach, whilst also highlighting the need for further studies of multimodality in the area of CMC which justifies my research interest.

The focus of **chapter three** is nonverbal communication. I explore the proxemic and kinesic modalities of nonverbal communication and classifications of such that have been suggested. For each modality, I explore: the theories that have been proffered linking, or not, the nonverbal modality with the verbal mode; the studies which suggest the role the modality plays in second language acquisition; and the studies into the use of the modality in two-dimensional CMC environments. This chapter, by providing a categorisation of nonverbal modalities, contributes to my description of the multimodal context of *Second Life* provided

in chapter six and, in turn, to the constitution of my methodological framework for multimodal transcription. It also serves as a preliminary literature review, enabling the exploration of some concepts which contribute to the analysis section of this thesis. It helps link the focus of my study to previous studies in face-to-face and two-dimensional CMC environments.

Chapter four allows me to introduce the verbal mode in synchronous computer-mediated communication and its characteristics. In this chapter, I define two of the key terms employed in this thesis: verbal participation and verbal production. I also describe what I understand by the phrase found in the thesis title ‘support verbal participation and verbal production’. I outline some of the studies which suggest that one affordance of CMC tools for language learning is that they help increase learners’ verbal participation and also democratise student-teacher participation. I also review studies that suggest the audio and textchat modalities in CMC environments can support verbal production because interactions in these modalities provide opportunities for learners to notice errors as a result of internal feedback, or as a result of implicit or explicit external feedback which leads to negotiation of meaning. Concerning the use of the verbal mode in synthetic worlds there is a lack of literature: only one study outlined in this chapter concerns synthetic worlds. The other studies, however, illustrate how other CMC environments help support learners’ verbal participation and production and, thus, are used to inform our study.

Part II of this thesis introduces the CMC environment, synthetic worlds, which is the focus of my study. It is divided into two chapters to distinguish between the literature review component and an original contribution this thesis makes to the study of multimodality in synthetic worlds: a typology of the nonverbal and verbal modalities available in the synthetic world *Second Life*.

Chapter five offers the reader a brief history of synthetic worlds before discussing my terminology choice to name these environments ‘synthetic worlds’ rather than the more commonly used term ‘virtual worlds’. I detail the characteristics that are common to synthetic worlds and then provide the reader with a summary of the perceived affordances of synthetic worlds for language learning, as outlined in the research literature. One of the weaknesses of this literature review is that the studies into synthetic worlds remain rather speculative. In this chapter, I then relate Part I of this thesis concerning multimodality to synthetic worlds, reporting on the, albeit limited, number of published research studies which have referred to multimodal interactions in language-learning contexts in synthetic worlds.

In **chapter six**, I describe the specific multimodal context of the synthetic world, *Second Life*, used in this study. I provide the reader with a classification of the nonverbal and verbal modes and their modalities, as offered by the synthetic world and describe interplay between the two modes which is pre-built into the environment. This classification will provide the reader, to whom *Second Life* may be unfamiliar, with an indication of the complexity of how the two modes are technologically mediated within the synthetic world. It also influences our methodological procedure for transcription of *Second Life* sessions, presented in chapter nine.

Part III, entitled 'Pedagogical approach to this study and research methods,' introduces the pedagogical approach to the study presented in this thesis, the pedagogical scenario of the course studied, the course participants and the research methods employed.

Firstly, an overview of the Content and Language Integrated Learning (CLIL) approach is given in **chapter seven**. This approach to language learning was adopted for the course which is the focus of my study. I, therefore, offer readers an overview of CLIL with respect to its development and framework of guiding principles. I review the theoretical foundations for CLIL with respect to the Second Language Acquisition theories of Krashen, Swain and Cummins. This leads us to describe curricular models for CLIL including the factors that course providers must consider when planning a CLIL course. I complete the chapter with a review of current research directions with regard to CLIL. This allows me to highlight some of the research gaps which this thesis can by no means fill but may contribute towards.

Secondly, in **chapter eight** I present the pedagogical context for this thesis: a course entitled *Building Fragile Spaces*. Firstly, I describe the motivations for the design of this CLIL course for students of architecture whose foreign languages were French (FFL) or English (EFL). An overview is given of a pedagogical scenario's parameters with reference to current research, before a detailed presentation of the *Building Fragile Spaces* course scenario. Chapter eight closes with a description of the course participants (teachers and students) with respect to their language profiles, distance communication profiles and social networking profiles.

Thirdly, **Chapter nine** presents the methodological approach to my study which is heavily influenced by a LEarning and TEaching corpus (LETEC) approach and which uses computer-mediated discourse analysis as a tool to investigate verbal and nonverbal participation. This chapter is divided into four sections. Firstly, I give an overview of the current methodological approaches in corpus linguistics which are linked to language

learning/teaching. I explore the weaknesses of these approaches for a study which focuses on multimodal L2 interaction. This leads us to discuss why a LETEC approach was adopted. Secondly, I present the research protocol elaborated around the *Building Fragile Spaces* course and our procedure for data collection. I provide an overview of the global ARCHI21 corpus (Chanier & Wigham, 2011) compiled from this data. Finally, I describe the methodological approach of computer-mediated discourse analysis that I used as a tool in this study. Adopting this approach required multimodal data transcription. I conclude this methodological chapter by detailing how I extended the methodology suggested by the Mulce project for multimodal transcription (Chanier, Ciekanski & Vetter, 2005; Ciekanski, 2008) to cover interactions in synthetic worlds.

In **Part IV** of this thesis, I present my analyses. Each chapter in this section is presented in a similar manner. Firstly, in the introductory sections, I remind the reader of the research questions that the chapter addresses and, suggest the pertinence of these, with respect to my writings in Part I. Secondly, I outline the data selected from the global ARCHI21 corpus for each analysis and the specific methodology employed in this. I then present my results and a discussion of these during which I endeavour to show their relevance, by linking them to studies outlined in Part I.

Chapter ten focuses on the interplay between the nonverbal communication and the verbal communication modes during collaborative building sessions in the L2. I present my analysis of floor space usage in the verbal and nonverbal modes, and the interactions between the two modes concerning miscommunication regarding direction and orientation, student proxemics and verbal deictic references.

Chapter eleven explores how students developed their inworld identities and how these identities were forged through the nonverbal modalities of avatar appearance and kinesics. I examine how these identities influenced interaction. Firstly, how changing avatar appearance influenced how students addressed each other inworld and the students' level of verbal participation in L2 interaction. Secondly, whether constructing an identity partially through nonverbal communication acts may have created opportunities for increased L2 verbal participation.

Chapter twelve analyses the interplay between the textchat and audio modalities during the group *Second Life* reflective sessions (described in the pedagogical scenario explanation in Chapter seven). I examine whether the tutor's stance towards and usage of the textchat affects the students' use of this modality and the overall interaction in the verbal mode. More

specifically, whether, in a CLIL context, for which the domain of architecture is not an area of expertise for the language tutors, it is still possible for the language tutors to provide corrective feedback concerning non target-like forms in the students' productions in order to support their L2 verbal productions. My findings are discussed in the light of the results of other studies.

To end this thesis, **chapter thirteen** outlines my study's general conclusions before presenting the original contributions of this thesis to the study of interaction in synthetic worlds. I also propose avenues for the continuation of research into the role of multimodality in synthetic worlds with respect to L2 verbal participation and production.

As the Contents indicate, lists of figures and tables, alongside a subject index and index of principal works cited, are offered to the reader at the end of this thesis, as well as a detailed contents index. These are accompanied by a bibliography of references cited which I hope will assist in the reading of this thesis.

**PART I – MULTIMODALITY -
NONVERBAL AND VERBAL
MODES**

Chapter 2. Multimodality

2.1. Introduction

This chapter focuses on the theoretical context in which this study is situated. First, the concept of multimodality is introduced and reasons for the rising interest in this domain outlined. Secondly, I turn to two different approaches to the research area of multimodality, namely the multimodal interaction analysis as advocated by Norris and Jones (2005) and which is related to the nexus analysis approach of Scollon & Scollon (2004) and the socio-semiotic approach to multimodality which is adopted in this study. This grew out of Halliday's (1994) theory of systemic functional linguistics and socio-semiotic theory, as advocated by Kress & Van Leeuwen (2001) and developed in Kress (2010), amongst other works. I offer definitions for the terminology related to multimodality that is adopted in this thesis and outline previous applications of the socio-semiotic approach to pedagogical situations. I conclude this chapter by relating multimodality to language-learning situations which draw on computer-mediated communication and by reviewing the research literature which suggests the need for further studies in this area.

2.2.A multimodal view of communication

Multimodality describes approaches which consider that verbal language is not the only semiotic mode available for communication and that a monomodal concept of discourse and communication is distorting (Scollon & Levine, 2004, Kress & Jewitt, 2003:2). Rather the approaches "attend to a full range of communication forms people use" (Jewitt, 2009:14) and to how a variety of modes or modalities associated with one mode operate (Reffay *et al.* 2008), in order to give a fuller view of how humans communicate. This view of communication is based on four theoretical assumptions which, as Jewitt explains (2009:14), are interconnected.

Firstly, multimodality does not consider that the "prototypical form of human semiotic is language" (Halliday, 1994:93). Rather, language is viewed as one means amongst others for meaning making. Hence, communication relies on a multiplicity of modes, including, for example, image, layout, gesture, moving images, gaze, colour and posture, and each communicative or representational mode that is used in a communicative event contributes to meaning. The representational mode refers to what an individual wishes to represent about the

thing represented (Kress & Jewitt, 2003:4). The communication mode focuses upon how, in a specific environment, an individual makes the representation suitable for another person or a specific audience. Kress & Jewitt (2003) describe, for example, a student *representing* a nucleus with a piece of sponge because she understands the nucleus as the brain of a cell and the sponginess represents the absorbent powers of the brain. However, to help *communicate* her understanding of a nucleus to another person, she colours the sponge red in order for it to appear salient. In doing this, the student focuses on the *communicative* aspect. In a specific communicative event, a mode may be foregrounded for its representational aspects or for communicative aspects.

Introducing multiple communication modes challenges a linguistic-only view of communication and meaning making. It also questions whether communication modes make meaning in combination, for example by reinforcing each other either through the duplication of meanings to illustrate something or by ornamenting meaning in the verbal mode, or whether they make meaning separately by fulfilling complementary roles.

Secondly, multimodality assumes that communication and representational modes are socially shaped over time by their cultural, historical and social use and, thus, have become meaning-making resources which articulate the diverse social and individual / affective meanings as demanded by the requirements of different communities. Each mode thus takes on a specific role in a specific context and moment in time. However, these roles are not fixed but the more they will be employed by a particular community in their social use, the more they will become fully articulated. Thus, there needs to be a shared cultural sense, within a community, of how sets of meaning resources can be organized to make meaning, in order for something to be recognized as a communication or representational mode. For example, Kress and van Leeuwen (2002) describe that, for the community of cartographers, colour will be perceived as a communication mode because it allows the distinction between areas of water, arable land, deserts etc. or to distinguish between different public transport routes. For a community of journalists and publishers, font may be perceived as a mode (Kress, 2010). Publications, including newspapers, magazines and academic journals, will use specific fonts for their master heads, section titles or particular sections of their publications, in order to attribute different meanings to the different areas or divisions within their publications. Decisions made by communities about what constitutes a mode, however, are not confined to that community. Any individual who comes into contact with the work of the specific community will be affected by their decisions, e.g. a public transport user will be affected by the colour choices used to represent different routes on public transport system maps or a newspaper reader will be affected by the different font choices which will aid him/her to

distinguish between the Sports and the Education sections of the newspaper, or between the news information itself and the advertisements.

Thirdly, people "orchestrate meaning through their selection and configuration of modes" (Jewitt, 2009:15). The interaction between different communicative and representational modes is therefore significant for meaning making because the modes are co-present and co-operate in the communicative event.

Finally, multimodality assumes that the meanings of signs are influenced by norms and rules which operate when a sign is made and which are motivated by the interests of the sign-maker, with regards to the specific social context and to the interest of the sign receiver(s) in that context. The sign-makers act "out of socially shaped interest with specially made resources in social interactions in communities" (Kress, 2010:66) and choose the apt meaning between a cultural meaning and a material form and match the two.

Although the study of multimodality is a fairly recent field, dating from the mid-1990s, and undertaken by researchers from many different domains including linguistics, visual communication, media studies, anthropology and information technology, the concept of multimodal practice, however, is not new (Goodman *et al.*, 2003). The work of de Souza (2003), for example, into the multimodal practices of the Kashinawá people of Brazil and Peru traces the use of *kene* and *dami* drawings in materials used in teacher training courses back to the community's early literacy practices. Her research suggests that due to the historical and cultural conventions in the Kashinawá community that, for this group, "a text is not a text unless it is multimodal" (Goodman *et al.*, 2003:219). The Western attention to multimodality, however, has arisen from a move away from knowledge and research being organized into subjects, each with specific domains, concepts of theory and methodologies (Halliday, 1994) and towards inter-disciplinary collaboration in research, where the objectives are thematic not disciplinary (O'Halloran & Smith, 2011). As Jewitt (2009:3) summarizes, multimodality has become an object of interest "across many disciplines" (2009:3). However, she also underlines that this has come about "against a backdrop of considerable social change" (2009:3). This backdrop is particularly marked by the rapid developments in Computer-Mediated Communication and interactive digital media. These technologies have been described as heightening humans' capacity for multimodal communication (O'Halloran & Smith, 2011) because the technology provides a stage for a range of semiotic modes to be combined and, in turn, the potential to produce new ways of making meaning. This is described by Snyder (2003) as 'the turn to the visual'. Kress (1995 in Sydnier, 2001) also suggests that this shift has been prompted by social and political causes including the growth of multiculturalism.

2.3. Approaches to the study of multimodality

In this section, I examine two different approaches to the study of multimodality: the multimodal interactional approach and the socio-semiotic approach.

2.3.1. Multimodal interactional analysis

The multimodal interaction analysis to multimodal communication, as advocated by Norris & Jones, 2005 and Scollon & Scollon, 2004, takes "social action as the theoretical center of study" (Scollon & Scollon, 2004:13), placing importance on the notions of context and situated actions within interaction. Interaction is used in multimodal interactional analysis to refer to "any action that a social actor performs in which the actor communicates a message" (Norris, 2009:79), albeit intentionally or not. In the approach, the basic unit of analysis is termed the 'mediated action'. Wertsch (1985) argued that all actions are inherently social and achieved using cultural or psychological tools which he refers to as material and symbolic 'mediational means'. This latter term is defined as the semiotic means through which any social action is communicated. However, within this approach, language is not the unique mediator of action: 'semiotic means' conveys not simply abstract or cognitive representational systems including language or visual representation but also material objects which exist in the world and which can be appropriated for the purposes of a social action. For example, the layout and positioning of furniture within a room. Mediation means, thus, are "neither external objects nor internal psychological constructs alone but rather are a dialectical relationship between objective materiality and psychological or instrumental process" (Scollon, 2001:14).

Multimodal interactional analysis focuses on "the action taken by a social actor with or through multimodal mediational means, that is, how a variety of modes are brought into and constitutive of social interactions" (Jewitt, 2009:33). Due to the focus being on interaction, the approach considers mode, the sign-maker and the context as a whole: one cannot be disentangled from another during analysis. Firstly, because modes never exist without social actors utilizing them in some way. Secondly, because the actors co-construct their actions in the environment (context) and with the other social actors involved. Therefore, a social actor's action can never be extricated from the environment or the other actors involved (Norris, 2009:80). Multimodal interactional analysis thus concentrates on understanding the situated interplay between modes at a specific moment in a social interaction (Jewitt, 2009): how the mediational means, social actors and the sociocultural environment intersect at the moment of the mediated action. The specific moment in the social interaction is termed the 'site of

engagement'. This is the convergence of social practices in a moment in real time which enable the moment in which a mediated action can occur, albeit it momentary (e.g. scanning your inbox to examine how many new email messages await you or reading a stop sign whilst driving) or for a longer, more extended period (engaging in a telephone conversation or giving a presentation). Scollon describes this as "the real-time window that is opened through an intersection of social practices and mediational means (cultural tools) that make that action the focal point of attention of the relevant participants" (2001:3-4).

The historical accumulation of mediated actions ('practice') within the 'habitus' (Bourdieu, 1999) of the social actors mean that the mediated actions are understood by the other social actors involved in the social action at the site of engagement as being 'the same' social action. For example, the social action of queuing is understood as standing in a line of order whilst waiting, or the social practice of greeting means that a social actor understands that when asked how they are they should reply by saying 'I'm fine'. These practices are learnt from society rather than being initiated by the social actor and, with time, become linked to appropriate mediational means.

Within a multimodal interactional perspective, Scollon & Scollon (2004) advocate a nexus analysis approach in which larger activities involving repeated sites of engagement, where social actions are facilitated by a relatively consistent set of social processes, are viewed as a 'nexus of practice' and situated in their broader socio-political-cultural context. A nexus analysis approach investigates how social actors, environments, semiotic means and cultural tools come together to facilitate action and social change within the nexus. The approach to multimodal interactional analysis involves three stages. The first stage is the researcher engaging in the particular nexus of practice. In the approach, the researchers are seen as contributing to the site of engagement through their own actions so, firstly, they should identify themselves as part of the nexus of practice which is under study. Secondly, they should navigate the nexus of practice, undertaking both data collection and analysis. Data collection occurs in different communication modes and from different points of view and thus is both multimodal and multi-perspective. Analysis involves understanding the nexus of practice through the lenses of social actors, discourse, other mediational means, timescales and motives. The final step of the approach then aims to produce social change by changing the nexus of practice. At this stage, the researcher investigates how the nexus has already changed during the research, due to the fact that the research has entered into the nexus of practice (Norris & Jones, 2005), and suggests the social actions in the nexus that could transform into new discourses and practices. Therefore, the research approach in itself is seen

as action and the researchers embrace their embeddedness in the places of study (nexus) by trying to improve the social places and actions.

Scollon & Scollon (2004) apply the nexus analysis approach within an educational setting to analyse the social actions of participants (teachers and students) involved in two university classes. One class is held in a face-to-face classroom and concentrates on the reading and production of essays. The other class is mediated by the computer-mediated communication tools of email and audio-conferencing. Whilst the classroom nexus was established within the historical practices and habitus of the participants as a panopticon event with the teacher the owner of the space and the manager who selects and deselects discourses for attention, the computer-mediated class introduced discourses involving actors present in the students' physical environment but not in their online environment. It redistributed the interaction order between the participants by setting the teacher's discourse in the background. Access to university education was therefore "redistributed in ways that come to serve different social goals, purposes and groups" (Scollon & Scollon, 2004:16).

2.3.2. Socio-semiotic approach

Another foundation for the description of multimodality and multimodal meaning-making resources comes from Systemic Functional Linguistics (Halliday, 1994) and socio-semiotic theory (van Leeuwen, 2004, Kress, 2010). The preliminary point for the socio-semiotic approach is Halliday's (1978) social semiotic theory of communication. This theory proposes that as members of a culture, individuals have access to a set of options, a network of semiotic alternatives, which are the meaning potential of the particular culture. Through these options and resources, meanings are made in their material form. The realization resources are *modes* in this approach. For example, the materiality of sound is organized by a culture as a resource, speech. Using these resources, meanings are made and understood. Halliday's theory focused solely on socially situated language. He suggested that a language's semantic system is shaped by the social functions that an utterance can achieve: representation, interaction or message. These functions are realized by the grammar and the lexico-grammar of the language and shaped by the social functions they serve.

Language can be understood to be the result of constant social / cultural working on and shaping of a material medium - sound in the case of language-as-speech – into "a resource for representation which displays regularities as mode, [...]the resource [...] for meaning" (Kress & Jewitt, 2003:278).

Within this view of communication, meaning and form are not separated, as they might be in Linguistics (i.e. the study of syntax compared to semantics). Rather, a multimodal approach deems that meaning and form are an integrated whole, manifested through a *sign*.

From Halliday's social semiotic theory of communication stemmed socio-semiotic theory. This theory, as advocated by Kress & Jewitt (2003) and Kress (2010), furthers Halliday's work by presuming that all modes, and not simply speech and writing, have been shaped in their social use into semiotic resources (modes) and have been "developed as networks of interrelated options for making signs" (Kress & Jewitt, 2003:278). Thus, in socio-semiotic theory, a sign can exist in all modes of communication and is *made* rather than used by a *sign-maker*. This person "brings meaning into an apt conjunction with a form, a selection/choice shaped by the sign-maker's interest" (Kress, 2010:62). Thus, a sign is made with relation to a person's representation and interest and also with the perspective of the sign-receiver: the sign-maker will make the sign in relation to the communication need and to the sign-receiver's interest.

The socio-semiotic theory of multimodality is linked to Saussure's linguistic theory of signs, particularly on two premises (Kress, 2010). Firstly, Saussure suggested that any linguistic sign is the unity between a concept, termed 'the signified' which is the relation of reference between a phenomenon in the 'outer world' and its mental representation in the 'inner' mental world, and 'the signifier': a sound-image used to produce the sign. Secondly, he suggested that these two entities (the signified and the signifier) are psychologically unified in the brain through a bond which associates the two. In Saussure's theory, the relationship between the signifier and the signified is unmotivated and rather is bound by convention (Kress, 2010). That is to say that once it has been established within a linguistic community, an individual member of the community cannot change the linguistic sign because it is stable. The relation between form and meaning is also arbitrary: there is no reason why the *sound shape* acts as the signifier of the signified. Also, the sound-image signifiers are linear in nature. Language is, thus, a chain or a grouping of signs that because of associative relationships between them impact on the meaning value of one another.

In a socio-semiotic view, meaning arises in social environments and in social interactions and signs are *made* rather than used. The sign-maker is agentive and generative and the sign is always motivated or intentional. The sign-makers, however, act "out of socially shaped interest with specially made resources in social interactions in communities" (Kress, 2010:66). The sign-maker will choose the apt meaning between a cultural meaning and a material form and match the two. In matching the two, the sign-maker shows "their wish for an apt 'realization' of their meaning" and this is needed to work as "a guide for the

recipient in their interpretation" of the sign (Kress, 2010:64). In the sign-maker's process of matching cultural meaning and a material form, s/he remakes the concepts, constantly reshaping the cultural resources for dealing with the 'outer world'. The recipient will also select the elements of the sign that align with his/her interests. These interests will be both the effect and the realization of histories in social environments and will depend on the demands of the particular social / communicative situation in which the text is produced, including the contextual constraints of production depending on the communicative environments which force the sign-maker to change and adapt how they use elements in their text (Kress, 2000). The sign-maker will align these interests and contextual constraints with the social context in which s/he is involved and transform the *sign-complex* into a new sign. Therefore, in contrast to Saussure's theory of communication:

- signs are newly made;
- form and meaning are related;
- signifiers are made in social interaction.

The socio-semiotic approach is concerned with mapping how modal resources are used by different communities in different social context. As Jewitt describes, "the emphasis is on the sign-maker and their situated use of modal resources" (2009:30). A strong emphasis is, therefore, placed on context because this shapes the resources that are available to a sign-maker for meaning-making and how these are selected. The approach focuses on detailed accounts of how modal systems are used in a specific social context or environment.

2.4. Approach adopted and terminology choices

In this section, I outline the choice to adopt a socio-semiotic approach to multimodality in the study presented in this thesis and define three of the key terms within this approach: medium, mode and modality. These are recurring terms in this study.

As Jewitt (2009) describes, each approach to multimodality will allow a researcher to ask different types of questions about an event, will require different types of data and will determine the direction the analysis will take in exploring data collected. The study presented in this thesis adopts the socio-semiotic approach to multimodality. In this approach, "the primary focus [...] is how [...] meaning potentials are selected and orchestrated to make meaning by people in particular contexts" (Jewitt, 2009:31). This study into interplay between verbal and nonverbal modes in synthetic worlds focuses on how language learners

(the sign-makers), in the synthetic world (the particular context), select and orchestrate meaning using the two different communicative modes (verbal and nonverbal) to better understand how multimodal communication is organised in the specific CMC environment. The appeal of the socio-semiotic approach to our study is that it places importance on the context, which is considered as realizing social meanings and also that the sign-maker is placed at the centre. Thus, this study's primary concern is the choices a sign-maker makes concerning the nonverbal and verbal modes within the contextual constraints and potentials of the environment and considering the social relations within the learning situation. This is studied through the multimodal discourses produced and the potential effects on verbal participation in the L2 and on learning through the offer of support for L2 production. Jewitt (2009) also describes how the approach uses patterns in the use of resources and in the multimodal texts produced because the approach considers the medium "as a resource with regularity and dynamic character" (Jewitt, 2009:36). This contrasts the socio-semiotic approach with the multimodal interactional approach in which the emphasis on a system is low. At several points in our study we are concerned by whether patterns exist between the use of the nonverbal mode and the verbal mode. The emphasis of the socio-semiotic approach upon the context, the sign-maker and patterns in the multimodal texts produced by the sign-makers in the specific context appears particularly valid as a starting point into this research.

I consider a *mode* as "the semiotic resources which allow the simultaneous realisation of discourses and types of interaction" (Kress & van Leeuwen, 2001:21). Each mode is the result of the cultural shaping of a material by which the resources display regularities in how people employ them (Jewitt, 2009:300). Each mode can be realised in more than one *medium*. The medium is the material resource that is used during the production of semiotic products or semiotic events. These material resources include both the tools and materials used (Kress & Jewitt, 2003:22). In distance learning environments, as Chanier & Vetter (2006:64) describe, the material resources will include the production mediums: the keyboard, mouse and microphone and also the distribution mediums: the screen and headphones.

Concerning the term *modality*, several meanings are in current use. One interpretation of *modality* is outlined by van Leeuwen who explains that the term can describe varying stances towards reality and is associated with expressing the "the truth value of propositions" (2004:15). The term, however, does not only include modal auxiliaries (should, would, may) but rather there are different kinds of modalities within language. For example, the use of mental process verbs (consider, believe, accept) and nouns, as well as frequency adjectives (sometimes, often), to express subjective modality. Another interpretation described by Chanier & Vetter (2006) comes from the field of Human-Computer Interaction (HCI) in

which *modality* is used to describe a specific form of communication related to a single mode. For example, in the textual mode, text can appear in the textchat modality or in a word processor modality or a whiteboard modality. A mode can therefore give rise to several modalities. A third interpretation is explained by Lamy who describes that *modality* is "the relationship between modes and the culturally intelligible object that they underpin" (2012a:111) and where Computer-Assisted Language Learning (CALL) is concerned, is the combination of the material tools, the communicative and representational modes and language-learning objectives materialized through educational designs (2012:112). In response to the definition from the HCI field, Lamy suggests that terming a specific form of communication in a mode as a modality is limiting: the diversity of what occurs in the tool is reduced. Lamy gives the example of the textchat, describing how within the textchat different modes and learning interactions are supported. For example, different discourse types (socio-affective, cognitive, methodological, linguistic, and technological) and modes (linguistic, iconic) are used in conjunction for different communicative needs. For the author, modality can only be considered as the combination of the tools, modes and language-learning objectives that are materialized.

I consider that Lamy's (2012a) definition resembles a *modality of usage* which comes below mode and modality in a hierarchical organisation. The environment offers a tool, the textchat, and although within this tool the productions may be different, in terms of their structure or discourse type, the textual nature of how the discourse is expressed remains the same. This textual nature is similar to that used in other textual modalities, for example collaborative writing tools. However, it is the environment and its configuration which mean that these tools, or modalities, have different parameters which affect the choices participants make concerning their usage. For the purposes of this thesis, I will refer to *modality* with reference to the tools that an environment makes available in a specific mode.

2.5. Application of the socio-semiotic approach to pedagogical contexts

In this section, I first examine studies which apply the socio-semiotic approach to multimodality to communication in face-to-face environments before turning to CMC environments. This review excludes studies into multimodality in synthetic worlds which I preferred to include in the chapter which focuses specifically on this type of environment (see Section 5.7).

2.5.1. Studies of face-to-face environments

One of the interests of the socio-semiotic approach to the study of multimodality has been in classroom pedagogical practices, looking beyond the use of written text and verbal language to the range of different modes which contribute to meaning-making and knowledge construction. Science classrooms, in particular, have been investigated, driven by the research project ‘Rhetorics of the science classroom: a multimodal approach,’ financed by the Economic and Social Research Council of the UK.

An analysis by Jewitt *et al.* (2001) focused upon a science classroom in which the lesson centred on looking at the cells of an onion under the microscope, with students aged 12-13, and recording visually ‘what they saw’ and in written form ‘what they did’. Focusing upon four students’ productions, the study describes how the students drew upon resources provided in different modes to produce very different visual and written texts. They argue that this is due to the students selecting and adapting information from the different modes, based on their interests. For example, verbal analogies of ‘building blocks’ and ‘honeycombs’ for the description of patterns of cells given by the teacher were transformed into the students’ visual productions. They also drew upon visual resources: images of cells shown on overhead projectors and on worksheets, which served as models of scientific texts for the students. Their written descriptions of the process drew upon the ‘actions’ that were performed with the onion, slides and microscope and the order and salience of these, as shown through the teacher’s posture and movements. The study demonstrates how the visual expressions of learning and the central role of action are fundamental within the classroom, suggesting that learning is realised through interaction between visual, actional and verbal modes (intersemiosis) and the transformation of the meaning-making resources within these different modes which is motivated by the interests of the students and the context in which the learning took place.

These conclusions are also demonstrated in another analysis conducted by Jewitt and her colleagues (Kress & Jewitt, 2001) within the same research project and which concerned a series of lessons which focused upon ‘blood circulation’. The authors analyse the range of meanings made by the teacher as he speaks to the class and writing on the whiteboard. They also analyse the gestures which accompany his speech and which are used to point to a model of the human body and direct students to look at visual resources in a textbook. The starting point for the lesson is a visual image drawn on the whiteboard of a circle with an inner and outer ring. During the lesson, the teacher verbally explains this image and adds to this image, drawing arrows to represent blood flow, adding symbols to represent organs and a second

circle to represent the complexity of the circulatory system. He also modifies the drawing through gestures of movement to indicate the direction of blood flow and deictic gestures to indicate the salience of specific organs that form part of the image. He uses the image in association with a model of a human body and his own body, using gestures to relate parts of the body to the image. Finally, he uses a topographical representation of the blood system in the students' textbook to provide a summary of the whiteboard image and gestures presented by the teacher, before asking the students to complete a series of exercises in the textbook.

The authors' analysis of the classroom practice suggests that each mode (verbal, visual, nonverbal, actional) represents different ways of shaping and conveying meaning, showing that how the modes combine foregrounds or backgrounds information. For example, the model of the human body is made salient at one part of the lesson by the teacher's actions of manipulation of the model to display the parts he names in his speech. Later it is backgrounded, as the teacher returns to the whiteboard to add an explanation by drawing which he is unable to do on the model. The meaning-making which occurs in the classroom is not achieved solely in the verbal mode. Rather, the authors reach the same conclusion that the different modes work together. They create coherence through repetition of the same information and by the intersemiosis between the different modes.

2.5.2. Studies of CMC environments

I now turn to research which focuses on multimodality CMC environments. Unsworth (2001:12) states that, although multimodality is not an exclusive feature of electronic texts, the range of modalities and the extent of their use, and nature of articulation, have significantly increased in CMC. For L2 learners operating in CMC environments this means the learners have the possibility to understand information through different channels (Legros & Crinon, 2002 in Guichon & McLornan, 2008) as well as use different modes for communication.

Kress states that, concerning multimodal environments, it is vital to "understand the meaning potentials of the resources as precisely and explicitly as we can" (2003:24). This is all the more so true *vis-à-vis* L2 learning where research needs to assess the affordances of the multimodal environments to support the pedagogical process that are accepted as the most effective for language learning (Lamy, 2012b) against the limitations on L2 learners' cognitive resources (Guichon & McLornan, 2008). Research also needs to consider how different modes are used in online environments for specific purposes (Hampel, 2006; Vetter & Chanier, 2006) or types of discourse (Vetter & Chanier, 2006) in order to take this into account in pedagogical scenarios and task design. However, as Hauck & Youngs (2006)

stress, how teachers and material designers can use multimodal CMC settings to exploit communication opportunities and foster SLA is largely unanswered. Potentially because there is a lack of research that examines the impact of the combined use of modes on interaction in online language classrooms (Hampel & Stickler, 2012; Dooly & Hauck, in press), particularly concerning environments other than synchronous written text environments (Lamy, 2012b). In advocating that research studies into CMC and language learning focus more on multimodality, Lamy warns that if we don't consider the multimodal meaning resources in L2 studies of CMC "we are in danger of missing out on explaining the nuances in the learning process" (2012:121) and risk failing to exploit learning processes to the full. Although this research agenda has only recently been recognised, several researchers have begun to address the question of the impact and effects of multimodality on interaction in CMC environments. I now outline the findings of several studies which address the latter with respect to L2 communication. These are organised by environment type.

Audio-graphic conferencing environments

Reporting on one-to-one tutorial sessions, for a first-year University beginners' Spanish course, Blake (2005) examined an audio-graphic conferencing environment that combines voicechat, a shared editing word processor and textchat. The former two tools were half-duplex, meaning that the participants' had to queue to use them. Blake's study suggests the benefits of the voicechat and textchat modalities' complementation for negotiating meaning. He illustrates the tutor's use of the textchat to record pertinent information in accompaniment to the student's use of the audio modality. The multimodality of the environment allowed the tutor to comment on the students' audio production without interrupting the flow of conversation, which may be discouraging to a low-level language learner. The tutor also made frequent repetitions of a highly didactic nature to reinforce what had been said in the audio modality. The student also made use of the multimodality of the environment. For example, using the textchat to gain equal footing with the tutor. The textchat allowed the student to direct the conversation by asking the tutor for help to solve her own communication difficulties, rather than continue unaided in the audio modality and lose face. Blake highlights the socio-affective benefits of the multimodal environment for distance learning, although the multimodal nature of the environment may not come naturally to most tutors or students. Limitations of his study, however, are, firstly, that he focuses solely on the audio and textchat modalities and does not discuss whether the word processor modality was used and if so how this modality affected the overall discourse structure: whether the modalities worked in complement or in competition. A second limitation is the small sample size. Interacting with

one student alone may have enabled the tutor to comment on the student's production and focus on didactic repetitions. The study's findings can not necessarily be generalized to groups.

The study by Chanier & Vetter (2006) shows that learners use different communication modes for different types of interaction, within a synchronous audio-graphic conferencing environment. Their study focused on a distance course for learners of English and the use and appreciation of certain communication modes and tools for different discourse objectives.

The authors' analysis showed weaker students tended to compensate for their relatively infrequent use of the audio modality by an intensive use of the synchronous textchat. They also showed that a group of false beginners tripled their audio speaking type with reference to the first and last sessions of the course and that their expression in the synchronous textchat modality doubled. This suggests that, as learners become more familiar and at ease with the environment, verbal production increases. During the course, the average number of lexical items in each textchat act also increased and was greater than the average act length of learners in the more advanced group. In contrast, the more advanced group rarely participated using the synchronous textchat, preferring the audio modality. Chanier & Vetter's (2006) work showed, however, that the choice of communication modality was not systematically linked to the learners' L2 level but rather that there are individual communication preferences which mean that learners either like or dislike the use of synchronous textchat. Concerning, the communication modalities which learners appreciated for different discourse objectives, the authors show that learners strongly preferred audio rather than textchat to manage the interaction and had a slight preference for audio over textchat to make decisions and to express themselves on a socio-affective level.

Chanier & Vetter's study (2006), through the use of qualitative examples, also clearly shows evidence for links between acts in the voicechat and the textchat. Their data shows examples of acts taken in the audio modality for which the interactional content is taken up in another modality. The authors, thus, show how adjacent pairs are split of different modalities. A representation of the links between the acts over different modalities is shown in Figure 1.

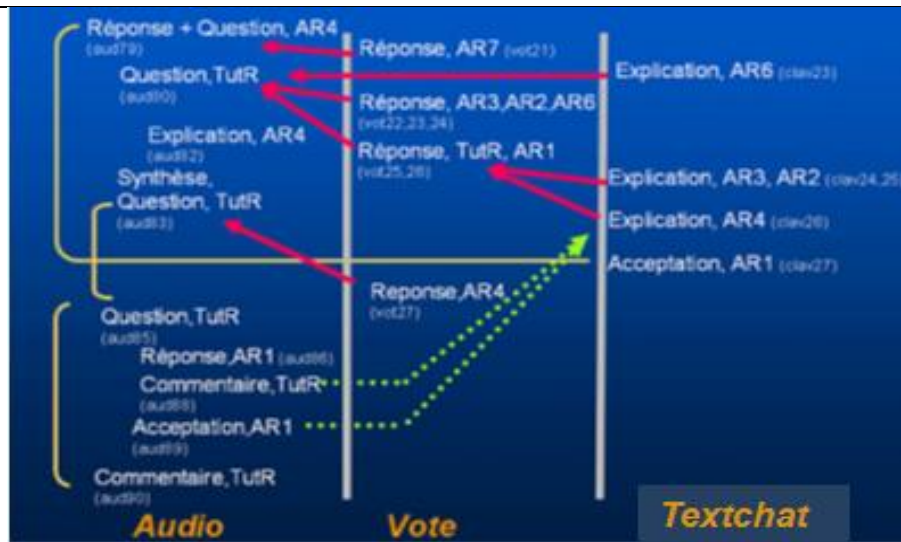


Figure 1: Links between acts shown over three different communication modes (from Chanier & Vetter, 2006:78)

The model shown in Figure 1, illustrates a sequence in which the synchronous textchat is used to clarify ambiguities in the audio modality and then how the discussions occurring in the two modalities converge. As the authors express, this is a polylogue, with acts distributed in different modalities, rather than a polyfocalisation in which different micro conversations take place each in each different modality. The authors conclude that it is the possibilities for different learners to express themselves in different modes which supported the verbal production in the learners' L2. They stress that the multimodal environment strengthened, rather than impeded, verbal production and the use of different modalities did not seem to disrupt either the learners' comprehension of the interaction nor their verbal participation.

Another study which focuses on multimodality in an audio-graphic synchronous environment is that of Ciekanski & Chanier (2008). Whilst Blake's study foregrounded the use of the textchat and audio modalities with an individual student, Ciekanski & Chanier focus primarily on the word processor and how this tool combines with other modalities to foster student group collaboration and make meaning. Their study concerns an English-for-Specific-Purposes course, involving sixteen students whose L1 was French. In this study, Ciekanski & Chanier focus upon two collaborative writing tasks. One in which students had to reformulate a questionnaire and another guided production activity. Their research highlights, firstly, how the different modalities, due to their technical parameters and specific natures, offered different possibilities to the learners. In a similar manner to Chanier & Vetter's (2006) study, the authors show how the different ways for learners to express themselves were not only linked to individual communication preferences but equally to the functions of the modalities, as perceived by learners in the given context. For example, the

audio modality, offering greater synchronicity than the textchat modality, allowed learners to comment more quickly on a piece of written text than the textchat. Textchat acts, however, remained longer than audio acts allowing for peer review of production in this modality. This affected the groups' strategies concerning how they approached the task. One group used the audio modality to conceive the meaning, before formulating a text in the word processor and then correcting this using both the word processor and the voicechat to comment and negotiate the contents of the written message. Another group chose the audio modality to organize their approach to the task and to provide a first version of the written text and then the textchat to propose, enrich and correct the form of their text. The multimodal perspective of the Ciekanski & Chanier's (2008) study showed that the students frequently switched modality because each modality served a different discourse function which helped to make meaning and encouraging the reflection of the students in complementary ways. The study shows that the multimodal nature of the audio-graphic synchronous environment facilitated group collaboration and the writing process.

Video-conferencing environments

Hampel & Stickler (2012) focus on how teachers and learners use different modes to make meaning in a videoconferencing environment which combines the verbal mode (voicechat, textchat, and collaborative text tool), the visual mode (icons, still and moving images) and the nonverbal mode (gestures via the webcam). Similarly to Ciekanski & Chanier (2008), they describe that students made choices concerning the modes in which they interacted with reference to the nature and technical parameters of the tools. For example, participants infrequently interacted using the gestural modality due to the slow refresh rate of the video images. The iconic modality of vote buttons and emoticons was also infrequently used, though the authors do not offer any explanation for this. The study, of a German-as-a-foreign-language intermediate-level course, focuses on the verbal mode which included the voicechat and textchat modalities. The data presented in the study covers ten video conferencing sessions.

The authors focus on discourse and patterns of use across the verbal modalities. They observed that patterns of interaction when considering the audio modality alone represented the typical initiation, response, feedback (IRF) patterns found in classroom settings. However, considering the voicechat alongside the textchat modality showed a more complex picture of discourse. The students used the textchat in conjunction with the audio in order to make assertions about what was being said in the voicechat, including disagreeing or agreeing with the audio productions and also to make clarification requests, particularly concerning lexis

used in the audio production. Hampel & Stickler (2012) suggest this is due to the nature of the environment in which the audio was half-duplex: participants have to queue to use this modality. This had an impact on turn-taking, interruptions and back channeling. Students used the functionalities of the textchat and transformed this modality for their own communicative purposes and to the context. The teachers also used the affordances of the textchat modality for interaction corresponding to their role in the context. They combined both modalities using the textchat to respond to students' productions, as in Blake's (2005) study, to recast or model target language in a written form and to summarize audio discussions. Similarly to Vetter & Chanier's (2006) study, the researchers also show that the multimodal nature of the environment catered for learner differences and preferences: different students occupying different amounts of floor space in the textchat and audio modalities. The study illustrates how the environment shapes the interaction and how participants need to adapt tools to their purposes. It also highlights how the verbal modalities can be used in a complementary manner whilst stressing the need for more studies which concern how interaction draws upon different modalities in computer-mediated environments and supports learner communication and interaction. They suggest studies need to show how multimodal CMC environments aid second language acquisition, in order to inform task design and identify the skills learners and tutors can be taught in order to prepare them to use CMC tools. A limitation of their study, however, is that the researchers focus predominantly on the verbal mode. As they acknowledge themselves, this mode forms one mode within a more complex whole and they do not extend their analysis to the use of the gestural modality or the actions of using, for example, the vote buttons available in the environment.

A study which looks beyond only the verbal mode in video-conferencing platforms is that of Guichon, Bétrancourt & Prié (2012). Their study focuses on modalities that are used by trainee teachers of French-as-a-foreign-language to provide feedback in a videoconferencing system which included voicechat, textchat and a note-taking tool in the verbal modality and web camera images and a marking tool in the visual mode. The marking tool allows the trainees to insert a marker at a specific point during the interaction (which is recorded), and combine this marker with a written reminder, in order to come back to specific language points in later sessions .

Guichon, Bétrancourt & Prié (2012) show several strategies for providing feedback across different modalities often based on the trainee teachers' personal preferences. Whilst the voicechat was the preferred modality for giving feedback, some of the trainee teachers also used the textchat modality, whilst one tutor exploited the potential of the gestures in the visual mode to signal incomprehension and prompt the learner to reformulate the message.

The authors' indicate the interest of providing feedback in the textchat modality. Firstly, it allows the teachers to provide feedback without interrupting the student and, therefore, not disrupting the communicative flow of the students' verbal production. Secondly, the textchat remains in view and can be a reminder to the students of the target form. This can, thus, facilitate uptake of this form. Guichon and colleagues, however, also underline the difficulties the trainees had in handling the interaction across several modalities. Particularly, in moving between the verbal mode and the visual mode to use markers. Because the markers presented the trainee teachers with a 'dual task' that of interacting, with the learners in the verbal mode whilst also placing a marker in the visual mode to serve as a reminder for feedback to be provided later, the two tasks in different modalities were in competition in terms of the teachers' cognitive resources. The study, thus, highlights in a similar fashion to that of Hampel & Stickler (2012), the need to train teachers in the skills and strategies needed to perform in multimodal environments in order that they do not become cognitively overloaded and in turn reduce their capacities to provide feedback on verbal production.

This review of the studies into multimodality in computer-mediated communication environments within language-learning contexts has allowed us to identify that the structure of the electronic medium affects interaction. For example, the synchronicity of the voicechat in Ciekanski & Chanier's (2008) study, the lag in the visual mode in Hampel & Stickler's (2012) study and the constraints of half-duplex audio modalities in the environment studied by Blake (2005). This prompts learners and teachers to use other modes and modalities to cater for their communicative needs within the specific context, both to compensate for limitations in other modalities and to complement interaction in other modalities. The studies all draw attention to the potential for language learning that lies in offering learners and teachers multiple modes to make meaning. These include the possibility to encourage participation and collaboration, to help focus learners' attention on process skills and to offer feedback on learners' productions. However, they similarly highlight the need to better understand multimodal perspectives, in analyses of classroom discourse which use computer-mediated communication tools, in order to recognize the possibilities and limitations of these environments for language learning. Particularly in terms of interaction analysis which in turn will inform task design, as well as the new skills and strategies that learners and teachers need in these environments. Content analysis studies are also needed to address how the different modalities and the interplay between these can foster second language acquisition.

2.6. Conclusion

This chapter, concerned with multimodality, has allowed us to provide an overview of the theoretical concepts upon which a multimodal view of communication is based. It has also allowed us to present two different approaches to the study of multimodality before determining the terminology adopted in this thesis. After outlining applications of the second approach, the socio-semiotic approach, to face-to-face pedagogical situations, I detailed several studies which showed the interplay between modes and modalities in CMC environments with reference to language-learning contexts. This allowed us to highlight some of the ways in which multimodality impacts on interaction within these environments. These studies also suggest ways in which a choice of communication modalities helps to support verbal participation, through the adoption of different modalities for different discourse functions, and also verbal production, through the possibilities offered by the multimodality for negotiation of meaning and corrective feedback.

Chapter 3. Nonverbal mode

3.1.Introduction

The focus of this chapter is the nonverbal mode. I explore the proxemic and kinesic modalities of nonverbal communication and classifications of such that have been suggested. For each modality, I explore the theories that have been proffered linking, or not, the nonverbal modality with the verbal mode; the studies which suggest the role the modality plays in second language acquisition and the studies into the use of the modality in two-dimensional CMC environments. This chapter serves as a preliminary literature review enabling the exploration of some concepts which contribute to the analysis section of this thesis. It helps us link the focus of this study to previous studies in face-to-face and two-dimensional CMC environments.

3.2.Nonverbal behaviour or communication?

Nonverbal behaviour is considered to be the body movements which are produced by different parts of the anatomy or "communication effected by means other than words" (Knapp and Hall, 2002:5). Body movements may be produced voluntarily or involuntarily but whether a movement is intended or not the movement can reveal intention, express a meaning or execute an action. Krauss, Chen & Chawla (2004:2) explain that the terms nonverbal behaviour and nonverbal communication are often used interchangeably. The use of the term nonverbal communication, however, has been contested. Ekman and Freisen (1969:57) argued that the use of the term communicative was too broad, stating that, should we consider nonverbal behaviour as communicative, this does not account for the difference between a behaviour which influences an interactant's behaviour and a behaviour which transmits a message. They argue that some behaviour may have interactive effects but are not intended to communicate, for example the twitch of a face muscle during an interaction. Along the same lines, Knapp and Hall (2002) preferred to divide nonverbal behaviour into three groups so that the category is less broad. These are i) communication environment, ii) communicators and iii) communication message and behaviours. The authors' classification of communication environment included not only the people who were involved in the communication but the space and time in which the communication was taking place. The communicators' message included the individuals' appearance and smell and their behaviours included the transfer of

meaning through visual clues, touch and movement. The authors emphasised in their classification that they consider that any nonverbal behaviour includes communication. As Burgoon stated "it does not matter if, on a given occasion, it [a body movement] is performed unconsciously or unintentionally; it can still qualify as a message" (1994:231 in McCafferty and Stam, 2008:29). In the previous example of a face twitch, information about the affect state, personality or attitude may be interpreted from the movement. Considering, the position of Burgoon to be pertinent, for this paper, I make the terminological choice to use nonverbal communication.

3.3.Communication environment

The communication environment involves the space in which the communication takes place (proxemics) the time aspects to the communication (chronemics) and the physical features e.g. light, sound, colour of the environment in which the communication is taking place. In this section, I discuss the modality of proxemics.

3.3.1. Proxemics

Proxemics is a class of nonverbal behaviour studied by Hall, in the context of cultural anthropology. He described proxemics as the study of how an "individual unconsciously structures microspace" (1963:1003) and how an individual "gains knowledge of the content of other men's minds through judgements of behaviour patterns associated with varying degrees of proximity to them" (1963:41). That is to say the ways in which individuals use space to communicate and how this use of physical space impacts on the behaviour of the individuals involved in the interactions.

The study of proxemics, coined by Hall from the Latin root prox- as in proximity and the suffix -emic as in systemic, is based on the notion of territoriality: the behaviour by which a person or animal lays claim to an area and defends it against others. Proxemics is interested in physical and personal territory; both concepts which Hall argues represent a hidden dimension of culture. He proffers that in observing humans in social situations and classifying the type of distances, or personal territories, maintained by humans, that patterns of proxemics will be able to reveal hidden cultural frames that determine the structure of the perceptual world of a person. Hall classified the personal territories maintained by humans in interaction as being i) intimate; 0-18 inches apart for touching, whispering, embracing, ii) personal; 18 inches to four feet - the space maintained during interactions with family members or good friends, iii) social; the distance maintained between acquaintances, between four and twelve

feet and iv) public; the distance maintained for public speaking, between 12 and 25 feet. In terms of physical territory, fixed features of space, for example, buildings; semi-fixed features of space, for example moveable objects or objects which can be manipulated; and informal space, including the personal space between humans in social situations that the people maintain without being aware of doing so, are studied.

Hall identifies eight dimensions to nonverbal, proxemic behaviour. Firstly, postural-sex indicators: the sex and the basic posture of individuals when they interact. For example, whether the individuals are standing, sitting, kneeling, lying down. Secondly, the sociofugalsociopetal axis or the orientations of individuals and how these orientations combine or separate individuals. For example, whether they are facing each other or positioned back to back. Hall, thirdly, identifies the kinaesthetic factor: the distance between individuals that gives them the possibility or capability to physically touch each other or not. This includes how close people are in relation to the possibility to knock into each other, to brush past another or to hug each other. Closely related to this factor is the touch factor, that is to say how the individuals are/ are not touching each other, e.g. whether the individuals are not touching at all, are accidentally brushing each other or are holding each other. The fifth dimension to proxemics is voice loudness which Hall sub-divides into seven sub-categories which range from silent to very loud. Lastly, Hall describes the dimensions of thermal code and olfaction code: the body heat and odour that an individual perceives from another individual.

In Hall's study of proxemics, he analyses spatial nonverbal behaviour as an independent communication system which has analogies to language: "proxemic behaviour parallels language, feature for feature" (1963:118). The aim of Hall was to study the spatial behaviours of different cultures and to what extent the codes he determined for spatial behaviour, based on the eight dimensions of proxemics, the classification of personal and physical territories and the interplay between these, were valid for different cultures. Hall claimed that the perception of space by an individual is determined by the morphological and semantic categories that the language of the individual provides for the representation of space, arguing that the communication of space is experienced or 'perceived' by an individual through the visual, auditory and tactile channels.

3.3.2. Relationship between proxemics and verbal communication

The importance of proxemics in face to face contexts and the interplay between proxemics and verbal communication has been studied by many researchers (Sommer, 1969, Allen, 1977, Chamberlin, 2000). With respect to verbal communication, Kraut, Fussell & Siegel (2003) propose a decompositional framework looking at how the mechanisms of proximity can make collaboration easier through verbal communication. The authors elaborate on the work of Allen (1977) who demonstrated that the probability for two people to initiate verbal communication increases with the decrease in physical space separating them. Kraut, Fussell & Siegel (2003) show that the first effect of proximity is in initiating conversations. Proximity increases the frequency of communication and people are more likely to communicate with others who are physically close.

Kendon and Ferber (1973) also focus on how proxemics plays a role in verbal communication initiation. They describe how participants in their study make the transition from seeing each other by catching each other's gaze to signalling their intent to interact to communicating. Once gaze has been established, the participants walked to an adequate distance according to the social norms established by Hall (1963). Distance between participants in verbal communication, thus, is a marker that expresses the kind of interaction that occurs. Other researchers have also found it to be an indicator of the social relationships between the participants. For example, Hall (1959) showed that the distance between a boss and an employee during verbal communication was greater than between two employees.

Other studies have looked at the efficiency of verbal communication with respect to proxemics. Co-presence in the same environment for face to face communication provides audibility: being in the same room, close to other people allows individuals to perceive sound in the environment. Moreover, physical proximity allows the use of different paralinguistic and nonverbal signs which help to coordinate communication. For example, coordination of turn-taking or the repair of misunderstanding (see Section 3.4.1).

3.3.3. Proxemics and Second Language Acquisition

Proxemics and Second Language Acquisition (SLA) has been studied from two viewpoints. Firstly, from a pedagogical perspective in terms of the spatial organisation of classrooms and the distance the teacher creates between him/herself and students. Secondly,

in terms of the different proxemic behaviours between cultures and the effect on learners of a second language, including strategies that could be employed.

Pannozo (1996 cited in Puren, Bertocchini & Costanzo (1998:29) describes the different use of space that a teacher might make, based on her fifteen-hour long observation of a language class. She describes that when a teacher sits behind a desk in front of the students that a particular communication space is created in which the exchanges are more difficult, less direct and perhaps more traditional. In contrary, she also describes a teacher using a personal distance between him/herself and the students when s/he goes through the rows to check the work of students. Describing the action of a teacher bending over the shoulder of a student, Pannozo suggests that the distance is no longer one of a teacher-student relationship but rather a communication distance between two people of similar status and that this impacts on the verbal communication.

In a similar manner, Pannozo (1996 cited in Puren, Bertocchini & Costanzo (1998:29) describes how the students also organise the space when they decide to sit in certain seats. Barrier (2008:63) also describes this in his work on nonverbal communication. Whereas Pannozo describes how students who appeared serious, interested and who participated in the class tended to sit in the first row, Barrier shows that when a class is organised in a U shape, that the leaders often choose the central places which allows them to have a panoramic view and, thus, increase their nonverbal communication space as they can emit a maximum number of communication lines, established through gaze, to the other participants.

As previously described in section 3.2, Hall (1963) suggests that proxemic zones are dependent on the culture of the one who holds them. A second area of research in SLA is interested in how learners learn the proxemic norms of the culture of the second language being studied. Watson and Graves (1966) describe that cultures can be divided into two groups according to their proxemic rules; 'contact cultures', such as South-Americans and Arabs, 'touch' their addressees much more than 'non-contact cultures', such as Scots and Swedes. For second language learners who are learning a language in which the cultural proxemic rules change it would appear that in learning the verbal communication of a language it is also necessary to learn the rules of the nonverbal communication as suggested by Arias (2010):

"The relevance of proxemics in foreign language teaching is enormous. Mastering the verbal system of a foreign language does not guarantee effective communication because mastering the nonverbal systems of that foreign language is also essential. These verbal and nonverbal systems are connected, and the use of one without the other might cause disequilibrium" (Arias, 2010:no page).

Indeed, according to Hall, "informal spatial patterns have distinct bounds and such deep, if unvoiced, significance that they form an essential part of culture. To misunderstand this significance may invite disaster" (1959:112). This is of particular significance for second language learners. Indeed, a study by Archer (1997) describes this. The author cites the example of how people from a Mediterranean culture often hold the elbow of the person to whom they are talking whereas for many Americans this uninvited touching would be unbearable. She argues that for foreign language learners an understanding of the nonverbal proxemic norms of a culture is vital for it is rare for a person to correct a nonverbal violation through verbal communication and, thus, learners must learn to recognise the acceptable norms of proxemic behaviour and the nonverbal behaviour that shows if they have violated these in order to be able to correct them.

3.3.4. Proxemics in two dimensional Computer Mediated Communication

Within the domain of computer mediated communication, studies have concerned how two-dimensional (2D) environments for communication can take into account proxemics and within these environments how users engage with the semiotic resources of the graphical environment itself, that is to say the users' proxemic behaviour.

In the study of online text-based forums, studies have been conducted into how information can be seen that is unavailable in a textual representation, including, for example, visually representing presence and participation in an online forum. Donath, Karahalios & Viagas (1999) studied online graphical chat systems in which each user was represented by a figure displayed in a single pictorial space. In their study of the online forum *Chat Circles* each person connected to the text-based forum was represented within the single pictorial space by a circle. When a user posted a text-message, the user's circle grew in size to display the message, as shown in Figure 2. After a certain time, following the posting of the message and dependant on the length of the text message, the circle faded. The aim of this visual display was to try to represent verbal conversations where the participants focus on the contribution from one participant before moving their focus of attention to the participant taking the next turn.

In *Chat Circles*, each user within the text-chat is represented in a different colour for the forum is designed to take the proximity of users into account: the closer the personal territory between users the easier it became to distinguish between the shades of colour used to represent different users: "within one's proximate group the ability to distinguish between say,

two shades of blue will be higher than for the screen as a whole" (Donath, Karahalios & Viagas 1999:4).

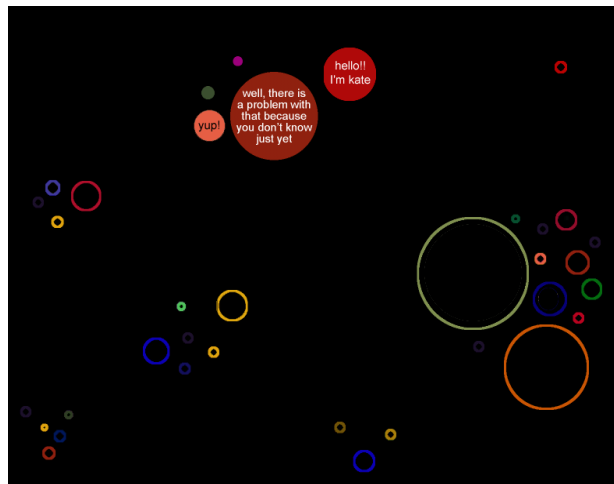


Figure 2: Chat circles (from Donath, Karahalios & Viagas, 1999)

By visually portraying each individual user of *Chat Circles*, the graphical chat system also represented the use of space within the communication: the size of the group of users involved in a specific conversation was shown through the number of circles. Although at any given time, a user could visualise the number of participants in a text-based conversation, the system also incorporated a "zone of hearing" in that a specific user could only read the text within circles close to their location. Hall's dimension of voice loudness (see Section 3.3.1) was, thus, taken into account with a specific user's message or 'voice' becoming visible as personal territory between two users decreased. Text-based conversations became spatially localised and dependant on a user's proximity to other users.

Krikorian *et al.* (2000) provide a further study of proxemics in online graphical chat systems. The study observed how spatial distances and spatial orientation between graphical images of users in a 2D space, firstly, affected how users predicted behaviour and used communication behaviours in doing so and, secondly, achieved conversational appropriateness and demonstrated social attraction. The study utilised the 2D online graphical chat system *The Palace* in which users were represented by graphical images and could access a number of different chat rooms via virtual corridors and doorways.

The research of Krikorian and colleagues showed that distance between the graphical representations of users within *The Palace* was meaningful. There was an existence of distance ranges between participants in the study and these distance ranges significantly influenced the users' social liking of other users. The possible distance range between users varied between 37 and 471 pixels which Krikorian *et al.* (2000) equated to a range from 0.76-

8.44 inches and, thus, to the 'intimate' personal territory classification of Hall (see Section 3.3.1). However, the authors showed that in this online graphical chat system and within this calculation of range, three distance ranges were possible: the close range zone, the mid-range zone and the far range zone. The authors identified that for users there was a minimal distance range which, once decreased, a user either felt a sense of intimacy and a greater social attraction to the other user or felt a sense of crowding whereby his/her personal territory had been invaded. An example, given in the work of Krikorian *et al.* (2000) is shown in Figure 3. The authors claim was founded on verbal communications: users asking others to 'get off my forehead' or telling other users that they were 'sitting on me'. Krikorian *et al.* (2000) showed the relationship between these verbal utterances and when avatars surpassed a minimal distance range, visually available to the users. The minimal distance range was analogous to the intimate proxemics range of Hall and of what the latter researcher termed as an 'intimate zone infraction'. For example, in Figure 3, we can see two avatars who are proxemically close and one user asking the other in a verbal act to 'get off my forehead'. The authors showed that whether the user felt a sense of intimacy or a sense of crowding was dependent on the personality characteristics of the user.



Figure 3: Intimate zone infraction in the 2D online graphical chat system *The Palace* from Krikorian *et al.*, 2009.

The study of proxemics within *The Palace* also showed that the further apart users positioned their graphical representations, the greater the other users perceived them to be conversationally appropriate. Although there was found to be a minimal distance range

between users, no public zone infraction range was identified whereby users perceived other users' graphical representations to be too far apart for conversation appropriacy.

3.4.Communicator's behaviour

The communicator's behaviour classification of Knapp and Hall (2002) includes the study of the modality of kinesics. Kinesics has been classified as a type of nonverbal behaviour that relates to movement, posture and position individuals assume in their interaction: "the study of the body's physical movement" (Lessikar, 2000:549). Kinesics was first studied by the anthropologist Birdwhistell in the 1950s. Birdwhistell (1952) argued that body movements conveyed meaning and were not incidental. Applying a linguistic analysis to body movements, he developed a 'grammar' to describe these movements. His system was based on kinemes, similar to phonemes, in that they consist of a group of movements which are not identical but which can be used interchangeably without affecting social meaning. The aim of Birdwhistell was to isolate body movements, treating them as a separate communication system to that of verbal language, a contested theory (see Section 3.4.2). According to Lessikar and Pettit, in the study of kinesics, we look for an inner state of emotion that is expressed through different parts of the body and the physical movement of these parts. Within the field of kinesics, the physical movements of body parts are often subdivided by the different area(s) of the body exhibiting the movement, notably by the area of the face and eyes, of the hands and arms and of the back and shoulders. In this section, I examine the first two categories.

3.4.1. Face and eyes

Eye contact, or gaze, has been deemed as important in nonverbal communication. Gaze has been defined as the fact of looking at someone in-or between- the eyes, or more generally in the upper half of the face (Cook, in Cosnier and Brossard, 1984:126)⁵. Gaze has been attributed several functions in interaction. Firstly, gaze is deemed as having an information seeking function. Argyle *et al.* (no date) describe that gaze may be used by individuals involved in an interaction in two ways. Either, gaze may be used by the participant who is talking to obtain feedback concerning the reactions of his/her interlocutors, or gaze may be used by a participant who is listening to supplement auditory information.

⁵ "Le regard se définit comme étant le fait du regarder quelqu'un dans –ou entre- les yeux, ou plus généralement, au niveau de la moitié supérieure du visage". My translation.

Gaze is also attributed to signalling personal attitudes and to expressing an individual's emotions (Kendon, 1977). Several studies have showed that people look more at other people who they like (Exline and Winters, 1965 as cited in Lefebvre (2008); Rubin, 1970 in Argyle *et al.* (no date)). Thus, one function of gaze is that it communicates interpersonal attitudes between individuals. Both looking at an interlocutor and looking away from an interlocutor can communicate attitudes. Nummenmaa (1964) also conducted a series in tests in which photographs of individuals' eyes were isolated from the rest of the face. The results of this test showed that there was a significant agreement between the subjects, concerning which photographs displayed different emotions including pleasure, surprise and anger. This study testifies to the expressive function of gaze as communicating an individual's emotions.

Relationship between face and eyes and verbal communication

Kendon (1977) proffered that gaze plays a role in regulating the flow of verbal communication. Verbal communication is accompanied by small movements of the head and eyes which Kendon proffered as supplementing the verbal contents by adding emphasis, illustration and displaying structure to what is said.

In terms of structuring verbal communication, Kendon (1977) considered that shifts of gaze were coordinated with the timing of verbal communication and helped with synchronizing such communication. Kendon's study showed that if an individual did not look up at the end of an utterance towards his/her interlocutor, that there was a longer pause before the other participant replied. Avoidance of eye contact during verbal communication marks a speaker's desire to continue speaking. Kendon also showed that the opposite is true: if speakers wish to pass a turn, prolonged gaze at his/her interlocutor is a signal that s/he wishes the other person to take the turn.

Argyle *et al.* (no date), in a similar manner, found that participants in a study had a harder time synchronizing their verbal communication, i.e. there were more overlaps in verbal communication between speakers, when their eyes were concealed by dark glasses. Thus, gaze can be seen to play a phatic function in communication, monitoring the initiation and maintenance of verbal communication.

Face and eyes in Second Language Acquisition

In the field of Second Language Acquisition (SLA), gaze is believed to play an important role in reducing the physical and psychological distances between teachers and

learners, establishing common ground between learners who are working together and in displaying a learner's lexical search to specifically ask the teacher for help.

Gaze, as a strategy to reduce the physical and psychological distance between teachers and learners, acts as an 'immediacy cue' (Quinlisk, 2008:33). Quinlisk explains that gaze is often used to regulate a relationship with people in power exhibiting longer-lasting gaze to someone of a lower status. Harper (1985 cited in Quinslink) similarly showed that a person with higher status is less likely to make eye contact when speaking and listening to others. How a language teacher uses gaze in an attempt to establish a connection with the students may ascribe to the position of power or non-power that the teacher seeks to establish with the students. A study by Golish and Olson (2000) showed that students are more likely to display positive perceptions of a teacher who displayed nonverbal immediacy clues. Another study by Swann (1998) focused on teacher's gaze and showed that, in this study, the teacher's gaze was more often directed to the boys within the class at 'critical points' during the class, for example, when the teacher was asking questions. Swann argues that the greater attention paid to the boys in the class through gaze encouraged fuller participation. Gaze may, thus, be used to establish relationships which facilitate learning.

Gaze, within the SLA field, has also been studied with relation to its role in establishing common ground when learners are working to solve problems together. Platt & Brooks (2008:69), in a study of learners of content-based Swahili who were collaborating on tasks which involved placing randomly-arranged words in the correct order and labelling places on maps, shows that gaze often indicated how task participants were attending to various elements of task performance, and helped the learners to focus on and track the relationship between those elements. For example, during one of the tasks, a participant (learner A) focused her gaze on the task sheet. The other learner (learner B) placed importance on this, telling her partner to "wait" as she placed her pencil point on the problem upon which learner A had focused her gaze. Learner A then similarly placed her index finger on the task sheet before moving her gaze to the flashcards the learners were using for the task. In this example, They argue that learners explicitly marked a spot for their gaze to return to (by placing a pencil point and using a deictic gesture) and in doing so illustrated to the other learner how they were attending to the task and which part of the task his/her attention was focussed on, both which contributed to the learner maintaining control of the task and to the collaboration between learners on the task.

Gaze has also been deemed in playing an important role in a learner's lexical search for a specific word. Faraco and Kida (2008:285) suggest that when a learner is searching for a lexical item, often the learner's gaze will look upwards which the authors determine as a sign

that a learner is showing his/ her cognitive activity in an obvious way and, therefore, as a display that the learner is letting the teacher see the behaviour of a person who is dealing with a linguistic difficulty (2008:286). This utilisation of gaze can be a learner's signal of a 'call for help' and if the learner moves his/her upward gaze towards the teacher may determine the exact moment at which a teacher intervenes in terms of verbal communication to offer such help. Extended gaze towards a teacher can portray the function of a learner designating the teacher as a target interlocutor and, consequently, be seen as explicitly asking for help. Faraco and Kida, thus, conclude that gaze can play a role in making visual the different stages of the cognitive activity of a learner confronting difficulty and "add to the management of the interaction by determining who the interactants are and by coordinating their participation" (2008:286).

Face and eyes in Computer Mediated Communication

Studies into gaze and computer mediated communication (CMC) have focussed on two areas. Firstly, the affective value of emoticons constructed as indicators of affective states, the purpose of which is to convey non-linguistic information alongside the written communication, which in face-to-face communication is conveyed through gaze and facial expressions. Secondly, the domain of Computer Supported Collaborative Work (CSCW) has been concerned with the importance of gaze and shared visual access for collaborative task completion. I turn now to each of these areas in turn.

The term emoticons refers to graphic signs, also termed smileys, which are often used in textual CMC such as chat and instant messaging, emails and forums: "visual cues formed from ordinary typographical symbols that when read sideways represent feelings or emotions" (Rezanek and Cochenour, 1998:201 in Dresner and Herring, 2010:251). The term emoticons reflects how these graphical signs are typically perceived as indicators of affective states, information which in face-to-face communication is often communicated through gaze or facial expressions. Kiesler, Siegel & McGuire. (1984) argue that gaze and facial expressions as channels of information are missing in textual CMC and, thus, a replacement for them was created in the form of emoticons. This creation is generally attributed to Scott Fahlman a computer scientist at Carnegie Mellon University who first used emoticons in 1982.

Emoticons have been studied with relation to how they combine with written communication to which they are attached. Dresner & Herring (2010:251) demonstrate that if the written communication and the emoticon point in two different affective dimensions (e.g. positive or negative) the written communication has a stronger impact on the overall affective assessment of the communication. Another study (Provine *et al.*, 2007 cited in Dresener &

Herring 2010:250) showed that emoticons hardly ever interrupt the phrase structure of the written communication and argued that this is because a higher-level process of language production takes precedence over the expression of emotion.

Indeed, several authors, including Dresner & Herring (2010) have argued that the contribution of emoticons to communication is independent of language and that, although they may influence an individual's understanding of the linguistic message, the linguistic message and emoticon have meaning independently of each other (2010:253). Indeed, the authors go on to argue that emoticons do not replace the expression of emotion found in nonverbal face-to-face communication, although they do not rule out an iconic mapping between the function of emoticons and some bodily and facial movements (2010:259). Rather, emoticons are used as indicators of the illocutionary force of the textual messages they accompany. Dresner and Herring suggest that emoticons are conventionalised to varying degrees and, similar to the argument of Kendon (1995) who claimed that some gestures function as illocutionary speech acts, making visible the implications of what is being said, the authors argue that emoticons can lend support to the written language by pointing to expressions and how the specific intended meaning of such written communication should be interpreted.

In the domain of Computer Supported Collaborative Work (CSCW) research has been conducted into the importance of situational awareness of the state of a task and another person's activities for the successful completion of a collaborative task. In face-to-face collaborative tasks, the importance of situational awareness through gaze has been shown to have an impact on what a participant plans to say next, how participants coordinate verbal communication and actions and how participants communicate about a collaborative task in hand by aiding conversational grounding (Kraut, Fussell & Siegel, 2003). Within computer supported collaborative work, the challenge is how to represent, in the design of a system, the diversity of such visual cues in order that they support remote accomplishment of collaborative tasks. Work in this area (Garau *et al.*, 2001; Beattie and Barnard, 1979; Kraut, Fussell & Siegel; 2003) has shown that gaze behaviour can significantly improve the quality of communication in remote meetings and in remote physical collaborative tasks.

The work in CSCW has examined the extent to which gaze directed towards a shared visual space between two participants concerned with a collaborative task had an impact on the successful completion of the task. In 1979, Beattie and Bernard suggested that if participants in a collaborative task did not have shared visual information available they were far more explicit in their verbal communication about the objects they were working on, the instructions given and the state of their own level of understanding of the task progress. Gaver

et al. (1993) developed this research studying distance collaborative tasks using video streams. They suggested that when visual information was available to both participants working on a collaborative task, at a distance, the participants gaze was more frequently on the video feed of an object that they were working on than at each other's faces. Kraut, Fussell & Siegel (2003) elaborated further upon this research, stating that visual information was valuable for making the participants aware of the changing state of a task and that through how the participants used gaze with relation to the object they were working upon, the more precisely they could time their verbal communication interactions with relevance to the task at hand. Thus, gaze played a role in structuring the verbal communication and synchronizing such communication so that it was pertinent for the task in hand, not through shifts of gaze between participants but in object-directed gaze.

The study of Garau *et al.* (2001), investigated the criticism that avatars representing users in graphical chat environments merely act as placeholders and do not contribute meaningfully to the communication. The study showed that the inclusion of eye gaze can make a significant impact on the quality of communication. The researchers compared an avatar that had random head and eye movements with a visually identical avatar who combined head tracking with 'while speaking' and 'while listening' eye animations with relation to the verbal communication (see Figure 4). This head tracking was elaborated from research into gaze patterns while speaking and while listening in face-to-face interactions from social psychology research. The study analysed the impact of the two avatars on one hundred participants with respect to four conditions of quality: how natural the conversation felt to participants; the degree of involvement experienced by the participants; the participants' sense of co-presence and a positive or negative evaluation of the partner.



Figure 4: Example avatar looking at and away from participant in the study.

The study predicted that having an avatar whose gaze behaviour was in correlation to the verbal communication would improve the quality of the overall communication. The researchers' prediction was confirmed by their data which showed that the avatar which incorporated head tracking significantly and consistently outperformed the random gaze avatar. The authors concluded that for avatars to meaningfully contribute to the overall communication, it is not sufficient for them to appear lively but rather that their animation needs to reflect some aspect of the verbal communication that is taking place. They argue that an avatar appears to be able to make "a significant contribution to the positive perception of communication even without detailed facial expression" and simply with a single nonverbal behaviour; gaze (2001:7).

Gaze in avatars has also been studied by Yee *et al.* (2007) in the synthetic world *Second Life*. The researchers work showed that gender and location of avatars had an impact on the participants' use of an avatars gaze. Avatars in male-male dyads were found to significantly less look at each other than avatars in female-female dyads and avatars communicating in indoor locations were significantly more likely to maintain eye contact than avatars in outdoor locations. The authors also reported on the interplay between gaze and verbal communication in *Second Life* concluding that the more two avatars were talking; the more likely they were to be looking at each other. Gaze was, thus, seen to be relevant, and perhaps even regulate, the flow of verbal communication. I elaborate upon this in Section 6.4.2 when describing the modality of kinesics in *Second Life*.

3.4.2. Hands and arms (gesture)

In this section, I outline the definition of a 'gesture' and the varied approaches to classifying gesture before turning to theories offered concerning the relationship between verbal communication and gesture, studies of gesture in the domain of Second Language Acquisition and studies of gesture in the domain of Computer Mediated Communication.

Definitions and classifications of gesture

The body movements of the hands and the arms are frequently termed as gestures. For certain researchers, gesture is the specific term for movements of the hands and arms that are seen when people are also communicating through the verbal mode of communication (McNeill, 1992, Gullberg, 1998). This definition, as a global definition for gesture, appears to me rather problematic. By way of example, consider that one is finished eating in a busy restaurant and wishes to ask the waiter/ waitress for the bill. One communicative strategy could be to catch the gaze of the person, establish eye contact and then to move one's hands

and arms to mimic the action of writing a bill. Although a gesture would be exhibited using the hands and arms, no verbal communication is necessary to communicate the message of asking for one's bill. The definition of gesture as a specific term for movements of the arms and hands that are seen by people who are also communicating through the verbal mode of communication, thus, appears flawed.

The problem of defining a gesture is underlined by Calbris & Porcher (1989). The authors outline three possible approaches to classifying gesture, arguing that if a definition of an object has not been constructed then the object has no scientific existence (1989:11)⁶. Firstly, the authors suggest an anatomical approach, using the part of the body that is most visibly moving in the production of the gesture. Secondly, they suggest a semantic approach towards a definition, deciding upon the significance of a gesture using social semantic categories such as anger or refusal. Finally, they suggest an alphabetic approach whereby a lexical entry in a dictionary would correspond with an explanation of the gesture.

Another approach in the definition of gesture has been to classify gestures by their function, dividing hand and arm movements between those which are communicative and those which are non-communicative. This sub-division of the category of gestures has been made by many researchers; although many apply different names to the sub-categories (see Table 1).

	Communicative gestures	Non-communicative gestures
Freedman, N. And Hoffman, S.P. (1967)	Movements centring around objects and in correlation with the spoken word	Movements centred around the body and not in correlation with the spoken word
Mahl, G.F. (1968)	Communicative gestures	Autistic gestures
Cosnier, J. (1982)	Communicative gestures	Extra communicative gestures
Kendon (2000)	Gesture	Expressions of affect
McNeill (1992)	Gestures	Non-gestures

Table 1: Terminological differences applied to communicative and non-communicative gestures

Communicative gestures are considered as the movements of the hands and arms that are produced with the intention of serving a role in the communicative exchange between individuals, either by illustrating or complementing something which is communicated through another communicative behaviour. Kendon (2000:49) described these as the range of visible bodily actions that are generally regarded as part of a person's willing expression. When associated with verbal communication, communicative gestures may be semantically

⁶ "Tant que la définition de l'objet n'est pas construite, l'objet n'a pas d'existence scientifique". My translation.

coherent with the meaning of one or more words in a verbal utterance, an integral part of the utterance or used as an expressive device that complements the expression achieved verbally.

Nonverbal gestures are seen as movements of the arms and hands that do not participate directly in the communicative exchange and can easily be perceived as not pertinent to the communication and, thus, eliminated from the communicative exchange by the receiver. Examples of these gestures include a participant touching/ playing with his/her hair or tapping his/her fingers against a table. As illustrated in Table 1, some authors have termed these as autistic gestures, non-gestures or non-communicative gestures. Should we consider that this type of movement from the arms or hands, even if produced unintentionally can qualify as a message, I prefer to use the term proffered by Cosnier and Vaysse in 1997 and refer to this type of nonverbal communication as extra-communicative gestures. If we consider that extra-communicative gestures may reveal intention or an emotional state, this choice of terminology seems important for this category of gestures may communicate such information, e.g. playing with one's hair as a sign of nervousness or tapping one's fingers against a table as a sign of impatience or distraction.

Within the sub-category of communicative gestures, Kendon (1982) elaborated a continuum which took into account the co-presence of verbal communication with a gesture or the absence of verbal communication with a gesture (see Figure 5).

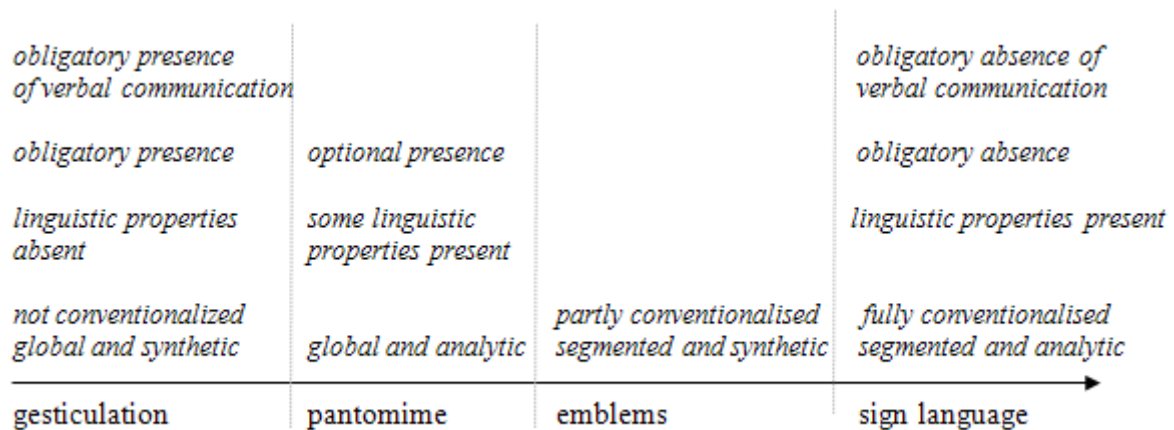


Figure 5: Kendon's continuum (1982)

On the left-hand side of the continuum, we find the category of gesticulations. Gesticulations are considered to be language-like gestures which are not learnt but which occur spontaneously with verbal communication. The movements are believed to be idiosyncratic or specific to each individual. This category of communicative gestures has also referred to as co-verbal gestures (Cosnier, 1982) and emblems (Ekman and Friesan, 1969).

Pantomime was defined by Kendon as a category of communicative gestures for which Kendon believed there was an optional presence of verbal communication. Others (McNeill, 2000) state that this category of gestures occurs without speech, proffering that "it is a movement often complex and sequential that does not accompany speech and is not part of a gesture 'code'" (2000:2). Pantomime gestures are considered as concerning the movement of the hands and arms always in the visual description of an action or an object.

To the centre-right of the continuum, we find the category of emblems. These gestures are defined as being cultural gestures which often replace verbal communication, despite the possibility to translate the gesture by a word or an expression. They are gestures which are learnt and which are common to a culture rather than to an individual. Within a given culture, they have a particular signification: they are "movements [that] have a set of precise meanings which are understood by all members of a culture or a subculture" (Ekman and Friesan, 1969: 45) or, as McNeill describes, gestures which are "partially conventionalised" (2000:4). This category of gestures has also been termed 'quotable gestures' (Kendon, 2005: 335), 'quasi-linguistic gestures' (Cosnier, 1982) and 'symbolic gestures' (Krauss, Chen & Gottesman, 2000). Emblems are believed to be exhibited by individuals directly in front of their body in the area between the head and the waist. McNeill (1992) defined this as the centre of the gesture space.

Certain studies have sub-divided the category of emblems into sub-categories (Cosnier, 1982, Kita, 2002 as cited in Tellier, 2009). Cosnier (1982:265) differentiated between expressives - emblems which communicate emotions or feelings; connotative emblems whose purpose is to influence other people; phatics or emblems used ritually, such as greetings; and, lastly, operators of which the purpose is to communicate information. Kita (2002, cited in Yoshioka 2005: 24) differentiated between performative emblems which performed a social function, word-emblems which were used to replace certain words, expressive emblems which communicate emotions and feelings and meta-discursive emblems which had a rhetorical function or which were used to regulate verbal communication.

Finally, at the right-hand side of Kendon's continuum is placed the category of sign languages. Kendon sub-divided this category into alternate sign languages and primary sign languages. Alternate sign languages are used by individuals who possess the ability to use verbal communication but who choose not to, within specific circumstances, due to social or religious reasons. An example is the Yolngu sign language used by the aboriginal community in Australia during specific rituals. Primary sign languages are used independently of speech and often are characterised by a complex morphology and syntax and as being used by individuals with hearing impairments.

The continuum of Kendon, has been more recently divided by McNeill (2000) into four continua, each based on a different dimension on which it is necessary to distinguish a movement. These four dimensions are the gesture's i) relationship to speech, ii) relationship to linguistic properties, iii) relationship to conventions and iv) character of the semiosis.

In the first continuum of McNeill, concerning the relationship between gesture and verbal communication, we can notice a difference between the placement of emblems and pantomime on the continuum, compared to that of Kendon (Figure 5).

McNeill argues that, by definition, pantomime does not accompany verbal communication and, in instances where this might occur, the verbal communication McNeill deems as trivial (2000:2). In comparison, emblems can either accompany verbal communication, for they can be used to illustrate a word or expression, or they may be exhibited alone. One of the defining properties of gesticulation, however, is that the gestures are co-verbal for the features of the gesture exhibited represent something being referred to in the verbal communication. Thus, without the verbal communication such a gesture's meaning cannot be determined.

McNeill's second continuum concerns the relationship of gestures to linguistic properties. The particular properties taken into consideration by McNeill are the existence of a conventionalized form-meaning mapping system, e.g. the existence of morphology and the potential for syntactic combination with other gestures.

The third continuum, elaborated by McNeill analyses the extent to which a gesture, between a community of users, meets an agreement about how it is used: the extent to which the gesture meets some kind of "socially constituted group standard" (McNeill, 2000:4).

The final continuum of McNeill concerns how gestures take on meaning, as does continuum three. In continuum four, McNeill contrasts the semiotic dimension of global-segmented with that of synthetic-analytic. In this classification, global refers to the fact that each part of a gesture does not exhibit an individual, independent meaning. Only when these parts of the gesture are combined compositionally and analysed does the gesture take on a meaning. This is contrasted with the term segmented whereby a gesture can only convey meaning when a critical segment is present. Synthetic suggests that the same gesture may have a range of different meanings.

Relationship between gesture and verbal communication

Within the field of gesture studies, the relation between gestures, verbal communication and how both are processed conceptually is a subject of much debate. Several theories have

been proposed to explain the relationship between gesture and verbal communication. These studies are divided into those researchers who believe that gestures and verbal communication arise from independent processes and those who believe that gestures and verbal communication arise from the same underlying process and are integrated within a single communication system. Krauss, Chen & Gottesman (2000:270) termed these relationships either as ‘autonomous’ whereby processes operate independently once initiated and ‘interactive’ whereby the systems affect each other during the production process.

Four theories concerning the view that gesture and verbal communication arise from independent, autonomous, processes have been proffered. Stam and McCafferty (2008:9) list these as i) gesture precedes speech, 2) speech precedes gesture, 3) gesture and speech develop in parallel with no collaboration, and 4) gesture and speech develop independently and collaborate. I now turn to studies which have demonstrated each of these relationships, before turning to studies which show that gestures and verbal communication are a single communication system.

Freedman (1972) held the view that gesture precedes verbal interaction and are connected to a mental image that a speaker has and which the speaker translates into verbal interaction: gesture is the encoding of information in an individual’s mind. It has been suggested that lexical gestures precede the word or phrase accompanying the gesture in verbal communication and, thus, are exhibited when individuals are trying to access their individual lexicon (Butterworth and Beattie, 1978, Morrel-Samules and Krauss, 1992). In this approach, often termed as the *Lexical Retrieval Hypothesis* (Rauscher, Krauss & Chen, 1996), gesture thus structures verbal communication and plays a direct role in lexical retrieval as a preverbal priming mechanism. Some evidence for this has been found during studies of the relationship between gesture and Second Language Acquisition (see Section 4.4.1).

Other studies have suggested that verbal communication precedes gesture; verbal communication being the dominant process. Stam and McCafferty summarise these studies (2008:10) quoting a study by Feyereisen (1987) who suggested that gestures are a result of a cognitive overload to the working memory or a problem in matching the verbal communication that was intended and the verbal communication produced, and Hadar and Butterworth (1997) who suggested that conceptual processing activates visual imagery.

Other models have been suggested for the parallel development of gesture and verbal communication, including the *Sketch Model* of De Ruiter (2000). De Ruiter proffers that the primary function of gesture is for communication and that gestures are initiated in a conceptualizer, similar to Levelt’s 1989 model for production of speech. The generation of a gesture comprises of three stages. An initial stage in which a sketch is produced. A secondary

stage in which a motor program is generated for the gesture and a final stage in which the gesture is exhibited. De Ruiter argues that gesture developed in parallel with verbal communication at the initial conceptual stage.

Finally, models have been suggested that suggest that gesture and verbal communication develop independently of one another and collaborate. Kita's *Information Packaging Hypothesis* constitutes one such theory. Kita (2000) suggests that there are two different categories of thinking. Firstly, what is termed spatio-motoric thinking which organizes information according to action schemas which take into account the environment, and analytic thinking which organizes information hierarchically as conceptual templates. Kita argues that gestures arise independently from these two ways of thinking and collaborate to organize the information for the verbal communication. That is to say that gesture is involved in the conceptual planning of verbal communication as it helps speakers to organize spatial information into units which are appropriate for the verbal communication.

In opposition to theories suggesting that gesture and verbal communication are autonomous, independent, processes are theories which suggest that gesture and verbal communication are part of a single system with the same underlying mental processes. McNeill proffered that both verbal communication and gestures develop from a growth point. He describes the growth point as a moment of instability in which "unlike modes of cognition imagery and linguistic categorical content" combine (McNeill, no date). The growth point concerns two dimensions: an analytic, sequential dimension from which verbal communication is produced and a synthetic, imaginistic dimension from which gestures are produced to form a whole idea. The growth point is the initial form of a thinking-for-speaking unit, i.e. the specific starting point of a thought, from which a "dynamic process of organization" emerges whereby the analytic, sequential dimension and the synthetic, imaginistic dimension are combined or coordinated. Thus, the growth point includes imagery and also verbal content of thought and is made visible with the onset of gesture as Example 3A, taken from McNeill and Duncan (2000:144).

(3A)

*and Tweety Bird runs and gets a bowling ball and Ø drops it down the drainpipe]
[the two hands appear to form a large round object and Ø move it down]*

In this example, McNeill and Duncan (2000) refer to both gesture and verbal communication to locate the growth point which they state as being embodied in both the image and the synchronized linguistic categorical content that accompanies this image. The image is composed of a cartoon character, Tweety Bird, dropping something. The linguistic segments 'it' and 'down' which form part of the verbal communication provide the

categorical content. In combining both the image and the linguistic segments McNeill and Duncan infer that the thinking in which the downward movement of the ball due to an action performed by an agent is central. They argue that this imagery is central for it grounds the linguistic categories in a specific visual-spatial context. The downward motion of the gesture is a specific visualisation of the verbal utterance 'down' whilst the linguistic categorization, they argue, is also crucial for it "brings the image into the system of categories of the language" (2000:145).

McNeill argues for an independent system for gesture and verbal communication justifying this proposition with evidence to show that growth points resist forces trying to divide the gesture from the verbal communication. Evidence McNeill puts forward is firstly, that when verbal communication is disrupted in terms of speech-timing, the speech-gesture synchrony remains intact: the growth point is resistance to interruption during the unpacking of the global imagery and linguistic categories. Secondly, the proposition that clinical stuttering does not divide the gesture from the verbal communication, and, lastly, that when interacting with someone who stutters, an individual is unable to state whether a specific piece of information was conveyed in gesture or in verbal communication.

In his study of the role of gesture with verbal communication, McNeill suggested that it is important to bear in mind that gesture forms often overlap and that any one gesture, depending on the verbal co-text, can take on multiple forms. With this in mind, he suggests classifying coverbal gestures according to the different 'dimensions' they carry (2000:41) in relation to verbal communication. His classification is composed of iconic gestures, metaphoric gestures, beats, and deictic gestures.

Iconic gestures are described by McNeill as representations of an action or object and have a very direct relationship with the semantic content of a verbal utterance. Butterworth and Hadar (1989) suggested that such gestures were used when individuals had a problem with lexical retrieval in the verbal communication and that these gestures helped to facilitate the lexical search. This was revoked by Nobe (1996 as cited in Stam and McCafferty, 2008) who claimed that individuals, whether they are facing problems with lexical retrieval or not, can exhibit iconic gestures. This notion was supported by Beattie & Coughlan (1998, 1999) who showed that lexical retrieval problems are not the sole reason for iconic gestures.

Metaphoric gestures can also be termed as iconic gestures. However, here McNeill's distinction lies in whether the gesture forms an abstraction in relation to the verbal communication or not. Metaphoric gestures represent abstract concepts or metaphors and can be considered as specific to a culture in the sense that different languages have different metaphorical representations (Gullberg, 1998:51).

Deictic gestures are pointing gestures that refer to objects, time, places or people in real or abstract space. In comparison to iconic and metaphoric gestures, deictic gestures are not representational but rather pick out their referents through a shared spatio-temporal proximity with them (Haviland, 2000:17). The referent which they pick out is normally anchored in the verbal communication through indexicals including pronouns, tenses and demonstratives. Haviland (2000:19) shows that when a present and perceivable referent is the object of a deictic gesture, its existence, as well as its location or other features, may be taken for granted in the verbal communication.

Finally, beats are quick movements of the hand that occur at the meta-level of discourse (Stam and McCafferty, 2008:9). McNeill (2000) identifies that they accompany the syllable structure of a word in verbal communication, particularly for children up until five years of age. In general, beats introduce new characters and themes in the verbal communication and accompany repairs in the verbal communication.

Should we consider that our interest in gestures is the way in which this nonverbal communication accompanies verbal communication, it may be of interest to use McNeill's classification for it specifically focuses on coverbal gestures and the dimensions they carry in relation to verbal communication.

Gesture in Second Language Acquisition

In looking at gesture with respect to Second Language Acquisition, we can see that research has concerned both gestures made by the teacher and gestures used by learners. I turn, now, to both subjects.

Gesture in a second language classroom by a teacher is thought to create a positive atmosphere and enhance the possibility of comprehension for the learners (Stam and McCafferty, 2008:17). Tellier (2009) outlines the way in which several researchers have distinguished between pedagogical gestures exhibited consciously by a teacher to aid comprehension and personal coverbal gestures that a teacher exhibits unconsciously.

Grant and Herrings (1971 in Tellier, 2009:95) make a distinction between what they term as gestures which have an educational mode, of which the aim is to transmit the meaning of interactions and to manage these interactions, and gestures which have a personal mode in that they have no intended educational value. The authors divided pedagogical gestures (educational mode) into three categories based on their function of conducting, acting or wielding. Conducting gestures served to organise and manage participation within a class and to obtain learners' attention. Acting gestures were exhibited to clarify a meaning by highlighting a specific word or phrase in an illustration of a specific concept. Wielding

gestures were those which were connected to interacting with the pedagogical material. For example, the gesture of writing on a whiteboard, the gesture of activating a tape recorder or distributing documents to learners.

Beattie (1977 in Tellier 2009:95), also concerned with teachers gestures, made a similar classification, distinguishing between pedagogical gestures which were used to demonstrate the meaning, gestures with an interactional function which are used to promote and manage dialogue and gestures with a personal function which he deemed as having no educational aim.

In the field of SLA, several researchers have shown the importance of pedagogical gestures for learners' target language development. Firstly, much research has focussed on the facilitation of lexical acquisition by learners when teachers used gestures which have an illustrative function (Lazaraton, 2004, Kellerman, 1992). In the research, gestures have been shown to help learners to understand the nuances of lexical items, facilitate the comprehension of new lexical items, reinforce the verbal message through illustration and reduce ambiguity. Much of the research into gestures to aid lexical acquisition has focussed on emblems. A study by Allen (1995) showed that language students who were exposed to emblems during the teaching of vocabulary retained more of the lexical items than learners who received only a verbal presentation of the items.

Tellier (2009:89) suggests that a teacher's use of emblems differs with relation to the level of the learners. She proposes that with elementary learners iconic and emblematic gestures are often used in order to help the learner access a meaning and, indeed, a teacher specifically uses nonverbal communication to help the learners access meaning. However, when learners have reached a more advanced language level, Tellier suggests that the teacher uses less explicit gestures which are more in line with gestures found in everyday communication. Tellier's suggestion supports that of Allen who suggested that "physical demonstration is important for learners in lower-level classes" (2000:169). In her study, Tellier concludes that a teacher adapts his/ her gestures and nonverbal communication in a similar way in which s/he adapts her language level to meet the language level of the learners. Adam (in Stam and McCafferty, 2008:1998) shares this point of view. Adams suggests that gesture may help learners to process information in the target language in a similar way to *foreigner talk* whereby the speaker emphasises salient aspects of the target language in an attempt to accommodate a perceived lack of proficiency.

From a learning perspective, gestures have been studied from many different approaches. In no particular order, these include the comparison of natural learning environments for the acquisition of gestures by L2 learners with the acquisition of gestures by

L1 learners; the comparison of rate of gesture in a L1 and L2; the use of gestures to establish time relationships in the L2; the use of gestures to overcome communication problems in the L2 and finally, the possible cognitive developmental roles of gesture in SLA. I turn briefly to studies that have been conducted from these approaches.

Studies by Mohan and Helmer (1988) and Jungheim (1991, 2006) have investigated the acquisition of gestures by L2 learners through exposure to the target language in naturalistic contexts in comparison to the acquisition of L1 learners. Mohan and Helmer (1988) found that learners exposed to English from an early age in naturalistic contexts understood emblematic gestures to the same extent that L1 children of a similar age did. A similar study by Jungheim (2006) concerning adult learners of Japanese, learning in naturalistic contexts, in comparison with L1 language users, also drew the same conclusions.

In comparative studies of gesture use in learners L1 compared to their L2, research has shown that learners use more gesturing space in their L2 than the L1 (Kita, 2005 cited in Yoshioka); that individuals gesture more in their L2 (Gullberg, 1998, Stam, 2006) and that in the early stages of acquisition, learners are often overly explicit in terms of their gestures even when referents have been established. Some research has found that these gestures were found to frequently accompany verbal communication rather than be used as a substitute for verbal communication when communicative difficulties arose. Indeed, McCafferty and Ahmed (2000) have shown that learners did not rely uniquely on the nonverbal gesture mode when uncertain of a lexical item, but rather used verbal communication in association with gesture and that gesture was exhibited to show the individual's intentionality onto the words in order to help facilitate understanding by an interlocutor. Contrary to this, Gullberg (1998) has investigated the use of gestures as communication strategies to deal with problems including clarifying problems of co-reference, to signal lexical searches and to change topic without resolution of the previous topic.

In establishing co-reference, other studies (Gullberg 1998, McCafferty, 2004) have shown the use of metaphoric gestures and deictic gestures by learners wanting to establish relationships in time but who lack the linguistic markers to do so verbally. Studies have shown that learners used metaphoric gestures to position people and events in their communication in space as a strategy to complete a verbal utterance void of time markers and then later refer back to this positioning within time using deictic gestures.

Lastly, an area of research within SLA and gesture has focussed on the possible cognitive role of gestures in SLA. Researchers have been concerned with whether a shift in thinking-for-speaking (Slobin, 1991) takes place as a result of learning a second language. For example, these studies have looked at whether there was a shift in the type of gesture used

when learners had a satellite-framed language as their L1 but were learning a verb-framed language. In satellite-framed languages, e.g. English, path and manner tend to be expressed in gestures whereas in verb-framed languages e.g. Spanish, gestures concentrate on path alone. Studies have been conducted into whether as L2 language proficiency develops learners produce, or not, gestures which are more in line with the thinking-for-speaking patterns of the target language. Currently, the research shows mixed results. Studies including those by Kellerman and van Hoof (2003) and Negueruela *et al.* (2004) have not shown any recorded shift in gesture in the L2, whilst others (Stam, 2006) have shown the contrary.

To summarise, gesture has been studied in the field of SLA with relation to communicative functions of gesture (both for teachers and learners), cognitive functions of gesture and acquisition of gesture through exposure to the target language in naturalistic contexts. Some of this work has considered the possible interplay between verbal communication and gesture for second language learners.

Gesture in Computer Mediated Communication

Much of the work into the relationship between gesture and verbal communication in Computer Mediated Communication comes from the field of Computer Supported Collaborative Work (CSCW). As Goodwin and Goodwin note,

Traditionally, work on gesture in interaction (and deixis in linguistics) has drawn a bubble around the perimeters of the participants' bodies. The body of the actor has not been connected to the built world within which it is situated (Goodwin & Goodwin, 1992:37 in Fraser, 2000: 25).

One area which considers objects in the local environment, and their relationship with and relevance to both verbal and nonverbal interaction is the domain of Computer Supported Collaborative Work. Of particular interest within this domain is to understand how verbal communication and nonverbal communication are used to facilitate interaction in what have been termed 'collaborative physical tasks'. Kirk, Rodden & Stanton Fraser (2007) describe collaborative physical tasks as a general class of 'mentoring' tasks in which "one person generally manipulates objects with the guidance of one or more other people, who frequently have greater expertise about the task" (2007:1). The interplay between verbal and nonverbal communication is of interest within this domain in order to explore how remote gesturing devices can facilitate interaction. The belief is that by developing deeper understanding of the interaction, improvements can be derived for the design and future deployment of remote gesture technologies. Although the domain of research is concerned with computer supported collaborative work, it is necessary to turn, firstly, to studies which do not rely on computer

communication to understand how these have informed studies in which the communication is mediated by computers.

In a paper by Fussell *et al.* (2004), the authors describe, at length, the type of interplay between verbal and nonverbal communication in collaborative physical tasks that are accomplished face-to-face and where they argue that "people can readily combine speech and gesture because they share the same physical space" (2004:280). The authors discuss that the use of verbal communication during collaborative physical tasks centres around the identification of target objects to be manipulated, descriptions of the actions to be performed on these objects and the confirmation that the actions have been performed successfully (2004:275). The authors go on to describe that as collaborators speak, gestures are used to clarify or enhance their messages. Figure 6 summarises their work into how they believe gestures are used.

Type of Gesture	Definition	Possible Functions
Deictic (Pointing)	Orienting a finger or hand toward a point in the environment	Reference to objects and locations
Concrete representational Iconic representations	Forming hands to show what a piece looks like, or to show how two pieces should be positioned relative to one another	Reference to objects, procedural instructions (particularly orientation), descriptions of task status
Spatial/Distance	Indicating through use of one or both hands how far apart two objects should be or how far to move a given object	Procedural instructions, descriptions of task status
Kinetic/Motion	Demonstrating through use of hands what action should be performed on a task object	Procedural instructions

Figure 6: Gesture types Fussell *et al.*(2004)

Fussell *et al.* state that pointing (deictic) gestures, which they describe as typically being when a person motions using his or her hands with one finger extended and the others curled inwards (2004:279), are used to refer to objects and their locations, accompanying verbal communication such as "put that piece over there." The authors also focus on the utilisation of what they term as 'representational gestures' to represent the form of objects, the spatial relationship between objects and the type of action that should be performed. They focus on three types of concrete representational gestures. Firstly, iconic representations, for example, an individual may tell another to "pull it out slowly twisting it" and at the same time use his or her hands to indicate the direction in which to turn the object. Secondly, spatial gestures, which involve playing two fingers or two hands a certain distance apart to reflect the actual

physical distance between two objects. Lastly, the authors quote the importance of kinetic gestures, equivalent to McNeill's definition of beats, in which the speaker uses the tempo and motion of the hands to specify the manner of motion.

Studies by Fussell, Kraut & Siegel (2000) and Fussell *et al.*, (2004) investigate to what extent the interplay between verbal and nonverbal communication which they notice in face-to-face collaborations can be exploited when the participants use tools that combine embodiments of gesture with live video feeds. In an initial study in 2000, the authors concentrated on a bicycle repair task in which the person who was manipulating the bicycle wore a head camera which was displayed on a monitor to the expert helping this person to repair the bicycle (see Figure 7).



Figure 7: Bicycle repair task

In this study, the authors showed that, as in face-to-face tasks, when verbal communication was used to reference objects this was often accompanied by a deictic, pointing gesture whereas when the verbal communication concerned descriptions of actions to be performed on the task object, this was often accompanied by iconic gestures. Indeed, 52 per cent of all the references made by the expert were accompanied by a gesture and 10 per cent of the verbal references made to a specific part of the bicycle, by the participant who was repairing the bicycle, included a deictic gesture.

A further study by Piwek (2007) also considered the interplay between verbal and nonverbal communication in collaborative physical tasks and specifically considers deictic gestures, which he terms as 'pointing acts'. Piwek (2007) set out to investigate whether nonverbal means of referring to objects used in physical collaborative tasks were secondary to verbal means as suggested in previous research by Lester *et al.* (1999 cited in Piwek 2007) who stated that participants only include a pointing act if a pronoun cannot be used to refer to an object, and Classen (1992) who concluded that pointing acts were used only when no purely verbal means of identification of an object could be found.

Piwek's investigation involved a corpus of twenty dialogues between Dutch speaking participants. The dialogues were recorded during a task in which the participants adopted two roles, either that of Builder (on the right in Figure 8) or Helper (on the left in Figure 8). The aim was for the Builder to build a structure in the workspace that is a copy of the example structure that was given to the Helper. Only the Helper could see this example structure but both participants could see the structure that the Builder was constructing.



Figure 8: Configuration of Piwek's study.

From Piwek's analysis of the video corpus compiled from the investigation, he concluded that nearly half of all referring acts to objects included a deictic gesture. This suggests that the nonverbal mode of communication was not simply a fall-back strategy. He also concluded that when a deictic gesture was used, the number of linguistically realised properties in the verbal communication was lower than for purely verbal communications alone. Piwek also noticed that the speakers more frequently used a deictic gesture when the object being referred to had not been referred to in a previous utterance or was not adjacent to an object which had been referred to in the previous utterance. Lastly, Piwek concluded that the participants were more likely to use a deictic gesture if the Helper was instructing the Builder to manipulate the object. The author concluded from this investigation that the nonverbal means of referring to objects was not secondary to the verbal communication and rather that the choice regarding whether to point or not preceded the choice of the verbal means of reference.

Studies in the Computer Supportive Collaborative Work, including those of Fussell *et al.* (2004) and Piwek (2007) have highlighted the use and communicative role of gestures in collaborative work. Such studies have informed both the design of computer interfaces to support collaborative distance work and further studies examining the roles of verbal and nonverbal computer mediated communication.

One such study was undertaken by Fraser (2000). His research concerned *Furniture World* a synthetic world developed at the University of Nottingham in which multiple participants may communicate synchronously using audio and with 3D graphics. The users have the ability to manipulate virtual objects and are represented as avatars. The synthetic world was developed with input on the design and development from Fraser.

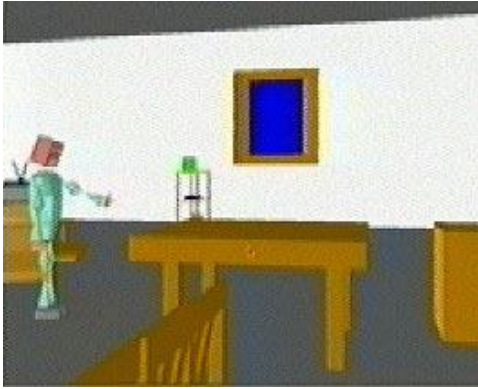
The aim of Fraser's study was to analyse ways in which the features of the virtual environment manifested themselves in participants' distributed interaction (2000:7). He studied this through a task in which participants had to collaboratively position furniture within a room, agreeing on a single design (see Figure 9). Six trials concerning two participants and two trials concerning three participants were conducted. Fraser's analysis included looking at how vocal and nonvocal⁷ methods of communication rendered features of the workplace invisible.



Figure 9: Furniture World

Fraser's investigation showed that pointing was a device which was used by the avatar users within the task. First of all, there was evidence to show that pointing gestures were used accompanying verbal communication to successfully encourage participants to look at an object with another participant, as shown in Figure 10.

⁷ Fraser's terminology for verbal and nonverbal communication.



K: It's this table I'm talking about. this one yeh?

((K Points))

S: Yeh.

K: Can you see me point?

S: Yeah, it's the one in front of you isn't it.

Figure 10: Sarah's view as Karen points with accompanying dialogue

Fraser suggests that the combination of a deictic gesture with verbal communication allows the user to relate or connect the gesture to the object being referred to in the verbal communication and that it is this connection which gives sense to the utterance and to the object as being relevant. This was the case when two participants shared the same view. However, Fraser goes on to show that, when participants did not share the same shared visual space, verbal communication took on a new role; that of making the visual conduct more explicit. Fraser shows that the participants tended to engage in prefatory sequences of verbal communication and reference in which the identity of an object was secured and that, during this stage, the participant wishing to make a certain object relevant attends to the difficulties the other may have in viewing or as Fraser puts it 'finding' their gesture. The participant who displays a deictic gesture is aware that the other may not be in a position to see their avatar or the object on which they are acting and, thus, employs certain practices in order to aid co-participants to coordinate their actions (2000:91) as shown in Figure 11.

T: Th-the door's in front of me.

A: Oh right.

T: Over here, can you see that?

((T points towards the door))

A: I'm coming ((A rotates))

T: Hang on ((T re-positions gesture))

A: Yeah, okay, I got the door.

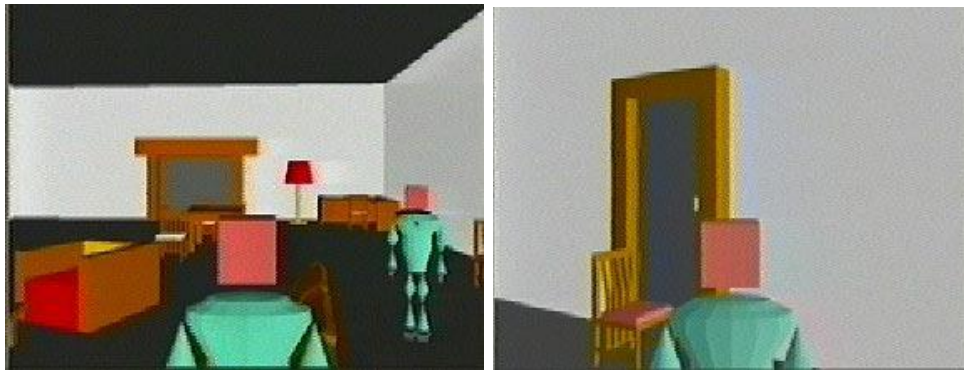


Figure 11: Participant A's view (left) and participant T's view (right) with accompanying dialogue (From Hindmarsh *et al.* (2000:23)).

In this example, the participant A is not able to see his co-participant point something out. Perhaps to compensate, he talks the participant through what he is doing and what he can see. In pointing to the door, participant T turns around and cannot see participant A nor whether he is attempting to look for the door. Participant A thus makes this explicit in the verbal communication ("I'm coming"). In attempting to design their nonverbal referential actions for each other the co-participants, the participants cannot turn to view their participant's response to a gesture for they cannot point and turn their avatar simultaneously. Participants, thus, use verbal communication alongside nonverbal communication to monitor the activities of others.

In this section, we have seen how gesture and interaction have been connected to the built world in which interaction is situated (in face to face circumstances) and to a synthetic world in which interaction is situated. In such situations, coverbal gestures have been identified, although the role of the verbal communication in the latter has been seen to take on a different role dependant on i) whether the participants have shared visual access, ii) the

extent to which they can determine if there is shared visual access or not and iii) the limitations of the interface the participants used.

3.5.Choice of terminology and conclusion

In this section, I have explored some of the different facets to nonverbal communication, with respect to the communication environment and a communicator's behaviour. I examined research into the links between verbal and nonverbal communication, the role of nonverbal communication in Second Language Acquisition and the studies into nonverbal communication that fall into the domain of Computer Supported Collaborative Work. In terms of choice of terminology, I have suggested that it is preferable to adhere to the proposition of Burgoon (1994 in McCafferty and Stam, 2008) and refer globally to nonverbal 'behaviour' as *nonverbal communication*, considering the idea that any body movement, performed unconsciously or unintentionally, could still qualify as a message.

Within the nonverbal mode, in this thesis, I will refer to the modality of proxemics, with respect to the communication environment, as being an individual's use of space to communicate and how this use of physical space impacts on the behaviour of the individuals involved in the interactions. With respect to a communicator's behaviour, in the proxemics modality, I will refer to the term *gaze* as the fact of looking at someone in-or between- the eyes, or more generally in the upper half of the face.

Considering nonverbal communication that involves the movements of the hands and arms (*gestures*), in order to distinguish between nonverbal communication which is produced consciously or intentionally by an individual and which the individual performs with the intention that the gesture will serve a role in the communicative exchange between the individuals, I propose to refer to these gestures as *communicative gestures*. I will oppose this term with *extra communicative gestures*; movements of the arms and hands that an individual performs unconsciously or unintentionally and, thus, may be eliminated from the communicative exchange by the receiver but which, if not eliminated, may still qualify as a message.

By way of a short concluding statement to this chapter, studies into nonverbal communication touch a range of domains including anthropology, philosophy, language sciences, second language acquisition, computer-mediated communication and computer supported collaborative work. Cross disciplinary studies are beginning to appear, in the sense that research is starting to take an interest in the links between verbal and nonverbal computer-mediated communication. It will be necessary to draw on a range of domains when

considering the verbal communication and nonverbal communication within a synthetic world environment. This chapter has served as a preliminary literature review enabling the exploration of some of the current approaches from different domains which contribute to the analysis section of this thesis.

Chapter 4. Verbal mode

4.1. Introduction

This chapter introduces the verbal mode in synchronous computer-mediated communication. Firstly, I examine the two modalities that form the verbal mode in CMC: the audio modality and the textchat modality, and introduce some of their characteristics. Secondly, I define verbal participation, which is a central theme to this thesis, and outline some of the studies which suggest that one affordance of CMC tools for language learning is that they help increase learners' verbal participation and also democratise student-teacher participation. I also discuss a study which suggests that these results are not simply due to the CMC environments. Thirdly, I review studies that suggest the audio and textchat modalities in CMC environments can support verbal production (proficiency) because interactions in these modalities provide opportunities for learners to notice errors as a result internal feedback, or as a result of implicit or explicit external feedback which leads to negotiation of meaning or offers corrective feedback. Although only one study outlined in this chapter concerns synthetic worlds, the focus of this PhD study, the literature review presented informs the study by illustrating ways in which the verbal modalities in a CMC environment may help support learners' verbal participation and production.

4.2. Modalities in the verbal mode

In this section, I introduce the two modalities that are present in the verbal mode in CMC environments; the synchronous audio modality and textchat modality, and introduce characteristics specific to these modalities.

4.2.1. Synchronous audio modality and characteristics

CMC tools offer the possibility for synchronous oral communication in the audio modality. In Cziko & Park's (2003) review of six CMC tools offering internet audio communication, the authors describe that all of the audio tools reviewed included a textchat modality as well as an audio modality. This is also evident in Ciekanski & Chanier's (2008) classification of online audio environments into audio-synchronous environments which

combine audio and textchat modalities, video-conferencing environments which combine audio, textchat and video, and audio-graphic conferencing environments which integrate audio, graphics and textchat. In this section, I review the characteristics proper to the audio modality, before in section 4.2.2 turning to the characteristics proper to the textchat modality.

Different possible configurations of the audio modality

The audio modality in CMC environments allows users different configurations of the audio modality. The audio modality may be half-duplex, in that only one speaker may speak at a time, or it may be fully duplex allowing speakers to intervene in the oral communication as they wish, thus allowing for overlaps in the interaction with multiple speakers participating at once.

In half-duplex systems, an 'interrupt' or 'hands up' button is often available to signal to the person speaking that another participant wishes to take the floor. In full duplex systems, iconic buttons may also be available for users to signal to others that they wish to take the floor. For example in the system *Adobe Connect* (Adobe, 2006), a hands-up icon can be used to signal that a user wishes to respond to something being said. Other icons are also available to signal to the speaker that s/he is speaking too quickly, slowly, quietly or loudly or to signal that a user agrees or disagrees with the speaker.

As Cziko & Park (2003) explain, these choices of one type of audio modality over another will depend on user preferences and the ability of the CMC tool to maintain high-quality audio if the more demanding full-duplex modality is offered. In CMC environments which offer half-duplex audio configuration, a queuing system is often included. This may either include the automatic allocation of the floor with the audio modality being opened automatically for the next speaker in the queue, or it may require a chairperson to distribute the floor space between the participants.

4.2.2. Synchronous textchat modality and characteristics

Synchronous textchat has been described as an "umbrella term" (Bower & Kawaguchi, 2011:42) which includes types of technologies that allow users to transfer text messages between different computers quasi instantaneously. These include chat rooms which can accommodate numerous users online, meeting either by invitation to a private chat room or by

accessing a public chat room; instant messaging programmes which allow invited users to connect online; and synthetic online environments which allow users to communicate via textchat, including audiographic environments, videoconferencing environments and synthetic worlds. This section describes some of the general, non-pedagogical, characteristics of synchronous textchat.

Typical visual presentation of synchronous textchat environments

Kötter (2003) describes that synchronous textchat is normally accessed through an interface comprised of two separate windows: one small window placed at the bottom of the screen and another larger window at the top of the screen (see Figure 12). The smaller window (2) allows users to enter their text-based messages using a computer keyboard. The larger window (1) displays the interaction between participants and some of the interactions between an individual participant and the computer text-based software. For example, the software may notify all users of an individual's arrival into or departure from the interaction space. A characteristic of synchronous textchat is that a username is chosen for the particular purpose of communicating within the environment. This is often a pen name or an email address.

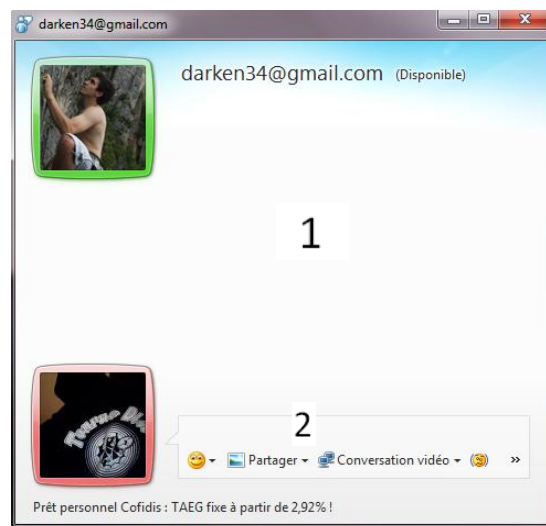


Figure 12: Typical visual presentation of synchronous text-based computer mediated communication environment

Discourse structure in synchronous textchat

Anis (2003), describing the characteristics of synchronous textchat suggests, firstly, that messages cannot be longer than three lines and as a general rule do not exceed one line. Secondly, he underlines the brief nature of the way in which the communication is organised whereby turns in the synchronous textchat file past in the larger visual display window at a rapid pace. Cosnier and Develotte (2010:40) suggest that this characteristic is an effect of the techno-pragmatic conditions of textchat. As a user cannot read another user's message during its elaboration, users tend to reduce the length of messages so that their interlocutor does not have to wait too long to receive these. A user will send parts of the overall utterance or message as s/he constructs the message, resulting in split conversational turns. Holmevik and Haynes (2000 cited in Kötter, 2003) describes the phenomenon of using strings of full stops to break up whole utterances into short split turns in order to display that the utterance is incomplete.

Cherny (1999) suggest that in textchat there are two possible modalities of usage (see Section 2.4): the 'say' and the 'emote'. Either a user can 'say' something by typing, or the user can communicate in the verbal modality nonverbal actions or narrative information by typing an 'emote'. Cherny (1999) in her two-year long study of a multi-user dimension (MUD) evokes four types of emotes which are frequent in textchat interaction and which use the simple present tense. These are summarised in Table 2.

Type of utterance using the present tense	Sample utterance
conventional actions	Henry waves
back channels	Lucy nods
by-play	Sarah is LOL
narration	John packs his suitcase

Table 2: Categories of emotes using the present tense according to Cherny (1999)

The first category of emotes, according to Cherny, draws on conventional actions including those of greetings and leave-takings. Cherny describes that in opening sequences the communication norms of the MUD community suggest that a user should make himself or herself known by waving (e.g. typing 'Henry waves') and then saying 'hello' (1999:203). Users who do not follow this ritual will be seen as not interested in participating in the interaction. In Cherny's second category of 'back channels', the simple present tense, combined with a user's name is also used to describe user gestures, e.g. Lucy nods, or Naomi giggles. Cherny suggests that because in the MUD the communication is limited to one modality there results

a reduced sense of social presence. Adopting descriptions of gestures to react to the interaction within the environment goes some way to increasing the sense of social presence. Users also signalled their attention to the interaction by describing imaginary actions in real life. For example, 'Sarah is LOL (laughing out loud)'. Cherny describes such turns as pertaining to the category of 'by-play': they are often humorous or teasing in nature. Lastly, within the category of 'narration', users employ the present simple tense, again often with their user name, to describe non-imaginary events in the first world. It is suggested that this results from a need to explain: i) why a user is distracted and not interacting, ii) the lack of a rapid reply or iii) a departure from the interaction within the MUD. In messages of this type, e.g. 'John packs his suitcase' or 'Sarah takes a nap', the present simple tense is often employed as if the action is simultaneous or as if the events have already occurred in the first world.

In Cherny's study, she also remarks that utterances which pertained to a user's beliefs, attitude or background (termed as 'exposition') often showed first person speech-like properties whilst containing second person pronouns. She quotes the example of 'Tom hated that movie' (1999:202) and describes that utterances of this type are not tense-dependent. Cherny's work on speech routines within a MUD was one of the first in-depth studies to show how the discourse in a textchat differs from face-to-face spoken discourse and written discourse.

Typographic features of synchronous textchat

Various studies have looked at the enriched typographic features of synchronous textchat. Marcoccia (2004) outlines several of these characteristics. He describes the use of 'expressive punctuation.' This phenomenon has also been described by Werry (1996 cited in Peterson, 2006). Punctuation is described as used for its expressive, emotive or affective values and these are often expressed through the duplication or repetition of the same punctuation mark. Marcoccio describes how this usage draws upon writing conventions which are used, for example, in fiction, when spoken speech is described in a written format.

Marcoccia (2004) and others, including Tella (1992 cited in Kötter, 2003), also depict the use of capital letters in textchat. Tella describes the use of blocks of capital letters to underline certain parts of messages. A phenomenon which Marcoccia explains is used to represent para-verbal elements and amplify their importance within the message: block capitals are the equivalent of shouting.

Several studies have looked into the use of emoticons in synchronous textchat (cf. Chapter 3). In the literature, these are often described as compensating for the absence of paralinguistic cues such as gestures, facial expressions or intonation. These authors believe that including such features in the interaction is a means by which to "speak orally using writing⁸" (Marcocchia, 2004:1). In Marcocchia's (2007) analysis of the usage of emoticons in CMC, he identifies four functions, as summarised in Table 2.

Emoticon function	Usage
expressive function	- to add information about the emotional state of the message's author which is not accessible by the message's verbal contents - to render explicit an emotional dimension of the message when the verbal contents of the message are open to several interpretations - to reinforce the expressive value present in the verbal contents of the message
marker of irony or humour	-to render the message unambiguous by showing that it is ironic or humoristic
interpersonal function	-to suggest a relation of familiarity with the interlocutor -to increase the proximity between the interlocutors
politeness marker	-to lessen the hostile or menacing nature of the verbal contents of a message -to serve a role similar to that of intonation or gesture

Table 3: Functions and usage of emoticons as forwarded by Marcocchia (2007)

Lastly, Anis (2003) describes the enriched typographic features of synchronous textchat that include the possibility to use colour, bold and italics within messages.

Classification as an oral or written genre

Anis (1998), during his study of the Minitel system in which users could receive and send written messages quasi instantaneously, proposed the terms 'interactive writing' and 'interactive texts' to characterise both the relationships established between the system, and the users but also the relationships established by the system between the different users: the system, at that time, being simply a central server (Mangenot, 2009). Anis (1998) suggested that Minitel had created a new hybrid form of communication between written and oral communication which he termed 'dynamic writing' (Anis, 1998:163). He suggests that

⁸ "Faire du face à face avec l'écrit". My translation.

because the written language was produced quasi instantaneously it played a similar role to that of spoken language and often the users of the system tried to mimic the spontaneity of spoken language and adopted an improvised writing style. In his later work, Anis (2003) suggests terming textchat as 'scriptural electronic communication.' Although this term takes into account the written nature of the communication that, due to numerical coding, can be communicated electronically, Anis (2003) does not specify whether the communication is asynchronous or synchronous. Thus, this term encompasses asynchronous forms of communication including email and short message services. Furthermore, terming text-based communication as scriptural, i.e. written, places the emphasis on the technology rather than the discourse style.

Indeed, furthering Anis' work and description of synchronous text interactions as a hybrid form of communication, certain studies have suggested that there is a stronger resemblance to spoken language in synchronous textchat than to written language. Marcoccia (2007:41) presents a balanced summary of the written or oral genre debate with respect to CMC in general. The studies he cites and their findings are summarised in Table 4.

Characteristics typical of oral communication	Characteristics typical of written communication
Types of errors made (Panckhurst 2006)	Greater usage of nouns than verbs (Panckhurst, 2006)
Predominant usage of first and second person pronouns (Yates, 1996, Collot & Belmore, 1996)	Negotiation generally respected (e.g. use of 'ne' and 'pas' in French) (Panckhurst, 1999)
Reproduction of functionalities of paraverbal and nonverbal oral markers (Marcoccia, 2000, Panckhurst, 2006)	Lexically rather than grammatically dense (Yates, 1996)
Representation of vocalisations (Yates & Orlikowski, 2003)	Type: token ratio closer to that of written than oral communication (Yates, 1996)
Repetition of segments of discourse which are commented upon, evaluated or completed (Mondona, 1999, Marcoccia, 2004)	

Table 4: Characteristics of synchronous CMC pertaining to oral and written communication (as cited in Marcoccia, 2007)

Tudini (2003a) describes synchronous textchat as "very interactive and conversational in nature" (2003a:94) illustrating how such communication data in her study contained numerous (unspoken) speech acts including greetings, leave-takings and well-wishing.

Such studies have prompted authors to describe synchronous textchat as closer to oral discourse than written communication, as a 'written conversation' (Alvarez-Mazartinez, 2007:15) or as a 'hybridisation' of written and oral genres (cf. Maroccia, 1998; Kerbrat-

Orecchioni, 2005). Due to the lack of paralinguistic cues which are available to the interlocutors it has also been suggested that this type of communication could be referred to as a 'text-mediated telephone conversation' (Toyoda & Harrison, 2002:83). Weininger and Shield (2003:329 cited in Lamy and Hampel, 2007:115) describe that the language can be placed on a continuum ranging from language of proximity to language of distance towards the 'proximate' end of a continuum.

The belief that text-based synchronous CMC strongly bears characteristics of oral communication, has led to studies concerning the negotiation of meaning which, as Lamy and Hampel (2007:115) describe was a concept hereto used only in the context of oral interaction. I discuss these studies in Section 4.4.2

4.3. Verbal participation

In this section I define verbal participation before turning to studies that focus on verbal participation in CMC environments with relation to L2 learning.

4.3.1. Defining verbal participation

Verbal participation can be calculated using the number of verbal acts that a participant contributes within the interaction. It can also be determined by the total length of the verbal acts which a participant contributes, or to contrast one participants' participation with another participant's, by the percentage of floor space each participant occupied. The unit chosen to describe interaction in this thesis is the 'act', which emphasises the functional action of different units within the interaction. In the verbal mode, an act in the textchat modality is considered as a published entry in the textchat window. An act in the audio modality is defined by when there is a change of speaker in the modality. We (Wigham & Chanier) consider the floor space as the sum of the total length of all acts within a specific mode or modality for an individual actor with reference to the total length of all acts communicated in this mode or modality (including silence for the verbal mode) by all participants present. This allows the calculation of the percentage of interaction time that a participant occupied in a given mode or modality.

In this thesis, I understand the term 'support verbal participation' as ways in which verbal participation can be increased.

4.3.2. L2 Verbal participation and the textchat modality

A central focus of research into the verbal mode in CMC with relation to L2 learning has been on participation or who is communicating with whom and what amount of communication is occurring. In particular, participation studies have focused on quantifying the frequency of participation and number and lengths of turns to study:

- the degree of participation in CMC interaction compared to face-to-face classroom environments,
- the extent of democracy and equality in CMC participation.

One of the first studies to be published concerning L2 learners' verbal participation using a CMC tool was Chun's (1994) longitudinal study which concerned whole-class discussions using textchat. The participants were first-year University students of German and their teacher. The study suggested that CMC could modify classroom interaction and that by encouraging students to interact with each other, the pedagogical interaction became less teacher-centred. Student participants interacted more equally with a higher number of student-to-student interactions than student-to-teacher interactions, due to students initiating interaction by addressing each other directly with statements and questions. Chun's data showed that in a total of 14 sessions consisting of 899 textchat acts, 354 acts were statements and questions addressed by a student to students and only 46 acts were statements or questions addressed by the teacher to the students. Furthermore, in the data, 95 textchat acts were students introducing a new topic of their own accord. Chun (1994) also showed that the students relied less on their L1 and used a wider range of discourse functions than in face-to-face communication.

Findings from Kern's (1995) study with first-year students of French were similar to those of Chun (1994). His study, which investigated the quantitative differences in participation between an online discussion using *Interchange*, a CMC environment and an oral class discussion, showed that student participation was more balanced in the *Interchange* sessions. Participants contributed more textchat acts to the discussion, involving more sentences and a higher mean of number of lexical items than in the oral class discussion. Student floor space represented between 85-88% of the total floor space during the online exchanges compared to 37-60% of the floor space during in-class discussions. As in Chun's (1994) study, the interaction was less teacher-centred in the verbal mode in the CMC environment compared to the face-to-face environment. In the CMC sessions, teacher-student

exchanges were in the minority and student-student exchanges were more frequent, which Kern describes as making for levelling of authority and greater democracy. Kern also showed that the type of interaction changed. Using the CMC technology, students used a wider range of discourse functions including questions which in the face-to-face sessions were reserved to teachers only.

It is also suggested that not only does the balance between the teacher and the student floor space change (the 'levelling effect' (Kelm, 1992)) with CMC tools but also that the environments allow shy students to take the floor. Warschauer (1996), for example, in testing the claim that CMC results in more equal verbal participation than face-to-face interaction studied interactions between learners of English at a Hawaiian university. His results showed that the four quietest members of the class in the face-to-face interaction increased their verbal participation considerably in the CMC environment. Whilst in the face-to-face discussions these students accounted for 1.8% of the total verbal floor space, in the CMC discussions their floor space increased to 17.3%. The more dominant speakers in the face-to-face discussion, however, decreased their participation so that it was of a more equal level.

Chun (1994) also found similar findings concerning students who were passive / reticent to participate verbally in the face-to-face environment but who participated more frequently in the CMC textchat environment. She equally suggested that the textchat modality could encourage learners to overcome shyness because it is perceived as less threatening than face to face interaction and thus that students feel more at ease to take participate verbally. One reason may be because audio-synchronous environments are 'faceless': social cues are reduced because no facial expressions or body language are available, including in textchat environments the social cues of pitch, tone and intonation. Hoffman (1996), thus, suggests that as well as being 'faceless', these environments are 'face-saving': learners are relieved of their inhibitions and can express themselves more freely.

In contrast to the studies discussed above, a study by Fitze (2006) suggests that it is not the environment which produces a change in verbal production but rather that other factors contribute to these results. His study compared face-to-face with textchat conferences and concerned advanced learners of English. The learners were divided into two groups and the study was conducted over a period of four weeks. Fitze found that there was no statistically significant difference in the total number of lexical items that the students produced in an equivalent amount of time in the two discussion environments. The interaction in the textchat environment displayed a greater lexical range and more interactive competence, suggesting

that the students could practise a greater range of vocabulary related to the discussion topics in the textchat environment. However, whilst for one group participation in the textchat environment was more balanced in terms of floor space between the participants compared to the face-to-face interaction, for the second group participation was equally balanced in both environments. Considering Fitze's groups were similar in terms of student numbers, gender, language and cultural background, he concludes that other, unknown factors may have influenced the variables that mediate balanced participation and suggests future studies must address factors such as speaking fluency and introversion.

One suggested reason for the more 'egalitarian' nature of verbal interaction in textchat environments is that the synchronous CMC tools have 'fairer' rules concerning turn-taking to those found in face-to-face classrooms (Kelm, 1992; Kern, 1995). The textchat acts of all the participants are treated as equal by the software which regulates the turn-taking and, in the textchat modality, participants do not need to wait to take the floor meaning that they have the possibility to contribute more often. Unlike in face-to-face interaction where, if one individual dominates the floor space, other individuals may be excluded from the interaction, in interaction in the textchat modality, because participants do not need to wait until another participant cedes the floor to participate, it is "the most interesting and relevant ideas, not the loudest voice, [that] attract[s] the attention" (Smith, 1998 in Kern, 1995:459).

The bi/multi directionality of the communication in the textchat modality is of interest for L2 learning. There can be coexistence of a variety of topics during the same discussion because participants can respond differently to the same utterance, leading to different micro conversations around the same topic. Noet-Morand (2003:392), terming this 'conversation doubling', illustrates this in her study of distance learning of French as a foreign language with the extract shown in Figure 13.

<77>marielies : qu'est ce-que vous faisez pendant les vacances? <81>amazine : Qu'est-ce que vous faisiez ou qu'est-ce que vous allez faire?		
<83>Svetlana : moi,je reste à Fribourg.		<82>Isabel : malheureusement je dois travailler pendant les jours de paques <85>Isabel : mais il me reste au moins un jour pour aller skier
<90>Caroline : moi aussi, je rentre à la maison seulement pour le weekend de paques, c'est aussi mon anniversaire, et après retour en suisse pour travailler à montreux et preparer des travaux pour le cerle et pour l'université		<86>marielies : Isabel qu'est ce-que tu vas travailler? <89>Isabel : je travail au Migros à Lucerne. Les express ont ouvert 365 jour par an <97>amazine : Où allez-vous skier Isabel? <102>Isabel : j'irai à Arosa. Ma soeur habite à Choire momentanement et va me joindre ce jour là <105>amazine : C'est dans quel canton Arosa? <109>Isabel : au canton de grison (merci le dictionnaire, smile)
<95>amazine : Qu'allez-vous faire à Montreux Caroline?	<96>Isabel : caroline, quel age tu fêteras ?	
<106>Caroline : alors, je travail chez un bureau de pub wui organise le festival de pub à montreux en mai ; ca vut dire que je prepare les présentations et j'ecrit des dossiers pour les participants, pas de grand chose. et pour isabel : c'est mon 25...		
		<125>Svetlana : Caroline,ques-ce que tu aimrais fair dans ton anniversaire? <129>Caroline : je vais passer le jour avec ma famille - c'est le premier fois il y a six ans, parce que j'habite depuis ce temps à vienne. le matin, mon père et sa famille vont aller me chercher pour "brunch", l'après midi avec des amis et le soir, ma mère m'a invité pour dîner

Figure 13: Micro conversations (from Noet-Morand, 2003:392).

In Figure 13, we can see that an initial question by the participant *Marielies* in turn 77 asking what the other participants were going to do during the holidays leads to two micro conversations. Firstly, a micro conversation between *Sveltana*, *Caroline*, *Amazine* and *Isabel* (shown in the left-hand column) around the subject of a birthday and a second micro conversation (shown in the two right hand columns) between *Isabel*, *Marielies* and *Amazine* which after two initial turns (82, 85) which evoke the subjects of work and skiing sub-divides into two subsequent micro conversations around each topic. Yun (2009:271) argues that such interaction patterns can offer for L2 learning the possibility to enrich the exchanges by multiplying the initial topic of discussion. Noet-Morand (2003:392) also draws attention to the fact that such a pattern of interaction would be unimaginable in a face-to-face context where simultaneous turns by different participants would have a cacophonous effect.

Although several authors suggest that conversation doubling can increase interaction possibilities for L2 learners, other authors suggest that interlinking discussion threads makes following interaction difficult for learners. A study by Werry (1996 cited in Toyoda and Harrison 2002:85) suggests that the complexity of unrelated conversation threads being interwoven may lead to communication breakdown, particularly for novice users. This is also evoked by Bower and Kawaguchi (2011:51) who describe that learners who are slow typists may need to choose between multiple conversation threads for their response, whilst fast typists may be able to send several messages during this time in reply to different conversation threads.

Several studies describe learners' strategies to regulate turn-taking and overcome difficulties presented by multidirectional interactions in synchronous textchat. Alvarez Martinez (2007), in her study of exolingual exchanges in chat rooms between students with French and Spanish mother tongues, describes the students' use of 'addressivity'. When there was a variety of conversations which were taking place simultaneously, Alvarez Martinez observed that the students used the name of their interlocutor in their utterances. She suggests this led to a certain coherence, in terms of the interaction occurring in the exchange.

This phenomenon for turn-taking management is also observed in Peterson's (2006) study of turn-taking strategies of undergraduate students of English at the University of Tokyo who were working in the synthetic world *Active Worlds*, previously described in Section 2.5. Peterson lists addressivity as one of the "series of adoptive transactional strategies that facilitated information exchange under conditions in which messages are intermixed and scroll in real time" (2006:91). He identifies two systematic uses of addressivity. Firstly, to quickly find partners at the beginning of sessions (see Figure 14) and, secondly, to exchange information pertinent to the tasks the learners were completing in their L2 and to maintain contact with their partner over extended periods of interaction. For example, Figure 14 illustrates a discussion between two participants *Hana* and *Elif*. The participants' discussion uses five textchat acts. However, other users are communicating in this modality and we note that between the first and second acts of the participants *Elif* and *Hana* there are three other acts added to the textchat window by other participants. Addressivity is used by the participants to distinguish the textchat acts that are designated for their partner(s) from the acts of other participants who are also using the modality.

1. NNS 1: hi, **hana**
(3 lines of text)
2. NNS 2: Hi, **Elif!**
(3 lines of text)
3. NNS 1: I have 2
(9 lines of text)
4. NNS 1: let's talk together
(3 lines of text)
5. NNS 1: ok, **Elif!**

Figure 14: Addressivity to find interaction partners (from Peterson, 2006:91)

1. NNS 1: and what is the last thing? **samurai princess**
(2 lines of text)
2. NNS 2: okay **maria**, what didnt you get?
(3 lines of text)
3. NNS 2: Magnifying glass
(4 lines of text)
4. NNS 2: do you know what it is? **maria?**
(4 lines of text)
5. NNS 1: besides the extension cord and the comb and the bouquet
(24 lines of text)
6. NNS 1: **samurai princess?**
(7 lines of text)
7. NNS 2: its for the elder ppl, when they read newspapers and stuff, they use
this glass
8. NNS 2: **maria?**
(10 lines of text)

Figure 15: Addressivity to exchange information and maintain contact (from Peterson, 2006:91).

A second turn-taking management strategy that Alvarez Martinez identified in her corpus of synchronous textchat data showed that the learners used contact markers in their interaction. The author describes these as markers which use words or phrases which allow an author to attract the attention of the individual participant whom he is addressing and to alert them to the fact that he invites them to take the floor. In the example of an interaction in Spanish which Alvarez Martinez uses to illustrate this observation, these markers included *oye* (hey), *mira* (look), *escucha* (listen) and *eh* (hey). The author also observes the use of interrogative interpellations including *verdad* (really) and *no* (isn't it/no) which actively implied the interlocutor in the interaction. Also, the use of pragmatic connectors including *bueno* and *bien* (okay/so), which although add to the cohesion of the electronic discourse were frequently used at the beginning of a turn. In particular, the author shows an example where such a marker was used to interrupt the discourse in order that the participant could take the floor. Alvarez Martinez suggests that all the above strategies were used to compensate for the

software organising turn-taking and as a strategy which allowed participants to participate more frequently in the verbal modality.

4.4.Support for L2 verbal production

In this section, I review studies that suggest the audio and textchat modalities in CMC environments can support verbal production (proficiency) because interactions in these modalities provide opportunities for learners to notice errors as a result of internal feedback, or as a result of implicit or explicit external feedback which leads to negotiation of meaning or offers corrective feedback. I understand the term ‘support’ as ways in which conditions for second language acquisition and verbal proficiency may be promoted.

4.4.1. Opportunities for noticing

Shmidt (1990) advocated the noticing hypothesis claiming that ‘noticing’ of linguistic form aids language acquisition. He maintained that the process for explicit knowledge to become implicit knowledge is facilitated when "learners attend to linguistic features of the input that they are exposed to" (Shmidt and Frota, 1986 in Thornbury 1997). Swain and Lapkin explain that this process can be a result of external feedback from other participants in the interaction or internal feedback:

In producing the L2, a learner will on occasion become aware of (i.e., notice) linguistic problems (brought to his/her attention either by external feedback (e.g., clarification requests) or internal feedback). Noticing a problem 'pushes' the learner to modify his/her output (1995:373).

Learners can produce linguistic items which are included both in the input they receive and noticed in the output in a learner’s personal verbal productions and also those of other interlocutors.

`Self correction in the textchat modality`

A study by Pellettieri (2000) suggests that the textchat modality gives learners more time to process their language production than the audio modality. The study suggested that because learners can view their productions in the textchat, increased opportunities exist for them to monitor these, as well as those of others, and to attend to and edit their messages. This suggestion is also forwarded by Kitade (2000) who states that because synchronous textchat software allows users to scroll back through the interaction on the screen, and review their

utterances, it encourages learners to notice their errors and self-correct. In various studies, self-correction has been shown to concern typing, lexical, grammatical and pragmatic errors.

In Noet-Morand's (2003) corpus of textchat interactions, self-corrections consist predominantly of typing errors in which the inversion, omission or addition of letters mean that a word risks being misunderstood. Tudini (2003a), also reporting on the textchat modality, shows that instances of attention to form and self-repair frequently related to spelling. In a study involving students of Italian participating in a course on society and culture, she suggests that self-corrections either reflect a typing error, possibly introduced because of the speed of the interaction, or are a reflection of a learner's pronunciation problem which causes the learner to incorrectly spell the lexical item.

Kitade (2000) illustrates various different types of lexical self-correction in her study of students following an advanced Japanese-as-a-foreign-language course. The students were using a synchronous bulletin board to communicate by textchat about the progress of a group presentation. Whilst Pellettieri (2000) and Tudini (2003a) suggest that self-correction occurs when learners review their own production and notice linguistic problems, Kitade describes that self-correction can occur when a participant reviews another participant's contribution and compares it with his/her own and in doing so notices a linguistic error. Kitade (2000) provides the example shown in Figure 16, describing that student Z's utterance 'I think that's good' (in turn 3) provides input from which student B realises that he should have used the word 'dou' (what) instead of 'sou'. Kitade suggests this prompts student B to scroll back and look at his/her previous act in the textchat and then to self-correct: firstly the student apologises for his mistake and then he re-asks the question with the correct word 'dou' (turn 4).

1. Z: Hachiji kara sanji made wa ii to omoimasu. (@11/2/98; 1:54:45 PM)
I think that from 8 o'clock to 3 o'clock is good.
2. B: 400 nin no gakkou nanode, minna ha isshou ni shokuji ga dekinai deshou ne. Z san sou [sic] sureba ii to omoimasu ka? (@11/2/98; 1:56:40 PM)
I guess it's impossible to have meals all together because the school has 400 students. Ms. Z., do you think so?
3. Z: ii to omoimasu. (@11/2/98; 1:58:54 PM)
I think that's good.
4. B: gomen nasai. Z-san dou sureba ii to omoimasu ka? (@11/2/98; 2:01:07 PM)
I'm sorry. Ms. Z, how (what) do you think we should do?

Figure 16: Example of lexical self-correction from Kitade (2000:153)

Tudini (2003a) also reports that grammatical self-correction may be triggered by other participants' utterances. She describes that her data included numerous non-target forms and that, through noticing other students' use of target forms, students self-corrected their grammatical errors. By way of illustration, she gives an example in which several students had started to use the non-target form 'mi ha piaciuto' (*I liked it*) during the discussion. When another student joined the discussion and used the verb correctly 'mi e' piaciuto' Tudini reported that one particular student who had been using a non-target form then incorporated the quasi-target form 'mi e' piacuto'. Although the utterance has a spelling mistake, missing an 'i' in 'piaciuto', the student used the correct auxiliary verb. Tudini suggests that this self-correction is an example of self-repair occurring in the textchat modality which is triggered by noticing another participant's contribution to the interaction (2003a:94).

Kitade (2000) also reports that students' self-correction in synchronous textchat can include the correction of pragmatic errors as well as lexical errors. She demonstrates that students are conscious of their speech style and of the pragmatic appropriateness of their utterances in CMC textchat interaction. Kitade illustrates this using the example shown in Figure 17.

1. S: K. konkai no chat no matome onegai dekimasuka (@9/28/98; 1:51:05 PM)
K, could I ask you to report this Chat session.

2. S: Gomennasai 'K-san' to hanashikakeru tsumori ga K. to utte shimatta (@9/28/98; 1:52:22 PM)
I am sorry. I was supposed address you as 'Ms. K', but I incorrectly typed K.

3. K: K. de ii desu. Keigo de nakutemo ii desuyo. (@9/28/98; 1:53:31 PM)
K is ok. You do not have to use the honorific style.

Figure 17: Example of self-correction of pragmatic appropriateness from Kitade (2000:155-6)

In this example, the student *S* recognises her mistake in addressing the person as 'K' without using the suffix '-san' which, in Japanese, must be used unless the relationship between the two interlocutors is intimate. In Kitade's data, despite what may be considered as a more informal style of interaction, the students consistently used the formal speech endings '-desu/masu' when addressing their interlocutors. In the example, the student recognises the

pragmatic inappropriateness of her utterance and apologises for her mistake, explaining that she should have addressed the other participant as 'K-san'.

The above examples demonstrate that synchronous textchat may support learners in their verbal production by providing a context which allows them to notice a problem in their L2 production, albeit lexical, grammatical or pragmatic and then modify their output to correct the error. Some studies have also reported on the way in which these self-corrections are rendered explicit within textchat interaction. Kitade (2000) identified in her synchronous textchat data that students used single quotation marks to recast the incorrect part of an utterance or to provide the corrected utterance (see Figure 18). She describes that this shows learners are conscious of their mistakes and are actively involved in monitoring the textchat that they send to other participants. In Noet-Morand's corpus of interactions between learners of French, she describes a similar usage of the '*' and 'o' symbols as a code to precede or follow the correction.

1. Z: Hoka no idea wa, 12:00 kara 2:00 made homeroom ka hitori de no benkyoo no jikan dattara, sono toki no aida ni curasu wa betsu ni [sic] shokiji suru no wa ii? (@11/2/98; 2:04:55 PM)
Another idea is to have the classes have meals 'betsu ni' during the free-time or individual study time from 12:00 to 2:00?
2. B: hitotsu ha ii desu ne, demo 1:00 shokuji shitara chotto osoi shi, gakusai ni taishite taihen kamoshirenai kara, tabun 11:00 to 12:00 wa ii. (@ 11/2/98; 2:05:15 PM)
I think that one time for meals is good, but 1:00 lunch would be late for the students. It may be good to have lunch from 11:00 to 12:00.
3. Z: sumimasen ga 'betsubesu ni.' [sic] (@11/2/98; 2:05:32 PM)
I'm sorry. It was 'betsubeus ni'.
4. Z: Sumimasen, 'betsu betsu ni.' Yahari, 11:00 to 12:00 no hoo ga ii.
I'm sorry. 'Betsu betsu ni (separately)'. I think it is good to have meals at 11:00 and 12:00.

Figure 18: Example of active involvement in monitoring production from Kitade (2000:154-5)

In the example Kitade (2000) provides (Figure 18) of rendering explicit self-correction in the textchat, the interaction data shows how the student Z in act 4 both responds to his/her partner B's previous utterance ("I think it is good to have meals at 11:00 and 12:00") whilst also self-correcting a previous utterance of his/her own "I'm sorry 'Betsu betsu ni

(separately)"). Kitade suggests that because synchronous textchat allows students to manage their own turns, self-correction occurs because learners can take the time to monitor their output and to process their language production. Kitade further suggests that in the audio modality and in face-to-face interaction, taking turns to correct linguistic output following the introduction of another topic, would confuse the speakers. Concerning the audio modality, spontaneous turn-taking will also depend on whether the system is half or full duplex. In contrast, the textchat modality allows learners to self-correct at any time, provided that they indicate the person to which the message is addressed and a topic keyword (see Section 4.3.2). This may mean that self-corrections are more obvious in the data. In the audio modality a learner may recognise a linguistic error and internally self-correct as part of his /her' quiet or silent inner speech (Long & Robinson; 1998; Ohta, 2000 cited in Jepson) because s/he may not interrupt the conversation to self-correct the error for the benefit of the other participants. Although self-correction may occur it may be less explicit in the data because the turn-taking rules are affected by the nature of the modalities in the communication environments.

Another feature of self-correction in synchronous textchat, suggested by Tudini (2012) is that unlike in face-to-face conversations where self-repair tends to take place in a single turn (cf. Schegloff, 1979:268 cited in Tudini, 2012), in synchronous textchat, self-correction often takes place over two or three turns (see Figure 19).

K. Vado ad abitare con gli amici
I'm going to live with friends
.....
C. Quanti amici?
How many friends?
K. Uno amica, suo chiamo e` Eve
One friend, her call is Eve
K. Ignoro last response
K. Uno amica, si chiama Eve
One friend, her name is Eve.

Figure 19: Self-correction over several turns (from Tudini, 2012:56)

One explanation is that learners, in realising their errors, use a series of short messages i.e. split turns between which there is little delay, in order to hold the conversational floor. This strategy may prevent the other interlocutor(s) from taking the floor and continuing the interaction concerning the semantic content. In the example in Figure 19, the learner appears

to wish to avoid two simultaneous micro conversations: one concerning the semantic content and a second paralinguistic micro conversation concerning the self-correction.

Another potential impetus for self-correction concerning synchronous textchat is that the software used often allows users to save and/or print the log of chat data. Schweinhorst (2003) proffers that this tool "presents huge opportunities as a future learning resource (2003:440); a statement echoed by Sotillo (2005). Sotillo states that language learners could benefit from the careful examination of such logs. Bower and Kawaguchi (2011) suggest that although logs have been used extensively by language researchers to analyse learner interactions that "little attention has been paid to how learners can use conversation logs as a language-learning tool" (2011:43). Whilst the paper by Bower and Kawaguchi (2011) suggests some uses of logs for corrective feedback from tandem partners to language learners, no studies advocate the review of synchronous textchat logs by learners themselves as a resource to help them to attend to linguistic features in their own production. Schweinhorst's study (2003) suggested that language learners in his eTandem project did not consult synchronous textchat logs, despite having access to them, because they had no specific task that required them to interact with this type of resource. One perspective for how the textchat modality could support verbal production / proficiency could be to investigate the possible use of textchat logs for tasks which promote noticing and self-correction following the synchronous interaction.

Self-correction in the audio modality

Yamada (2009) in a study of the relationship between media and output analysed the frequency of self-correction by learners of English in four different CMC environments: videoconferencing (web camera and voice), audioconferencing (voice but no web camera), textchat with image (web camera but no voice), and plain textchat. The study concerned 40 university students who were non-native speakers of English and who did not know each other previously. The students were divided randomly into four groups each assigned to a different type of CMC environment. The students worked in pairs to complete a decision-making task in which they had to choose a new teacher amongst four candidates according to certain conditions. They were allocated fifteen minutes to complete this.

The study shows, firstly, that the mean number of self-corrections was higher in the audio modality than the textchat modality (see Table 5) and higher for the environments which included a visual communication mode than those which did not.

CMC environment	Mean number of acts during task
videoconferencing	65.3
audioconferencing	34.4
textchat with image	10.8
textchat without image	9.1

Table 5: Mean number of acts in each environment

Secondly, Yamada's data (2009) shows an increase in the number of self-corrections in the environments in which the visual mode was combined with the verbal mode. This increase was of statistical significance. The researcher suggests this is because the nonverbal mode and the kinesic modality of gestures allow learners to understand their partner's comprehension. Their partner's nonverbal acts prompt the learners to self-correct in the audio modality. We can question the added value of the web camera, however, in comparison to the studies into noticing and self-correction which examine only a textchat environment. These studies outlined earlier show the concentration of the participants during the interaction to monitor their production and which prompts noticing and self-correction. Although in Yamada's study (2009) the visual mode appears to increase the mean number of verbal acts, these findings need to be re-analysed across different groups of participants. With respect to language learning, giving participants verbal modes of communication may push the language learners to negotiate meaning verbally, expressing themselves in the target language directly and thus may be more beneficial for second language acquisition.

One of the limitations of Yamada's study (2009) is that it does not give any information concerning the materiality of the tools involved which Lamy (2004:525) argues must be included in a definition of oral competence in a CMC learning environment. Indeed, we do not know if the audio modalities are full or half duplex. Furthermore, the materiality of the environments may explain the large difference in the mean number of acts between the textchat and audio environments. Also, as Kenning (2010) argues, this will have significant implications for the rate at which self-corrections will occur in the audio modality since "the only point at which an interlocutor can intervene in a half-duplex system without resorting to another tool (e.g. textchat) [...] is when the speaker releases the floor" (2010:8). In interpreting Yamada's (2009) results, the reader needs more information about the materiality of the environment and the impacts this may have on discourse.

As this review of studies concerning self-correction through the process of 'noticing' shows, the majority of investigations into CMC and noticing have focused on the textchat rather than the audio modality. The studies suggest, however, that CMC tools, and particularly

the textchat modality, offer opportunities for language learners, to support their own verbal production by noticing errors. These can be brought to their attention by internal feedback both concerning their own productions and those of others and can lead to learners modifying their output using self-corrections.

4.4.2. Opportunities for negotiation of meaning and corrective feedback

Several studies evoke the opportunities in synchronous textchat and voicechat for learners to attend to linguistic features of the interaction when prompted by external, corrective feedback: a corrective response to a learner's non target-like language production (Li, 2010 cited in Bower & Kawaguchi, 2011). **Corrective feedback** is generally divided into explicit and implicit types (Bower & Kawaguchi, 2011). **Explicit feedback** shows a learner overtly that there is an error in his / her output. **Implicit feedback** encourages a learner to modify his / her output without an overt indication of the error s/he produced. Implicit feedback is divided into two categories. **Recasts**, which are the reformulation of a learner's error into a target-like form and **negotiation strategies** which draw attention to the non target-like form in a learner's output but do not provide the correct form. Negotiation strategies include **clarification requests** which require the learner to rephrase his/her output, **repetition** of the non target-like form often with a questioning intonation, **confirmation requests** to ensure the understanding of a learner's statement is correct and **comprehension checks** to check if the interlocutor understood.

Corrective feedback is thought to support a language learner in their verbal production and proficiency because it provides negative evidence to the learner. According to Long's (1996) interaction hypothesis, such corrective feedback facilitates and promotes second language acquisition because it draws attention to the linguistic form, showing it to be salient. This can lead to the correction of specific L2 mistakes (modified output), prompting an evolution from a learner's interlanguage towards the target language. It can also be used by the learner to show that a breakdown in communication has occurred and that the interlocutor needs to simplify his / her verbal production (modified input) in order that the learner can understand.

In this section I explore first two studies concerning corrective feedback and, specifically negotiation of meaning, in the textchat modality and involving only L2 learners before looking at some of the published research on native-speaker and non-native speaker

tandems in synchronous textchat. I then turn to studies into negotiation of meaning in the audio modality.

Negotiation of meaning in textchat environments

Blake's (2000) investigated negotiation of meaning in a synchronous textchat context. His study involved native speakers of English who were studying a university-level intermediate Spanish-as-a-foreign-language course. These students worked in dyads without any tutor present and used the synchronous textchat software *Remote Technical Assistance* to complete a series of cooperative tasks. These included one and two way information gap tasks, for example, developing a personality profile of the student's partner, and also jigsaw tasks including finding a flat by sharing different sets of advertisements. The first conclusion of Blake's study was that negotiation of meaning occurred between students working in pairs using textchat tools in a manner similar to negotiations of meaning reported in oral learner discussions. Regardless of the type of task, the negotiations that were shown in Blake's data followed Varonis & Gass' (1985) typical schema for classroom negotiation (see Figure 20).

trigger → indicator → response → reaction to response

Figure 20: Classroom negotiation schema (as proposed by Varonis & Gass, 1985)

This schema for negotiation of meaning among language learners proposes four functional primes. Firstly a 'trigger', the source of misunderstanding. This generates a resolution composed of three different primes: an 'indicator' which acknowledges that there is a communication problem; a 'response' which tries to solve the problem; and, lastly, the optional prime of a 'reaction to response'. Figure 21 shows an example of this schema that Blake cites which includes all four primes in the same order that Varonis & Gass (1985) propose in their schema which was based on face-to-face interaction.

X: Cuales son en común ? [What are in common?]	[TRIGGER]
Y: como se dice comun en igles? no comprehede [How do you say "common" in English? ... no understand]	[INDICATOR]
X: común es cuando algo y una otra algo son el mismo; entiendes mi explicacion? ["Common" is when something and another thing are the same; do you understand my explanation?]	[RESPONSE]
Y: si, gracias... [Yes, thank you.]	[REACTION]

Figure 21: Sample of synchronous textchat negotiation that follows the classroom negotiation schema as exemplified in Blake (2000:125).

Blake's second conclusion was that negotiation of meaning was, on the whole, prompted by lexical misunderstanding rather than syntactical or morphological problems. Blake's study was conducted with two different groups of learners. In the first group, lexical negotiation of meaning accounted for 75 per cent of all negotiation of meaning, and in the second group for 95 per cent. When grammatical negotiations occurred, Blake described that the triggers of these negotiations did not follow a classical pattern but rather took on the form of direct questions about linguistic forms. Blake explained the predominance of lexical negotiation of meaning with respect to the students' level of Spanish as a L2:

An intermediate L2 learner has typically logged only 200 hours of instruction in the target language and simply doesn't have a solid syntactic base with which to help or correct peers. Vocabulary knowledge, however, can be more straightforwardly developed (Blake, 2000:133).

Lastly, Blake suggested the importance of task design with reference to negotiation of meaning. In the study, jigsaw tasks proved to encourage more negotiation of meaning than information exchange-type tasks.

A second study by Pellettieri (2000, cited in Tudini, 2003a) investigates whether synchronous textchat holds potential for developing learners' grammatical competence through negotiation of meaning. The context for Pellettieri's study was interactions between English-speaking students of Spanish of an intermediate level. In contrast to Blake's (2000) study, Pellettieri showed that synchronous textchat can foster the negotiation of meaning for

form-focused grammatical competences. Both implicit and explicit feedback led to learners engaging in error repair strategies and also to learners incorporating target forms in future production. Within her study a total of 34% of all turns involved negotiation of meaning.

Research into native-speaker (NS) and non-native speaker (NNS) tandems have also shown evidence of negotiation of meaning in synchronous textchat. Some of these studies draw conclusions similar to the studies of monolingual groups discussed above. Other studies, however, demonstrate different characteristics of negotiation of meaning in NS-NNS exolingual groups.

Firstly, a study by Kötter (2003) concerned 14 students from a German university who were learning English and 15 students from an American university who were learners of German. The students worked together twice a week for 75 minutes; each session having a different target language. Kötter's analysis revealed that learners in negotiating for meaning utilised more requests for clarification, elaboration or reformulation of their partners' ideas than learners in studies of face-to-face interaction. However, the data showed that 82% of the students of German preferred direct translations of lexis which they did not understand rather than paraphrases of the items or explanations. The data further showed that, learners would more often try to guess the lexical difficulty from the context, rather than ask their peer for help. Contrary to this, the students of English preferred to ask for a paraphrase of a message they had not understood or ask for a repetition of the utterance. Kötter suggests that it is surprising to see how many students asked for a repetition of an utterance, given the environment in which they were interacting which allowed them to scroll back and read older contributions. He also questions whether students' L2 level affects the strategies employed. The American students were weaker than the German students in their target language. He believes this could have influenced the requests for direct translations. Kötter's data shows that the students alternated deliberately between their L1 and L2 languages. Kötter observed that any appeals for lexical help were answered quickly in a matter of turns (presumably because of the American students' reliance on translation which resolved lexical issues more quickly). However, even if the lexical issue was resolved through translation, a third of requests for lexical help also provoked a short meta-linguistic discussion about the lexis that a learner had queried as illustrated in Example 4A, taken from Kötter, 2003:164.

(4A)

Helen says, a foreigner (in America) is a person who is not "Americanised"

Nina [to Helen]: **What do you mean by americanized?**

Kim [to Helen]: I think that a foreigner is someone who loves another culture more than American culture.

Kim [to Nina]: **how would you say "to put one culture above the other," as more important to them?**

Helen says, Americanized... hmmm ... a person dresses like an American... eats like an American... thinks like an American...

Kim says, especially THINKS like an American

You say, **They think that one culture is of higher value than another, perhaps, oder schätzen sie mehr = appreciate it more?**

Kim says, **thanks - that's what I mean**

You say, can you generalize things in this way, thinks like an American?

You say, In Germany that would be very problematic, because people would reject such

Pauschalisierungen..

Helen says, I don't understand "**pauschalisierungen**"

You say, ... it is especially problematic because of our history. I would never say that I think like a

German, but always put that more concisely.

You say, **that is, if you look at it in a general way, look at it as something universal, so, as if everyone would think the same**

Helen says, but I think that you an opinion about how an

Helen says, ...

Helen says, American thinks have

Helen says, materialistic...

Helen says, a person who seeks "the American dream"

Kötter's study showed the increased use of requests for clarification, elaboration or reformulation. The students' reliance on translation and also the students' meta-linguistic discussion of lexical problems goes some way to supporting Pellettieri's suggestion that "negotiation of meaning among students who meet online differs markedly from the sense-making processes that learners engage in face-to-face conversations" (2003:158). As in the studies of monolingual interaction, Kötter's study of exolingual interaction notes predominance in the negotiation of lexical meaning rather than grammatical meaning.

The predominance of lexical negotiation of meaning is also a finding confirmed by a study undertaken by Tudini (2003b). This concerned nine students of Italian studying at the University of South Australia. The students were asked to interact with native-speakers [NSs] of Italian during their own time in a selected chat room. An open conversational task was set. Tudini's data consisted of 49 one-to-one chat sessions between 49 different NSs of Italian and

the nine students: a total of 3687 textchat acts. Her study showed that, as with studies into monolingual groups of students, in exolingual one-to-one exchanges in unsupervised settings where the NS is unknown to the learner that negotiation of meaning is a predominant feature of synchronous textchat interaction in a L2. In the study, nine per cent of all turns involved negotiation. Although Tudini compares this figure to another study of NS-NNS speaker synchronous textchat by Iwasaki and Oliver (2003), who cite a figure of around one third of all turns comprising of negotiations, her data showed that in a similar manner to other studies triggers for negotiation are mainly concerned with lexical issues (see Table 4).

morphosyntax	lexicon	misuse of word	spelling	sociocultural	semantic	incorrect register
14	30	1	6	1	6	3

Table 6: Triggers for negotiation in NS-learner sessions out of a total of 61 instances (from Tudini, 2003b:150)

Tudini's data also shows that the learners in her setting paid particular attention to form in their textchat: 23 per cent of all instances of negotiation were triggered by morphosyntactical errors. In comparison to her finding of a previous study regarding monolingual interactions (2003a) in which other learners were "very tolerant of one another's non target forms" (2003a:96), Tudini describes that in the exolingual discussion considerable attention was paid to form and the NSs displayed intolerance towards errors concerning grammar and syntax. In these examples of negotiation of meaning, the NSs provided the learners with explicit corrective feedback. However, Tudini reports that this did not always lead to the learner immediately modifying his/her production.

One study by Sotillo (2005) concerning English as a L2 examines corrective feedback within NS-NNS and advanced NNS (pre-service teachers)-participant NNS dyads. These dyads completed four communicative tasks and one problem solving task using an instant messaging environment. With similar results to Tudini (2003a), Sotillo found that many opportunities existed for the learners and their interlocutors to focus on errors in lexical items and errors in form. However, in two of the NS-NNS dyads that Sotillo studied, there was evidence of numerous morphosyntactical errors left uncorrected by the NSs. Sotillo explains that these NSs were "primarily focused on message meaning and kept the chat going without momentarily drawing the learners' attention to an incorrect linguistic form" (2005:480). Also, contrary to Tudini's (2003a) findings, Sotillo found that the NSs provided more indirect corrective feedback to learners than direct or explicit corrective feedback. In contrast, the

NNS who were pre-service teachers provided mainly direct or explicit corrective feedback to the learners. Predominantly, this corrective feedback occurred immediately after the learners' incorrect production: 82% of corrections were immediate rather than spread out over several textchat acts.

Sotillo's (2005) study also revealed, in a similar manner to Blake's (2000) study of monolingual students, that task type affected negotiation of meaning. Negotiation of meaning was more predominant in the communicative learning activities for NNS-NNS dyads whilst for NS-NNS dyads error correction and negotiation of meaning were more frequent during the problem solving activity.

A further research question posed by Sotillo (2005) was whether there was evidence of uptake following negotiation of meaning. She concluded that there was evidence of uptake on the part of the learners with 32 occurrences. This number included general learner uptake (e.g.; a minimal responses including 'yes' and 'okay'). In 75% of the occasions in which there was evidence of uptake, the learner successfully incorporated the corrective feedback received. Sotillo also reported that 51% of the corrective feedback provided in negotiation of meaning was neither acknowledged nor incorporated by the learners into their production. In such instances, the learners continued to focus on the semantic content of the interaction or carry on with the task in hand.

Negotiation of meaning in the audio modality compared to the textchat modality

Negotiation of meaning has also been examined in studies into interaction in the audio modality, although these studies are rarer than those examining the textchat modality. Yanguas (2009) studied dyads of Spanish learners interacting in a face-to-face environment, an audio-graphic conferencing environment and a video-conferencing environment. She examined, firstly, how learners in the CMC environments negotiate meaning and whether there are differences between oral CMC and traditional face-to-face communication. Secondly, she examined how the negotiation routines compare to those found in studies of the textchat modality. Her results showed that negotiations in all three environments focused on lexical items but whilst the frequency of negotiated turns in the video-conferencing and face-to-face environments was similar (230-242 turns) this type of turn was slightly more frequent in the audio-graphic conferencing environment (290 turns). Furthermore, there were differences amongst the group data for each environment concerning the number of

negotiation routines in which a participant reached a complete or partial understanding of the target item negotiated. In the audio-graphic conferencing environment, there was a higher percentage of negotiation sequences, which in the data were shown to lead to partial understanding (39%), than in the video-conferencing environment (25%) or face-to-face environment (15%). Complete understanding was higher in the videoconferencing environment (64%) compared to the audio-graphic environment (45%). However, we can question how the researcher determined which negotiation sequences were fully understood compared to those which were only partially understood. Yanguas (2009) gives the following two examples (translated by the researcher from Spanish). 4B shows a sequence considered as complete understanding, 4C as partial understanding.

(4B)

B: I think um...we need a Swiss army knife

A: What is it?

B: It's like um..like a um

A: What do you use it for?

B: For cutting stuff

A: Oh yes!

(4C)

B: And a Swiss army knife for \$8

A: A Swiss army knife?

B: For cooking

A: Oh yes

The author argues that example 4B shows full understanding as the students identify the object as a cutting utensil. However, he states that 4C shows partial understanding because the students refer to the tool as a cooking utensil in general and do not show a more precise interpretation of the new vocabulary item. Without testing the students on the new vocabulary items during a post-test or coding examples in which the students re-employ the lexical item correctly by incorporating into a longer utterance we cannot be sure of the extent to which the learners understand the item or not. Although in example 4C, the students refer to the use of the item for cooking they may understand its use for cutting things but not express this. We can thus question the researcher's conclusion that the videoconferencing environment better

encourages full understanding after negotiation of meaning than the audio-graphic conferencing and face-to-face environments.

Authors of studies into negotiation of meaning in synchronous textchat suggest that negotiation is prompted by the lack of nonverbal cues (cf. Kötter, 2003:159; Kitade, 2000:147). In the absence of aural and visual cues which give contextual support to the verbal interaction, all understanding of the interaction must be ascertained through linguistic forms. When there is misunderstanding learners must verbally ask for comprehension checks and explain verbally whether a reformulation has been understood or not. As Yanguas suggests, they are pushed to elaborate on the lexical item that caused the miscommunication. In doing so, the negotiation routines in Yanguas' (2009) study were longer and included several other lexical items that triggered embedded negotiation routines. This led to a higher percentage of partially understood target lexical items but a lower percentage of complete understanding of the trigger.

Another study which compared negotiation of meaning between the textchat and the audio modality is that of Jepson (2005). His study concerned learners of English who were enrolled at a private online language school. The participants took part in 10 online sessions. In five sessions the participants communicated using textchat and in the remaining sessions by synchronous voicechat. Ten sessions of five minutes in length were considered for the study. Jepson, however, does not detail whether a specific task was given to the learners for each session. I presume from the article that learners were engaged in discussion-type activities. Jepson's study researched, firstly, the type of conversational repair moves that existed in each environment, and, secondly, whether differences occurred in repair moves occurring in the synchronous text-based environment compared to those occurring in the synchronous audio environment.

Using quantitative methods exposed to statistical analysis, Jepson's study shows that the interaction in both the textchat and voicechat environments provided opportunities for repair moves, including clarification requests, confirmation checks, self-repetitions, recasts and explicit corrections. However, there were no examples in either the textchat data or the voicechat data of comprehension checks, questions or self-corrections. Jepson suggests that this could be because the learners were interacting without the presences of a teacher and that comprehension checks and questions may be seen as uniquely pedagogical discourse structures.

Comparing the two environments studied, Jepson shows that learners used a significantly higher number of repair moves in the synchronous voicechat environment than in the synchronous textchat. He suggests that this may be due to the faster conversation pace of the textchat. Indeed, he noticed long periods of silence in the voicechat data and suggests that this is an under-researched area. There were pauses of up to one minute between turns in the voicechat interaction. Jepson suggests that this provided time for a learner to incorporate repair moves.

The data also revealed that whilst self-repetition occurred in the voicechat, the synchronous textchat did not show evidence of this. This contrasts with Kötter's 2003 study described earlier in this section. Jepson (2005) concludes that because learners can read the text log, repetition is made redundant.

Finally, the study showed that the majority of communication breakdowns in the voicechat were due to pronunciation problems. Indeed, repair moves in the voicechat data concerned predominantly pronunciation. Jepson suggests that due to the lack of nonverbal communication in the environment that a focus is placed on pronunciation and indeed that synchronous voicechat environments may be optimal environments for pronunciation work with language learners. We can question the validity of the study though, considering Jepson's sampling technique in which interaction data of only five minutes length was considered. I believe it would be more valid to study longer sessions otherwise the conclusions drawn cannot really hold. Indeed, Yanguas' (2011) study, in which interaction samples were of fifteen minutes length and were whole-sessions rather than extracts from sessions, contrasts Jepson's finding as in his data none of the non-communication episodes in the audio modality were pronunciation related.

The review of literature concerning corrective feedback and negotiation strategies shows that the textchat and audio modalities may offer opportunities to support verbal production by providing opportunities for these types of interaction which are believed to be beneficial for L2 development. Although not conclusive, these studies suggest that negotiation of meaning follows a similar schema to that used in face-to-face interaction (Blake, 2000), that lexical items trigger more negotiation episodes than other aspects of linguistic form (Blake, 2000; Tudini, 2003b; Yanguas, 2009) and that task type affects negotiation of meaning (Blake, 2000; Sotillo, 2005).

4.5. Conclusion

This fourth chapter introduced the verbal mode in synchronous CMC. It allowed us to describe the characteristics of the textchat and audio modalities in CMC environments and to define how I understand the term ‘support verbal participation’ and ‘support verbal production’ in the thesis title. My exploration of some of the studies suggest that CMC environments support verbal participation by changing the student-teacher floor space balance and, in comparison to face-to-face environments help learners participate more frequently. They also suggest that audio and textchat modalities in CMC environments can support verbal production (proficiency) because interactions in these modalities provide opportunities for learners to notice errors as a result of internal feedback which leads to self-correction, or as a result of implicit or explicit external feedback which leads to negotiation of meaning, often concerning lexical misunderstandings, or offers corrective feedback. The chapter informs this study by illustrating ways in which the verbal modalities in a synthetic world environment may help support learners’ verbal participation and production.

PART II – SYNTHETIC WORLDS

Chapter 5. Synthetic worlds and L2 learning

5.1. Introduction

This chapter introduces the multimodal environment which is at the centre of this study, namely synthetic worlds, and presents the environment in relation to L2 learning. Firstly, I offer the reader a brief overview of the history of synthetic worlds. I then discuss my terminology choice to refer to these environments as synthetic worlds, rather than virtual worlds. This leads us to describe the characteristics which are common to this type of environment, before turning to the perceived affordances of synthetic worlds for L2 learning. I then relate Part I of this thesis, concerning multimodality, to synthetic world environments and discuss the limited number of published research studies which have examined language learning, with respect to multimodality, within synthetic worlds.

5.2. Emergence of synthetic worlds

Synthetic (virtual) worlds are three-dimensional environments through which users can connect and interact both synchronously and asynchronously. They are a new medium of CMC (O'Connelly & Groom, 2010:1) which have developed from written text and two-dimensional graphical gaming worlds. Sanchez (2009) lists five milestones in the emergence of synthetic worlds:

- Multi-User Dungeons (MUDs)
- TinyMUDs
- Multi-user dungeons Object-Oriented (MOOs)
- Massively Multiplayer Online Role-Playing Games (MMORPGs)
- Graphical synthetic worlds

Graphical synthetic worlds were preceded by Multi-User Dungeons (MUDs) from which they have inherited themes and user culture (Wadley, 2011). MUDs are networked games, often based around a combat or adventure quest. MUDs simulate a space which is portrayed using written language (Bartle, 2008). A primary feature is that they could be accessed by individuals who were geographically dispersed. Within the space simulated, users who played characters in the games could interact with other users and with the game by

using text-based commands, for example ‘/walk’ or ‘/open’ (O’Connell & Groom, 2011). Most MUDs were composed of several rooms and any text-based interaction in a room could be seen by all the users in that room.

The development of TinyMUDs, which were also text-based, added a creative and social element to traditional MUDs. They focused on user cooperation to create new static game objects which could be played by six to eight players and the creation of the users' own rooms in which these game objects could be played. To distinguish TinyMUDs from the combat-oriented traditional MUDs, the D in the name stood for Dimension or Domain.

TinyMUDs then developed into Multi user dungeons which were Object Oriented (MOOs). These text-based environments which also used a 2D graphical interface allowed the users to perform more sophisticated object-oriented programming with the server and create interactive objects. These included, for example, creating new rooms where users could entertain their friends or generic objects for others to use and changing the way the MOO interface responded to user commands. Users could also create a description of themselves or their online personality: ‘a described avatar’ (Davies, 2009). Their distinguishing feature, compared to TinyMUDs, is that the user-programmed objects were not restricted to small groups of players but could be played by thousands of people.

The first Massively Multiplayer Online Role-Playing Game (MMORPG) was developed in 1996. What distinguishes MMORPGs from MOOs is, firstly, the games’ persistency: it continued to exist and evolve when a player was offline. Secondly, the number of players that the game could host. The popular MMORPG *World of Warcraft* (Blizzard Entertainment, 2004), for example, currently attracts around 11 million users (Wadley, 2011). The development of MMORPGs led, in turn, to the development of 3D graphical synthetic worlds. These worlds, rather than be text-based, exploit a graphical user interface which simulates a three-dimensional space and allows the user to interact with the graphical environment. This space contains virtual objects, of which some are typically representations of the users in the form of avatars (Aarseth, 2008; Nitsche, 2008). Although these online environments are not yet mainstream, they are progressively becoming more widespread. Gartner Inc. (2007) estimated that by 2012, 80% of active Internet users will have created an avatar. Bennett & Beith (2007) also estimated that, by 2011, four out of five Internet users will have used synthetic worlds such as *Second Life* or *Active World* (Active Worlds Inc., 1997).

5.3. Terminology choice: synthetic world

"There is currently, no agreed-upon definition" of a graphical synthetic world (Bell, 2008:2) Whilst some researchers present definitions that emphasise the number of users that can be simultaneously connected to a synthetic world, for example, "crafted places inside computers that are designed to accommodate larger numbers of people" (Castronova, 2005:4), other researchers incorporate the sensory experience offered by synthetic worlds: "a computer-generated display that allows or compels the user (or users) to have a sense of being present in an environment other than the one they are actually in" (Schroeder, 1996:25 cited in Schroeder, 2008). As Schroeder (2008) argues, it appears vital that researchers establish a clear definition, firstly, in order to be able to set the phenomena apart from other technologies, and secondly, to guide research.

The lack of agreement about how to define a synthetic world is also reflected in the variety of names given to this type of environment in the literature (see Figure 22), although the term 'virtual world' is becoming predominant.

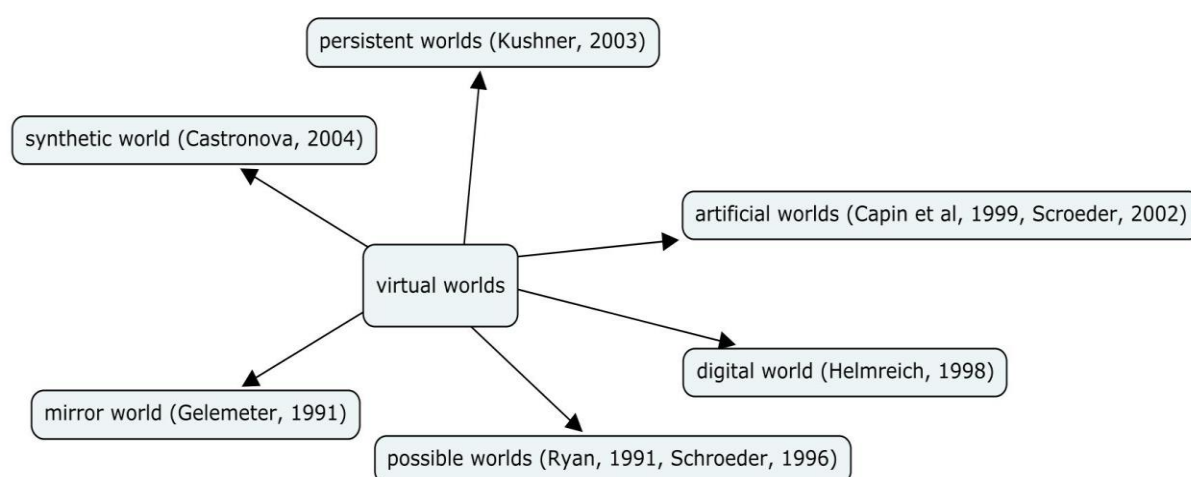


Figure 22 Names attributed to synthetic worlds (cited in Boellstorff, 2008)

The adoption of the term 'virtual', however, poses several problems. Firstly, 'virtual' is loosely applied to anything online. The American Heritage Dictionary of the English Language (2011) draws attention to this. It explains that although, when introduced, in the computational sense, 'virtual' was applied to things simulated by a computer, the adjective is always applied to things that really exist and which are created or carried out using computers e.g. virtual communities. Indeed, 'virtual' is often used in reference to things that mimic their 'real' equivalents. For this reason, we (Wigham & Chanier) feel it is more pertinent to use the term 'synthetic worlds', because the 'world' in itself is in fact in force (Castronova, 2004). It

has become an extension of reality and perhaps even a reality itself (Taylor, 2006). Moreover, it is made by people and often includes characteristics that do not mimic or mirror physical world equivalents e.g. being able to fly, or teleport. I will contrast the term ‘synthetic world’ with ‘first world’ or ‘face-to-face world’.

5.4.Characteristics of synthetic worlds

There exist several defining characteristics of synthetic worlds which are recurrent in the literature. Firstly, synthetic worlds are perceived as shared multi-user spaces (Book, 2004; Bell, 2008; Smith-Robbins, 2011; Sadler, 2012): environments which allow many users to be connected simultaneously. For example, for the year 2008, on average 38,000 users were logged on at any one time to the synthetic world *Second Life*. Simultaneous connections are made possible through synthetic worlds using Wide Area Networks (WANs).

Secondly, synthetic worlds employ a graphical user interface (GUI) (Book, 2004; Nelson & Erlandson, 2012). This interface allows the user to interact with the environment in ways that are not simply text-based. The space in the environments is depicted visually and there can be direct manipulation of the graphical elements. The GUI allows the user to interact with the interface, for example, by dragging and dropping objects.

Synthetic worlds also share the feature of interactivity. The interactivity within the environments falls under two categories. Firstly, synthetic world environments are supportive of social interactions allowing users to interact synchronously and asynchronously. Secondly, synthetic worlds allow interactions with the environment itself. As Bell states, in the world, the users can "alter, develop, build or submit customized content" (2004:2). Objects inhabit the space and have programmable behaviours. That is to say they are reactive, and can communicate with other objects to the extent that they "compromise the tangible part of the virtual world" (Bartle, 2004:326). These reactive objects can be altered by users. For example, on entering a synthetic world, the first object that may be modified by a user will be his / her avatar. The users are not only active within the environment, but they are also actors on the environment in that they co-construct the synthetic world. Book (2004) and De Freitas (2006) also attribute the characteristic of immediacy as being common to all synthetic worlds. The interaction takes place in real time and the environment responds to input immediately.

A further characteristic is that the synthetic world’s existence and internal development continue whether an individual user or player is connected or not: the environments are ‘persistent’ (Bartle, 2004:1). As Bell (2008:2) expresses, these worlds cannot be ‘paused’. Unlike some other CMC tools where interaction can only occur when a programme is open

and the parties wishing to interact are connected, a synthetic world is open and accessible 24-hours a day (Sadler, 2012) and a user does not need another party to be connected in order to interact with the environment. Synthetic worlds, therefore, are dynamic and evolve continuously, even if a specific user has exited the world. For example, building in a synthetic world may continue when a specific user is personally not logged in; meaning that, on their return to the world, a new simulation (building) may be part of the environment.

Synthetic worlds also encourage socialization/ community building, more specifically by the creation of in-world groups including guilds, associations or neighbourhoods. Many synthetic worlds are designed around this characteristic and indeed offer certain privileges if members become part of a group. For example, in *Second Life* avatars can display name tags which they can choose to show at any given time to illustrate their affiliation to a certain group; groups can share specific textchat windows. They can share a Linden dollar account for the currency used inworld and can jointly own land. This characteristic is proposed by Book (2008) and also by Bell and Robbins-Bell (2008 cited in Peachey *et al.*, 2010:180-1) who state that all synthetic worlds include a "network of people" and therefore argue that an essential characteristic of any synthetic world is a social element.

A final characteristic highlighted by Bell (2004) and Sadler (2012), is that in synthetic worlds, users are represented by avatars. Bell breaks avatars down into two types: graphical representations and textual representations. He argues that the central defining characteristic of avatars is that they have agency so, although it is controlled by a human being, it is the avatar itself which performs an action in a synthetic world. Even when the form of communication, e.g. voicechat, comes directly from the user within the synthetic world it is the avatar which is seen as performing the action.

The characteristics outlined above may not form a unanimous definition of synthetic worlds amongst the academic community for which they are the object of study. However, as Robbins-Bell states, they "do function as a foundation for a discussion of the possibilities for virtual worlds in education" (2008:2).

5.5. Distinction between social and gaming synthetic worlds

Although all synthetic worlds are seen as sharing characteristics as outlined above, some authors including Peachey *et al.*, (2010:xix-x), Aldrich (2009:8) and Wadley (2011:32) when characterizing synthetic worlds, make the distinction between social synthetic worlds and gaming synthetic worlds. Peachey *et al.*, proffer that gaming synthetic worlds imply "an

additional set of characteristics that serve to structure and motivate the play"(2010;xix). In games, the meaning is undoubtedly to achieve an appointed activity or to resolve a problem (Grosbois, 2012). Sauv  *et al.*, (2005:3) in outlining the theoretical underpinnings of games, using what they term as a 'semi-open analysis' based on the essential attributes of over 250 games, proffer that having a pre-determined goal is an essential game attribute. Such a goal determines the notion of victory in a game and the structure concerning who wins, and when and how play comes to an end. This goal, thus, influences the choices made by the player(s) and their motivations. Gaming synthetic worlds are based upon a story and a story line that players must follow to progress towards the pre-determined goal. Often, the games adjust the level of challenge, placing goals, at a level slightly beyond the users' capacities. The pre-determined goal also necessitates a rule structure for games. Sauv  *et al.*, (2005) suggest this as a description of the relationship between players and the environment which specifies the extent of permitted player actions and the sequence in which these actions take place.

The rule structure of a game is arguably what differentiates gaming synthetic worlds from social synthetic worlds. Whereas progression (and, thus, meaning) in gaming synthetic worlds is highly scripted, social synthetic worlds allow a wide range of behaviours and variations in how they should be "played." As a result, their progression and their meaning are generative.

In a social synthetic world, users have neither a real quest or a defined objective to fulfil nor an evil to defeat. Unlike in gaming synthetic worlds, there is no pre-determined goal, general to all users. There are also no levels for the users to go up or down nor is there any pre-determined story. In comparison, there is a high degree of freedom. Derryberry summarizes this point by stating that social synthetic worlds, such as *Second Life* are not games for they lack "the features used in a game study definition, such as games are played, have various models of play and they incorporate goals, chance, rules and discernible outcomes" (2007 in Ulicsak, 2010:19).

Whereas gaming synthetic worlds have an embedded pre-determined goal, social synthetic worlds need its users to fill the environment with meaning and to extend the environment in order to make sense. This is a difference between the two sub categories of synthetic worlds that Bell, Smith-Robbins & Withnam (2010:205) outline. They argue that social synthetic worlds allow users to generate complex content, to the extent that in many social synthetic worlds the content is entirely created by the users rather than the business who own the synthetic world. They suggest, thus, that social synthetic worlds adhere to the description proffered by Boellstorff (2008) as a blank slate which allows for a new type of culture to develop. In contrast, in gaming synthetic worlds, Bell, Smith-Robbins &

Withnamm (2010) argue that, although some user-generated content may be allowed, this is highly regulated, so as to adhere to the context of the game mechanics and the majority of the content in the world is company-created.

Gaming synthetic worlds are the focus of recent research interest concerning their use in pedagogical contexts. For example, the use of Massively Multiplayer Online Role-Playing Games for collaborative learning (Whitton & Hollins, 2008) or language learning (Thorne & Fischer, 2012) and the use of serious games in language-learning contexts (Meyer & Sørensen, 2009). However, the study presented in this thesis, and the synthetic world in which this study is conducted, do not draw on the principles of game play.

5.6. Perceived affordances of synthetic worlds for L2 learning

In this section, I present the perceived affordances of synthetic worlds with reference to literature concerning synthetic worlds and language learning.

The term 'affordance' was suggested by Gibson (1977), in his research within the field of psychology, as a term to refer to both the environment and the actionable properties the environment offers an actor (person or animal). Concerning, human-machine interaction, Norman (1988) suggests that an 'affordance' is the design aspect of an object which suggests how the object should be used. He defines an affordance of an environment as the 'action possibilities': the perceived characteristics of an environment, tool or object which allow a user to perform an action. In opposition to this term, Norman evokes the notion of 'perceived non-affordances' to refer to actions that are impossible.

Van Lier (2000, cited in Lamy & Hampel, 2007) suggested that the importance, in Gibson's definition of an affordance, is the relational and interactional processes between the object and the actor which offer an actor different options for action. That is to say, the interrelation between the characteristics of an object, tool or environment, and the user's appropriation of these characteristics, as they are revealed "in and through humans' attempts to interact with the artefact" (Hutchby, 2001:146). With reference to research into language learning, van Lier thus suggests that researchers, when considering affordances, should be concerned by the active learning and the activities as well the ecology of the learning situation. This is furthered by Lamy & Hampel (2007) who propose, with reference to CMC tools and environments, that an affordance must be considered as the meeting point of three mediational tools: the technological characteristics of an object, environment or tool; the participant interaction; and the tasks accomplished by the participants.

In this thesis, the term 'affordance' is employed in a more unidirectional sense to evoke the property, quality or characteristic of an object, tool or environment with respect to the user. 'Affordance' is thus employed in the ergonomic sense relating to the characteristics of an environment, tool or object and their convenience for user activities and, in particular in this section, L2 learning.

Before turning to my presentation of the perceived affordances of synthetic worlds with reference to literature concerning synthetic worlds and L2 learning, it is important to highlight that the presentation of certain studies has been ruled out, due to their lack of scientific rigour which renders the results presented impressionistic and / or anecdotal. Whilst the introduction of any new environment or technology, such as synthetic worlds, will naturally initially give rise studies of a speculative, impressionistic nature, in order to go beyond these initial studies I deem it important to consider only studies in which the pedagogical scenario and the research design are carefully constructed, in order that the results presented by these studies help to forward research into the domain of L2 learning and synthetic worlds.

A study by Chen (2012) which aimed to investigate how social media can facilitate the learning of Shakespeare in project-based English L2 classes illustrates my position. In the study, undergraduate students, after studying a scene from Hamlet in-class, were asked to complete a character analysis for one character and create the character in *Second Life*, before constructing one scene from the play inworld in small workgroups. Students were required to share screen shots of these two tasks on *Facebook*. The study by Chen concludes, firstly, that students did not appreciate the time spent in *Second Life* as much as that spent on *Facebook* and, secondly, that *Facebook* better facilitates the learning of Shakespeare in a L2 project because the technical challenges of *Second Life* frustrated some students. These conclusions are drawn from post-course questionnaire feedback. However, on examining the study in more detail, the reader discovers that a pre-course questionnaire completed by 30 of the 37 students on the course, and which concerned social media habits, showed that the 30 students used *Facebook* prior to the course on a regular basis. The results section of the study also describes that whilst three *Second Life* tutorials had been offered to students, fewer than 10 students attended these. It is therefore, not surprising, that the analysis section reveals that most students did not accomplish the activities and, when they did, rather than use *Second Life*, the students used other media to complete the assignments. I deem that the lack of rigour in the design of the pedagogical scenario and, in particular, the lack of initialisation to the synthetic world environment by all students on the course may have led to the conclusion that students did not appreciate the time spent in *Second Life* as much as that spent on

Facebook and that the latter environment better facilitates the learning of Shakespeare in a L2 project.

My choice to cite studies in which the pedagogical scenario and the research design are carefully constructed, in the following presentation of literature into L2 learning in synthetic worlds, is all the more important on consideration of the introduction of citation impact factors. Citation impact factors work as a proxy for the relevant importance of an article within the field. Our (Wigham & Chanier) stance within this thesis is that we cannot attribute recognition to studies for which the scientific approach is problematic.

Having explained the reasons why certain studies into synthetic worlds and L2 learning have been ruled out, I now turn to the perceived affordances of synthetic worlds for L2 learning.

Wehner, Gump & Downey (2011) argue that much of the research available concerning the use of synthetic worlds in education is grounded in two views of learning: the view of learning as experiential and the constructivist paradigm of learning. Deutschmann, Molka-Danielson & Panichi (2009) and Henderson *et al.*, (2009) warn, however, that where language learning is concerned, the literature is limited and a lot of the published work concerns speculation about potential and hypothesized advantages of synthetic worlds for language learning rather than empirical research.

In Kolb's notion of experiential learning, students are placed at the centre of the learning, which is viewed as a process of creating knowledge which is grounded in experience and in transactions between the environment and an individual rather than as passive learning: a learner is "an active member of the learning process via his interaction with the environment" (Sadler, 2012:67). This is believed to occur in a four-step process (Kolb & Kolb, 2005). Firstly, a learner engages in a concrete experience. He then engages in reflective observation of the experience which leads him to form generalizations about the experience (active conceptualization) before testing these in a new environment in the form of active experimentation.

In the constructivist paradigm of learning, a primary assumption is that learners "construct understandings by interacting with information, tools, and materials, as well as by collaborating with other learners" (Dickey, 2005: 441) rather than in passive receptive transmission from an authority (a textbook, a teacher). Learning is, thus, encouraged in realistic situations that are often analogous with professional practice (Hutchinson, 2007). This must take place through authentic tasks in meaningful contexts (Jonassen, 1994), rather than formal decontextualized situations, and in the socio-constructivist view of learning,

through collaborative social contexts which allow for interaction with more expert peers and teachers, as well as content, and for reflection on experience. In the socio-constructivist view, reality is constructed through human activity. Knowledge is a product of human interaction which is socially and culturally created and learning takes place through social activities and is an active process.

Synthetic worlds are believed to be able to offer a language learner the concrete experience which is key to the process of experiential learning and also the meaningful contexts and possibilities for interaction and collaboration that prime in a socio-constructivist view of learning. This is firstly, because of the possibilities they offer for a user to interact with the environment and, secondly, due to the possibilities for social interactions with other users in the target language.

With respect to interacting with the environment, synthetic worlds can "facilitate experiential linguistic tasks that would be impractical or impossible to undertake in the real [first] world" (Dalgarno & Lee, 2009:19). For example, the logistics and cost of taking a foreign language class to an airport where the target language is spoken, in order to practice checking-in, may make the task unfeasible. However, in a synthetic world, with the help of a holodeck⁹ which allows one to build, save and then rez¹⁰ a variety of scenarios/environments, an airport can be 'built' and the task be completed by students. Similarly, where the scenario in real-life would simply be too dangerous to attempt, synthetic worlds can offer possibilities to experience the event. Kern (2010) illustrates this in her kitchen fire simulation lesson. Using a holodeck which resembles a kitchen, Kern simulates a fire that starts in the kitchen whilst a meal is being prepared. She asks learners to react and work together to ensure the group's safety. These two examples show that synthetic worlds allow learners firstly to practise situated skills and, secondly, undertake embodied learning tasks that to accomplish in the real-world would be too expensive or dangerous. Dalgarno and Lee (2009) suggest that this potential for situated learning may allow for greater contextualisation of language and improved transfer of knowledge and skills to authentic communication situations: learners may apply knowledge more effectively in real-world contexts because the learning environment in which the knowledge was acquired was based upon the context for application. The persistency of the environments also means that, after a class, the objects do not disappear. Henderson *et al.*, (2009) suggest this could be an advantage of synthetic worlds for language learners who are able to return to their place of learning and interact again with

⁹ A holodeck allows you to store a variety of rooms and scenes which you can then display within a limited space in the synthetic world. For example, in a plot you could display an airport holodeck scene and then a cinema holodeck scene.

¹⁰ To rez means to create or to make an object appear in the synthetic world.

the objects. The persistency of the written interaction in the form of textchat logs has also been suggested as an advantage for awareness raising tasks with language learners (Hislope, 2008), as well as tasks which focus on language form (Peterson, 2011).

The content being user-generated in synthetic worlds allows learners to create artefacts within the environments. Brown & Bell (2004) and Dickey (2005) suggest that the object-oriented nature of this type of environment, which includes possibilities for building but also for other forms of content creation including importing videos, digital presentations and other animations, facilitates collaboration. Peterson (2011), reviewing the literature on synthetic worlds, highlights that researchers concerned with language learning have suggested that the creation of personally meaningful objects by learners in synthetic worlds stimulates learner engagement and investment in the environment as well as motivation. Dalgarno and Lee also suggest that three-dimensional virtual learning environments can be "used to facilitate learning tasks that lead to increased intrinsic motivation and engagement" (2009:20) because of the high degree of collaboration and personalization that the environments allow. Individuals have the possibility to co-construct the environment visually as well as socially. The ability for learners to carry out tasks collaboratively may create positive interdependence between learners which in turn acts as a stimulus for learning. Furthermore, Dalgarno and Lee (2009) advocate that the ability for learners to establish individual goals and make personal choices as to how best achieve these in the synthetic world is an affordance of the environment which leads to increased learner engagement. In relation to this, it has been suggested by Steuer (1992) that the sense of being present in the mediated environment rather than the learner's surroundings in the first world environment, due to the rich sensory stimuli, contributes to intrinsic motivation. The sense of 'being there together' has been highlighted as particularly important for distant language learners' motivation and effective communication (Ornberg, 2003).

Concerning the possibilities for social interactions with other users in the target language which can also form concrete experiences for language learners, Deutschmann and Panichi argue that synthetic worlds "increase the scope for authenticity" (2009:38) of language-learning tasks. Peterson (2011) suggests this is because synthetic worlds offer a wider range of interlocutors than in traditional classrooms and subsequently can increase students' exposure to authentic target language. Deutschmann and Panichi (2009) give the example of asking someone for directions in a synthetic world, explaining that unlike in a real-life classroom, where a learner has to pretend to be lost and to follow the directions, in a synthetic world this can be a real act of communication. For example, asking directions to an avatar that is not part of the learning group, whilst completing a treasure hunt task to find

specific locations within the synthetic world. The environment allows the learner to perform a real communication act. The environment contextualises the language which may also improve the transfer of such a language skill to a real situation. Henderson *et al.* stress that this authenticity is augmented not just by the presence of native speakers of target languages but also due to the "linguistically appropriate environments" (2009:465) that exist within synthetic worlds. An example is the replication of first world cities or of first world environments. The authors give the example of Chinese restaurants with signs and menus in Mandarin but we could also cite the examples of the replication of Arcachon (Second Life, no date-a) or of Paris circa 1900 (Second Life, no date-b) or New York City (Second Life, no date-c) in *Second Life*.

Sadler (2012:68) gives a possible example of a social interaction acting as a concrete and meaningful experience for a learner: a learner interacts with someone with whom they are working in the target language to build an object inworld. Based on this concrete experience, the learner may reflect on the interaction: for example the language used in the building process to refer to shapes or object locations. The learner may then make generalisations about how this language should be used in this type of situation which he may test in the form of active experimentation the next time he engages in a building activity in the target language.

A lot of the literature, albeit somewhat speculative, highlights the anonymity that avatars provide for language learners as a potential affordance of synthetic worlds. Avatars may reduce apprehension and embarrassment (Sanchez, 1996; Schweinhorst, 2002; Grosbois, 2012) about expressing oneself in the target language, allowing learners to take risks and engage in language play while feeling safe to practise language (Teoh, 2007), behaviours suggested to facilitate language learning (Peterson, 2011).

Finally, the opportunities for multimodal communication in synthetic worlds are also suggested as advantageous in the literature. Peterson proposes that the "presence of multiple communication channels, provides additional sources of feedback that are beneficial for language learners" (2011:70). Dalgarno & Lee (2009) suggest these multiple communication channels also allow for richer and more effective collaborative learning than in two dimensional online environments. They argue that drawing on the spatial and nonverbal cues within the environments can provide learners with a greater 'sense of place' and, subsequently, enhance group relationships and effective communication between users. In a further paper, Lee (2009) complements this, explaining that should learners have the abilities to point to virtual objects or to use the position of their avatar or of an object as reference points, the type of interactions between learners can be considered as richer and the communication, due to

the possibility of using indexical items to refer to the environment, can be more efficient. Henderson *et al.*, similarly refer to this perceived affordance for language learning, stating "the immersive social environments of virtual worlds provide a range of discourse elements which are generally not available in less immersive environments" (2009:466). They suggest that synthetic worlds allow the merge of both physical and linguistic co-presence and, thus, indexical language becomes one of the discourse items which, in turn, is used as an aid to make communication more efficient during collaborative learning. However, as Deutschmann, Panichi & Molka-Danielson (2009) advise, there is much to be done concerning the multimodal nature of synthetic worlds before the potential benefits of the environment can be evaluated regarding language learning.

5.7. Studies into multimodality and L2 learning in synthetic worlds

In this section, I outline the limited amount of research which has looked at the role of multimodality within synthetic worlds in language-learning contexts.

One of the first studies into multimodal interaction in a synthetic world was conducted by Toyoda and Harrison (2002) in *Jewels*, an earlier version of *Active Worlds*. At the time of the study, the synthetic world included only textchat communication in the verbal mode. The longitudinal study involved five undergraduate advanced learners of Japanese and native speakers of Japanese. The participants engaged in ten one-hour sessions held over a semester, focusing on discussion activities related to the macro task of the creation of a website. Whilst the focus of Toyoda and Harrison's (2002) study was on negotiation of meaning between the native speakers (NS) and non-native speakers (NNS), the authors discuss the participants' use of the nonverbal mode alongside the textchat modality. They report that whilst the participants, in terms of their nonverbal communication, changed the appearance of their avatars, they made little use of avatar movement. The authors attribute this, firstly, to the task design which meant that the learners were not given tasks that required movement, and secondly, to the participants' low level of IT skills which meant that they did not have prior experience in using synthetic worlds nor in electronic chatting. The authors suggest that, whilst they were interacting in the textchat, the participants did not have any 'spare time' to attempt to use their avatars' movement features.

One of the limitations of Toyoda and Harrison's (2002) study is potentially that they assumed that the participants would quickly become familiar with the environments' interface and the communication possibilities in different modes, rather than provide specific

instruction or training concerning these. Another limitation is that the task design did not take into account the affordances of the modes within the environment but rather transposed a face-to-face learning task (discussion activity) into a synthetic environment. It does not therefore appear surprising that the authors conclude the limited use of meaning making across different modes and suggest this is due to inadequate IT skills.

A pilot study by Peterson (2005) reported on a session conducted in *Active Worlds* with 15 intermediate students of English. The participants had the textchat modality and the nonverbal communication mode available to them. No private textchat modality was available in *Active Worlds*, rather the participants communicated in the public textchat which could be read by avatars who were proxemically close to each other. Peterson investigated whether participants used the communication features of their avatars during interaction in an open-exchange task. Similarly to Toyoda and Harrison's (2002) study, the participants were novice users with no previous experience of synthetic worlds. Peterson's study showed that the participants made use of the nonverbal communicative features of their avatars to a greater degree than in Toyoda and Harrison's previous study. Peterson's data analysis revealed that the participants used kinesic acts of gesture and the nonverbal acts of avatar movement, including flying, during the early phase of the session. In particular, this was to obtain the attention of potential interlocutors for the activity. However, once the students had found their communication partners, they ceased to use their avatars' nonverbal communication and focused uniquely on interacting in the textchat modality.

Peterson's (2005) study laid the groundwork for a larger scale study reported in Peterson (2006). This longitudinal study involved 24 intermediate level undergraduate learners of English from a variety of first language backgrounds and was conducted over five ninety-minute sessions in *Active Worlds*. The pilot study, and that of Toyoda and Harrison (2002) suggesting that learners needed orientation sessions in order to benefit from a period of familiarization with the environment, led to the incorporation of introductory sessions concerning the communication and navigation features of the synthetic world. The students then participated in three types of task: information-gap, decision making and opinion exchange. Again, Peterson investigated whether the participations used the nonverbal communicative features of their avatars during the L2 sessions. His data showed that 15 of the 24 students made use of their avatars. Similarly, to his 2005 data, this use included the use of kinesic gestures to attract the attention of communication partners. Thirteen students also used gestures to give emotional responses to their partner's L2 productions in the textchat. The students also made use of nonverbal proxemics which allowed them to move their avatars away from crowded areas, in order to make it easier to follow their interlocutors' productions

in the public textchat. In Peterson's study (2006), participant post-questionnaires emphasized the learners' perceived benefits of avatar interaction. The majority of the students claimed that the avatar enhanced their sense of telepresence. Concerning the nine students who did not make use of their avatars' nonverbal communication possibilities, they accorded this to the rapid scrolling of the textchat due to multiple users interacting, combined with the gaps in their vocabulary knowledge, meaning that they had to focus closely on the textchat communication, leaving them no time to manipulate their avatar.

Although the above studies provide insights into the potential combinations of verbal and nonverbal modes in synthetic worlds, one of their limitations is that the nonverbal communication interaction, unlike the verbal data which used textchat logs, was collected using field notes. This method of data collection remains selective in that two different observers will legitimately notice different things about the same event. There is also a danger of bias: observers may see what they want to see and ignore counter evidence.

Two more recent studies into multimodality in synthetic worlds, after the introduction of the audio modality (circa 2007) focus on multimodality within the verbal communication mode. A study by Palomeque (2011) looked at the role of synchronous textchat in relation to the voicechat in the synthetic world, *Second Life*. The context for the study was an English-for-tourism course run for voluntary undergraduate students at a Spanish university. Thirty students participated in the course which comprised of three thematic modules; hotels, museums and virtual tourism. None of the students had previous experience of using synthetic worlds. In the study, Palomeque used examples of the participants' interaction to suggest the synchronous textchat played three different roles during the sessions. Firstly, the textchat was used during technical checks of the audio modality. Secondly, it was used by students to address their peers and make jokes, often in the L1, unrelated to the session's activities. Thirdly, the textchat was used by the language tutor to enhance pedagogical instructions given to the students in the audio modality and which had been misunderstood. Palomeque's examples demonstrate that these key words were often related to the nonverbal mode, for example when referring to objects in the environment or asking students to move into smaller groups. Her analysis suggests that the learners could not cope with combining the audio modality and the nonverbal mode. They therefore resorted to the textchat modality because the instructions remained in the window for a longer period, which gave the students the time to understand them, whilst they moved their avatar or interacted with an object.

Palomeque's study relies on examples of interactions. Although it details different types of interactions that take place in the textchat modality it does not detail the extent to which the usages observed were common in the data or the extent to which they were isolated instances.

Without details of the data coverage or a quantitative analysis of the frequency of these observations from which the examples were drawn, the study appears somewhat anecdotal (cf. Section 9.6.1).

Another study of language learning using the synthetic world *Second Life*, refers to the participation management issues which occur when synchronous textchat and audio are used in combination. Deutschmann and Panichi (2009), in a reflection upon a number of different teaching/learning projects, primarily addressed at doctoral students who were learners of English, describe that they found the use or not of synchronous textchat combined with audio "depended greatly on how familiar the students were with using SL [*Second Life*] and other similar environments" (2009:40). Novices had difficulty combining the two modalities. Indeed, in one study, a student felt that the other participants' use of the textchat during a presentation which the learner was giving was 'rude' and distracted from what the student was saying. Deutschmann and Panichi (2009) also report that several students found it stressful to combine the two communication modes with the nonverbal mode of commanding their avatar. The authors suggest, from their experience, that the textchat modality can be useful as a complement to the audio modality, provided that the comments made relate to the activity in which the learners are involved at the time. However, they suggest that textchat which is running parallel to the voicechat but which treats a different subject can be "disturbing and draw attention away from the main activity" (2009:40). Although this study offers insights into the perceived difficulties of use of two modalities in the verbal mode, the study relies on researcher observations and data from post questionnaires and interviews but does not provide any quantitative data or specific interaction examples concerning the actual usage of the two modalities from which the authors draw their conclusions.

5.8. Conclusion

This chapter provided an overview of the environment which is at the heart of this study. After describing the characteristics of synthetic worlds and the perceived affordances of these environments for language learning, I presented the small number of research studies which, rather than be speculative papers about the potential of these environments, have used learners' production data to consider language learning and multimodality within synthetic worlds. The overview of these papers showed that, at present, there is a lack of clarity concerning a methodology for the study of multimodality in synthetic worlds. Although these studies present interesting observations and research leads, the lack of a detailed methodology adopted across the different research studies weakens, to a certain extent, this research.

Chapter 6. Nonverbal and verbal modes in synthetic worlds

6.1. Introduction

This chapter describes the multimodal context of the synthetic world, *Second Life*, used in this study. I provide the reader with a classification of the nonverbal and verbal modes and their modalities, as offered by the synthetic world and describe interplay between the two modes which is pre-built into the environment. This classification will provide the reader, to whom *Second Life* may be unfamiliar, with an indication of the complexity of how the two modes are technologically mediated within the synthetic world. It also influences our methodological procedure for transcription of *Second Life* sessions, presented in chapter nine.

6.2. The multimodal context in *Second Life*

Second Life, the synthetic world at the core of this research study, was launched by its owners, Linden Labs, in 2003. The synthetic world is a social synthetic world in that it does not have traditional game play mechanics or rules. It offers a range of communication modes include still and moving images, layout, verbal, nonverbal, colour, movement and artefacts. These are used by experienced users of the synthetic world but not necessarily in this study. Concerning the verbal and nonverbal modes upon which this study concentrates, many of the modalities offered to the synthetic world users are not available in face-to-face contexts.

Whilst verbal communication was originally text-based in *Second Life*, in 2007 Linden Labs introduced audio communication. For the general public, the introduction of the audio modality in addition to the written modality met with resistance (Wadley & Gibbs, 2010), however, for the language learning-teaching community the increased possibilities for interaction helped generate interest in the environment.

In this section, I describe the multimodal context in *Second Life*, through the presentation of a typology for the verbal and nonverbal communication channels offered for interaction in the synthetic world. I outline the relationships between the different types of communication acts that are built into the environment, and also some of the similarities and differences with the first world. By defining the multimodal context, I seek to contribute to

some of the methodological reflections needed to better understand the affordances of synthetic worlds. In particular, this typology will later be used in this study to inform our methodology for multimodal transcriptions of our data (see Section 9.6.2). Also, because a socio-semiotic approach to multimodality and interaction places importance on the context, because this shapes the resources that are available to a sign-maker for meaning-making and how these are selected, it seems important to describe this context.

6.3. Verbal mode

In this section, I outline the possibilities in *Second Life* for verbal communication in the audio and written modalities.

6.3.1. Audio modality

In *Second Life*, verbal synchronous communication can take place through three different channels: the spatial audio channel, also termed the **public audio channel**, the **group voicechat** or the group voice channel and the one-to-one voicechat, also termed the **private audio channel**.

The **public audio channel** enables users to talk to other users whose avatars are within a radius of either less than 60 metres or less than 110 metres (see below), provided that the users are in a voice-enabled parcel of land. This type of voice transmission within synthetic worlds has been termed '*proximity transmission*' (Wadley and Gibbs, 2010:188). The activation of the audio channel of a user is displayed through icons. Firstly, within the textchat box, a green circle appears if a user's avatar is in proximity to another avatar that has the voicechat function activated (see Figure 23). Secondly, this is also communicated via a white dot which can be seen above an avatar's head. When a user activates his/her microphone by clicking on the 'speak' button in the *Second Life* interface this white dot appears. Concerning the 'message transmission' (Herring, 2007), when a user talks, a green icon appears above his/her avatar's head (see Figure 24). This icon grows and shrinks with the volume patterns and fluctuations of the user's voice. The icon may turn red should a user be speaking loudly; have the microphone too close to his/her mouth or the volume control of the microphone badly adjusted. The message transmission is full duplex: multiple speakers can talk simultaneously in the public audio channel.

The public audio channel takes users' proximity and orientation into consideration. Another user's voice becomes louder if the avatars are oriented towards each other and also when the distance between users decreases. Individual users equally have the opportunity of increasing another user's audio volume without approaching the avatar or orientating themselves towards the avatar, by choosing a volume slider within a menu from the interface. If different users are speaking at the same time the voices of users will be of different levels of loudness depending on the distance to the receiver's avatar.

When using the public audio channel, users can either decide whether to attach the audio received from other users to their avatar position or to their camera position. The camera is a device which allows users to detach their point of view from the avatar they are controlling, allowing the user to gain multiple perspectives. If a user selects to listen from his/her avatar position, the user's voice will carry for around 60 metres. If a user decides to listen from the camera position, the sound carries for around 110 metres.

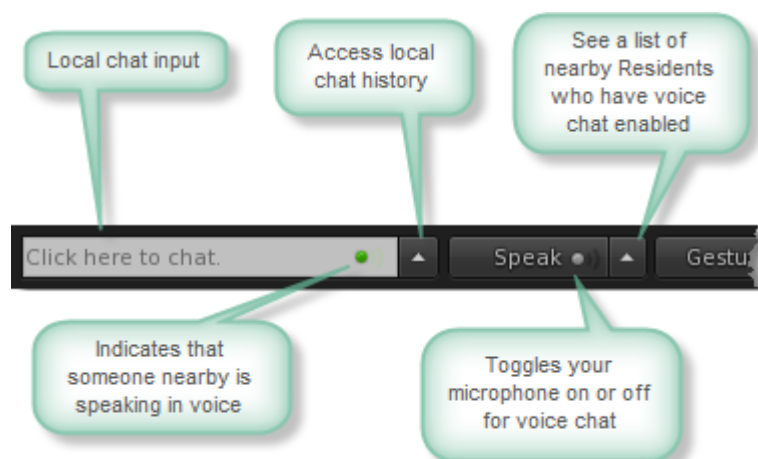


Figure 23: Public audio and textchat as part of the bottom task panel bar in *Second Life*

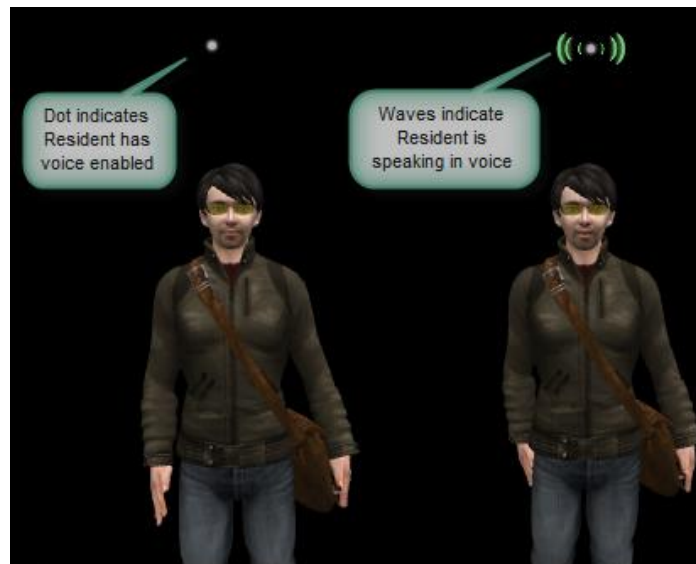


Figure 24: Icons to show the activation of audio within *Second Life*

The **group audio channel** is used between different users who belong to the same group. To use this channel the users do not have to be spatially close to each other in *Second Life*. Rather, this channel allows communications between users at arbitrary virtual locations. Wadley and Gibbs (2010:188) term this '*radio transmission*'. This voice channel opens a new window within the *Second Life* interface in which there is a list of all the avatar names of the users who are typing or talking within the group is displayed and also an instant messaging interface. Within this interface the group's textchat history is displayed and, against the name of each avatar who has the speak function enabled; the volume of the individual speaker is displayed through a green icon next to their avatar name.

Finally, the **one-to-one audio channel** is a 'private' channel (Herring, 2007) allows users to utilize voice communication with another user, even if they are spatially separated. Again, a new window is opened allowing the users to communicate simultaneously with audio and textchat.

The use of verbal communication in *Second Life* was introduced in 2007, four years after the creation of the synthetic world. The introduction and use of verbal communication within *Second Life* has been studied by Wadley and Gibbs (2010) who compare the voice channel usage in *Second Life* to that of the massively multiplayer online role-playing game (MMORPG) *Dungeons and Dragons Online*. I turn now, briefly, to three issues the authors raise with the use of voice communication in online 3D graphical environments – identity, association of voices and multiple conversations.

Wadley and Gibbs describe that the uptake of verbal communication within the synthetic world *Second Life* differed with respect to the type of user. 'Immersionists' (Boellstorff, 2008) who use synthetic worlds to play a character in a fictional universe were opposed to using voice communication for it resulted in a loss of anonymity. 'Argumentationists', who project their offline identity to collaborators whose identities are known, however, were more willing to adopt this mode of communication, believing that the voice communication helped to convey a speaker's identity and helped them to establish trust. These users of *Second Life* also felt that voice communication conveyed richer and more nuanced meaning and was superior when discussing complex topics or when helping other users (Wadley and Gibbs, 2010:192).

Users who adopted the voice channel for communication in the MMORPG had difficulty in identifying the speakers, that is to say in associating a voice with an avatar. This was especially true when the avatar was a stranger. Users described being unable to see the visual icon which highlighted that a speaker was talking and that searching for this icon was a distraction for users. The authors also highlight that if an utterance is short, by the time it takes for a user to search for the visual icon to associate the voice with a user, the icon may have disappeared.

Finally, Wadley and Gibbs (2010) describe that *Second Life* users felt that textchat was better suited to multitasking and conducting simultaneous conversations, in comparison to verbal communication. Users appreciated textchat channels to support short-term asynchronicity, allowing users to read back through textchat logs to refresh their memory of a conversation when necessary. The authors also report that *Second Life* users felt that written communication through textchat supported complex, multithreaded real-time conversation between large groups better than voice communication did. In large groups, users appreciated the possibility to use the textchat as a back channel while someone is speaking, a practice that is normally considered rude in physical classrooms or meetings.

6.3.2. Written modality

Written communication in *Second Life* can take place through various channels and may be synchronous or asynchronous. Firstly, the **synchronous public textchat** can be used and read by any avatars that are within a 20 metre range of the communicating user's avatar (see Figure 25). This range can be extended or decreased if the user chooses to make use of the whisper or shout function. By typing a backslash before the message and then 'whisper' or

'shout', a user can increase the range of their public message to 100 metres or decrease this range to 10 metres. Within the textchat box, shouted messages are displayed in bold and whispered messages are displayed in italics (see Figure 25). The 'message transmission' is message-by-message (Herring, 2007) and concerning the 'format' when a message is displayed, the user's avatar name appears before the message. The message transmission is two-way: several users can type into the public textchat simultaneously. There does not appear to be an upper limit in terms of the 'size of the message buffer'. No possibilities for 'quoting' previous messages are offered apart from copying and pasting them into the message being composed. In Figure 25, we can also see that when a user decides to communicate using the 'whisper' or 'shout' functions that the written communication is accompanied by nonverbal communication. In Figure 25, a blended pantomime gesture (see section 4.3) accompanies the user's shouted message.



Figure 25: Public textchat channel in *Second Life*

Secondly, a **group textchat** feature is available to users allowing them to communication with others who are at arbitrary virtual locations. When this group textchat channel is opened a new window within the *Second Life* interface is displayed in which a list of the avatar names of the members of the group who are currently connected to *Second Life* figures. This channel is for synchronous written communication. The communication is 'filtered' in that it is only available to members of the group.

Finally, an **instant messaging** feature is available. This feature is for private synchronous and asynchronous communication, allowing users to contact another user no matter where they are, inworld or offline, at any time. When this feature is opened, a new instant messaging window is displayed. Previous instant messaging conversations with this

user are displayed and depending on the colour of the text of these previous messages a user can decipher whether his/her interlocutor is online or offline. Should s/he be offline, the messages are displayed for the user the next time s/he connects to *Second Life* or, if the user has the option activated, the messages are delivered to an email account. Regarding the ‘size of the message buffer’ the number of characters per instant message is limited. ‘Message transmission’ is message-by-message.

Note cards are another written form of communication that may be used in *Second Life* (see Figure 26). They are a single text document that a user can create and share with one or numerous people. Note cards provide a way to deliver more extensive information than an instant message for the size of the message buffer is not limited. Another difference is that a note card can contain embedded items including, snapshots, objects or textures. Note cards, once sent to another user, are stored both in the sender's and in the receiver's inventory. The user decides whether s/he wants to delete this note card. The user also has the possibility to share the note card s/he has received with other users. Objects in *Second Life* can also be programmed to send a user a notecard when s/he touches the object.

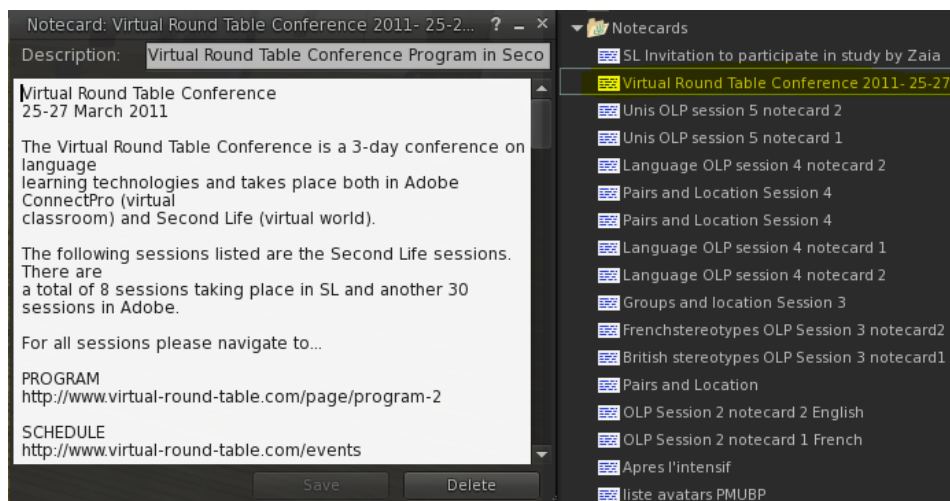


Figure 26: Example of a notecard with storage in the inventory shown in yellow.

Another form of written communication in *Second Life* for communication between an officer of a group and members of a group is **group notices** (see Figure 27). Group notices can be written by the officers or owner of a group and sent either to selected members of the group or to the whole group. These notices are stored in the group profile area for a period of fourteen days. When a message is sent to group members, the user is alerted by a message symbol on the interface and can read the message directly. However, these messages are not

stored in a user's inventory but are only accessible once closed after a first reading, through the group space. Notices can contain attachments but the number of characters in a notice is limited.

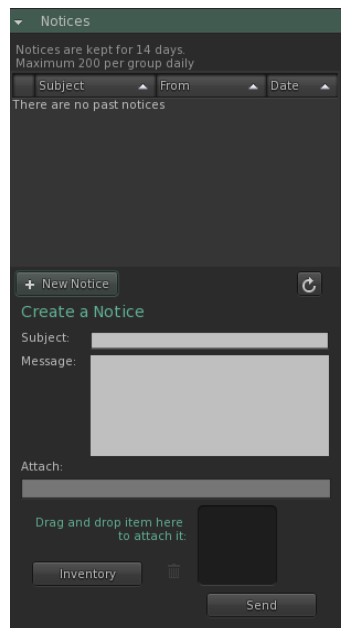


Figure 27: Group notices

In terms of research into written communication in synthetic worlds, there has been some debate about the significance of textchat. Ventrella (2011:72) quotes the avatar scholar Schroeder who argues that text communication does not enhance but rather distracts from the sense of presence and copresence in a synthetic world, although he acknowledges that because textchat communication is so widely used in synthetic worlds that it cannot be ignored when conducting research on avatar communication.

6.4. Nonverbal mode

Some authors have divided nonverbal communication in SL into user-generated and computer-generated acts (Antonišević, 2008), also described as rhetorical and non-rhetorical nonverbal communication (Verhulsdonck & Morie, 2009). A user-generated nonverbal act involves a user consciously selecting an act of nonverbal communication and deliberately performing this act. Computer-generated acts, however, are predefined in the system and the user does not deliberately choose to display these. In my methodological framework, I prefer to sub-divide the categories of nonverbal communication by their communicative act rather than with reference to how they are encoded by the user and synthetic world. I will refer to

the modalities of **proxemics**, **kinesics** and **avatar appearance**. We must remember that what we term nonverbal mode refers to the mode of production. In the synthetic life environment itself, the reception of the nonverbal mode is visual. Figure 28 shows my classification of nonverbal acts identified in SL. I will now exemplify a few of these categories.

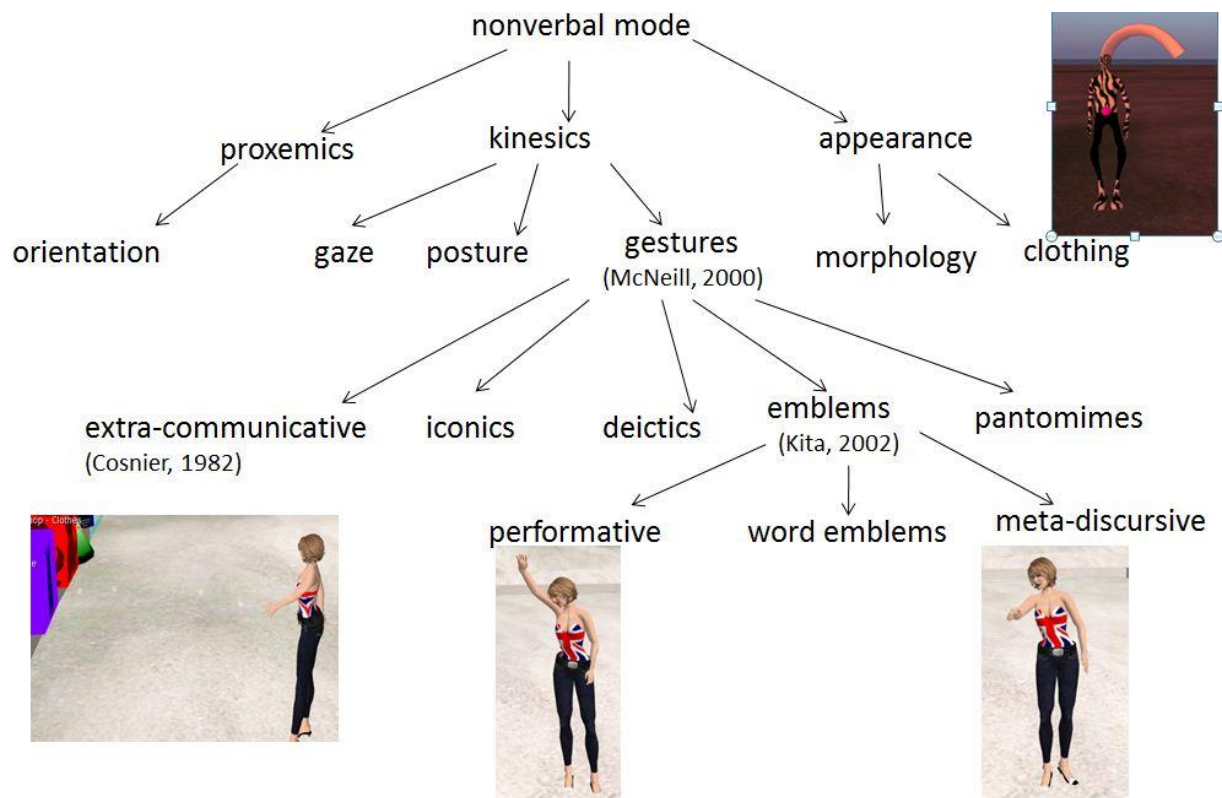


Figure 28: Typology of nonverbal communication in *Second Life*

6.4.1. Proxemics

Proxemic cues in *Second Life* are user-defined nonverbal acts. That is to say that the user has direct control of when to perform a proxemic act. The range of proxemic acts which are available to *Second Life* users include the user choosing to move his/her avatar, for example, through making the avatar walk, run or fly; orientate his/her avatar and how the user decides to position his /her avatar with respect to other users. Because proxemic acts in *Second Life* are controlled by the user, we must take into consideration their importance for interaction. Indeed, proxemic nonverbal communication has been the focus of various studies in several synthetic worlds (Jeffrey and Mark 1998, Yee *et al.*, 2007, Antonijevic, 2008).

Jeffrey and Mark (1998) studied social norms involved with personal and group space in *Active Worlds* and *Online Traveler* and showed that the way in which people move through

synthetic worlds, approach other users in synthetic worlds and position their avatars in relation to other avatars is affected by how the space in the synthetic world is perceived. In their study, the researchers found that individuals, in general, kept a distinct physical distance between their avatar and the avatars of other users and that when this personal space was violated, users reacted and expressed their discomfort either through user-defined nonverbal clues combined with written communication or uniquely in their nonverbal behaviour. When groups of avatars were communicating in synthetic worlds, the users' proxemic communication related to the positioning of other avatars. For example, in group situations avatars preferred to navigate around invisible boundaries rather than passing through the groups of avatars; users recognised distinctive interactional zones between other users present in the area to which they had exclusive rights.

Yee *et al.* (2007) examined whether interpersonal distance in *Second Life* was comparable to social norms in the physical world. The authors demonstrated, in a study on *Second Life*, that the genders of the avatars had an impact on the proxemic space that the users chose to adopt between the avatars when interacting. Avatars in mixed-gender conditions stood closer together than avatars in the male-male and in the female-female conditions.

In *Second Life*, we note the wish of the designers of the synthetic world to associate the nonverbal communication class of proxemics with the verbal communication, particularly in association with the proxemic dimension of voice loudness (Hall, 1963). Firstly, in the written communication, a user has the possibility to increase or decrease distance at which a message can be read publicly by using the whisper or shout function and when s/he does so this is displayed nonverbally through a pantomime gesture. Secondly, the audio channel takes the spatial proximity and orientation of users into consideration. Another user's voice becomes louder if the avatars are oriented towards each other and also when the proximity between users decreases.

6.4.2. Kinesics

The nonverbal communication modality of **kinesics** in *Second Life* is composed of predefined cues, that is to say nonverbal acts that the user does not deliberately perform or encode and blended cues that are user selected but system encoded. Kinesics in *Second Life* concerns mainly the categories of **gaze**, **posture** and **gesture**. Kinesic acts in *Second Life* have several functions, including showing the status of the verbal communicative activity of a user and mimicking 'interactional synchrony' (Kendon, 1970) between users. In this section I

outline some of the nonverbal kinesic acts possible in *Second Life* and their relation with verbal communication and possible impacts on interaction.

The kinesic act of **gaze** is incorporated in *Second Life* as a predefined cue which has, with relation to the verbal modes and the nonverbal modality of proxemics, the function of mimicking interactional synchrony. For example, when a user moves his/her avatar in a certain direction, the heads of nearby avatars will automatically turn to this direction, imitating the proxemic coordination of movements between interlocutors so as to complement the verbal communication. Another example of a predefined gaze movement is when an avatar joins a group of avatars. An automatic 'lookat features', whereby the other avatars in the group gaze at the avatar joining the group, is activated.

We also note the wish of the synthetic world designers to make a connection between nonverbal kinesic acts and verbal communication: avatars in *Second Life* respond to another avatar's written communication in the public chat channel by turning their gaze towards the avatar who generated the written communication (see Figure 29). Ventrella (2011:88) argues that the kinesic act of avatar gaze helps to make users feel acknowledged and welcome: subconscious social acts are included in the autonomic, nonverbal kinesic acts which Ventrella believes help make conversations feel more natural.

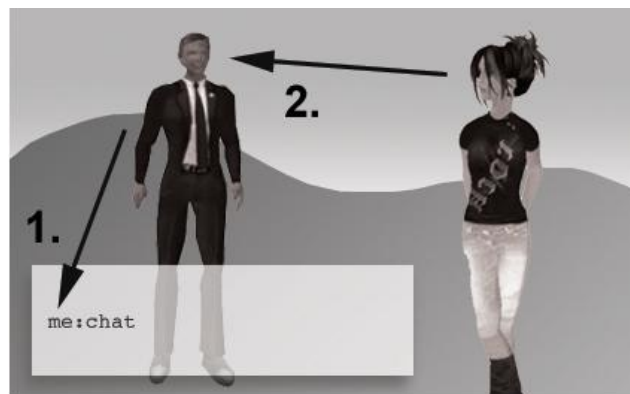


Figure 29: Written communication appearing in a text chat window causes a gaze reaction in the synthetic world (from Ventrella, 2011:11)

The impact of the kinesic act of avatar gaze on the communication and perceptions of communication in synthetic worlds is important. Ventrella (2011) exemplifies this explaining the possible consequences for interaction should synthetic world users not be aware of possible virtual "faux pas". He quotes the example of a popular avatar that started to get a bad reputation as a snob due to the computer-generated kinesic acts of gaze. This, despite extra

attempts by the user to be sociable. The computer-generated kinesic acts meant that the avatar's gaze was frequently directed at nothing in particular. Although the user was not aware of snubbing people, the nonverbal communication of her avatar meant that she gained a bad reputation with other users who became reluctant to engage in conversation with her.

The kinesic act of **posture** is also incorporated into *Second Life*; both as a predefined cue, which is in is encoded by the system with relation to the verbal communication and as a blended cue which the user selects but the system encodes. When a user makes a significant pause in his/her written or oral communication, and this is identified by the *Second Life* system, the user's inactivity in the verbal mode automatically sets the posture of the user's avatar to that of a 'spectator': "the avatar slumps over forward as if to fall asleep while standing" (Ventrella, 2011:85). Individual users can decide that this kinesic act will be performed, five, 10 or 15 minutes after verbal inactivity.

Gesture acts in *Second Life*, cover a number of different categories as discussed in Chapter 3. These include **extra communicative acts**, **deictics**, **pantomimes**, **emblems** and **iconics**. Verhulsdonck and Morie refer to this category of nonverbal acts as 'default gestures' (2009:4). All but one of these acts, that of extra communicative nonverbal acts which I will treat first in this section, are pre-programmed within *Second Life*, but an individual user must choose for his/her avatar to perform one.

Extra communicative nonverbal acts of gesture are predefined cues in *Second Life* that are activated when there is a short pause in the verbal modes of communication and before the spectator posture act is encoded. Verhulsdonck and Morie (2009) refer to these acts as the 'wait state' of an avatar and describe the movements that are performed during this time as including the avatar shifting his/her body weight around, looking around and appearing to be breathing. It has been suggested (Antonijevic 2008:232) that these acts take on greater communicative significance in the synthetic world than in face-to-face interaction. For example, the extra communicative gestures that an interlocutor may display during a four-second pause in verbal face-to-face communication would rarely be of communicative significance. However, because in *Second Life*, these predefined acts represent passivity in the verbal communication modes when displayed, they may signal to users interactional indifference and cause avatars to walk away from the communication. There may be an over interpretation of the act by the users who understand the nonverbal communication as portraying a detachment from the interaction.

It is interesting to note that in *Gesture Studies*, kinesic acts of posture and extra communicative nonverbal acts which are used in *Second Life* to encode a break in the written communication, e.g. putting the avatar in a 'spectator' pose, moving the avatars arms from hanging beside their bodies to placing their hands on their hips, are often the type of movements of the hands and arms that in face to face communication are termed 'non-communicative' (Freedman and Hoffman, 1967). In face-to-face communication, non-communicative gestures are seen as movements of the arms and hands that do not participate directly in the communicative exchange and can easily be perceived as not pertinent to the communication and, thus, eliminated from the communicative exchange by the receiver (Kendon, 2005). When applied, however, to synthetic worlds, it would appear that they may appear to take on a communicative act which may agree with or contradict the verbal intention of a user, e.g. in the previous example, that of interactional indifference.

Deictic gestures are pointing gestures that refer to objects, time, places or people in real or abstract space. In comparison to iconic and metaphoric gestures, deictic gestures are not representational but rather pick out their referents through a shared spatio-temporal proximity with them (Haviland, 2000:17). The referent which they pick out is normally anchored in the verbal communication through indexicals including pronouns, tenses and demonstratives.

Deictic acts are encoded in *Second Life* when a user touches or manipulates a media object in the synthetic world by clicking on it with his/her mouse. This type of gesture is blended for it is the user who decides to touch or manipulate an object but the system has the deictic gesture pre-programmed. One arm of the avatar that is editing or touching the object becomes stretched out to the edited object and a 'particle stream' of white dots forms a line between the avatar's hand and the object itself (see Figure 30). There is no distinction between the pre-programmed gestures to show whether an avatar is simply touching an object or if the user is manipulating or editing the object, for example, changing the object's size, colour or scripting the object.



Figure 30: Deictic gesture at a media object

Pantomime gestures are defined by Kendon (1982) as those movements of the hands and arms always in the visual description of an action or an object. In *Second Life* there are numerous avatar animations which portray the avatar as visually imitating an action. For example, these include the avatar animations of crying and smoking, as shown in Figure 31.



Figure 31: Examples of avatar pantomimes for crying, smoking and typing

Links between the nonverbal acts of pantomimes and the verbal modes can be seen. Firstly, users can choose for his/her avatar to perform this type of act by using the public text chat box and a backslash followed by the name of the gesture to trigger the system to animate the user's avatar. Secondly, when a user is communicating in the written mode, his/her avatar portrays the pantomime gesture of typing (see Figure 31). Should the user decide to communicate in the written mode using the whisper or shout features, his/her avatar will also perform a pantomime gesture which complements the written communication.

Whereas in face to face language-learning situations, the use of certain pantomime gestures may be unsuitable to the communication context, in this study I noted that the use of

such gestures was to personalise a user's representation of him/herself. I will develop this point later in the study.

Second Life includes examples of **emblems**. These gestures are defined as being cultural gestures which often replace verbal communication, despite the possibility to translate the gesture by a word or an expression. Should we refer back to the sub categories of emblems as defined by Kita (2002 cited in Yoshioka, 2005:24), examples of word emblems which make redundant the verbal communication are present in *Second Life*. These include the blended cues for 'yes' and 'no' which are shown through the avatar nodding or shaking his/her head. Examples of performative emblems, which perform a social function, are also present. These include emblems which are used ritually such as greetings, including the Anglophone greeting of a hand wave and the Eastern Asian greeting of bowing (see Figure 32). Although these performative emblems could make the verbal communication redundant, they are often used to complement the verbal communication.



Figure 32: Examples of performative emblem gestures

Examples of gestures also fall under the sub category of meta-discursive emblems, which have a rhetorical function or which are used to regulate communication, are also present in *Second Life*. For example, the gestures 'me' and 'you' (see Figure 33). These could be used to help regulate conversation or facilitate introductions: they complete the verbal communication.



Figure 33: Examples of meta-discursive emblem gestures

Iconic gestures are described by McNeill (2000) as representations of an action or object and have a very direct relationship with the semantic content of a verbal utterance. This type of gesture, in face to face communication, is normally used to illustrate what is being said: these gestures are used to show physical, concrete items. *Second Life* examples include the avatar animations for scissors and muscles in which the avatar portrays in his/her movements of the arms and hands the physical item, as shown in Figure 34.



Figure 34: Examples of avatar iconic gestures for scissors and muscles

Within *Second Life* indicators of emotional states are also expressed through iconic gestures in comparison to face-to-face communication in which these would be shown through facial expressions. For example, avatars can communicate their boredom, embarrassment or the fact that they are impressed through blended gestures, as shown in Figure 35. It is of interest to note that the expressions of emotional states are accompanied by vocal interjections. For example, the boredom iconic gesture is accompanied by the sound of a sigh [acH:] whilst the gesture for the emotional state of embarrassment is accompanied by a nervous laugh and the iconic gesture to show that the avatar is impressed is accompanied by [waU].



Figure 35: Gestures to indicate an emotional state (accompanied by vocal interjections)

6.4.3. Appearance

The nonverbal communication modality of **appearance** in *Second Life* is composed of possibilities both to change an **avatar's morphology** and **clothing**. In the synthetic world, each virtual object, including items of clothing and body parts (including body skin), is a prim or collection of prims which is worn by the avatar. A primitive, or prim, is a single-part object: the simplest 'building brick' which allows a user to create a virtual object in the synthetic world. The user can decide to entirely change a prim, for example detaching one item of **clothing** and adding another prim in its place so that the avatar changes clothing (Figure 36). A user can also change the texture of a prim, for example the pattern or colour of an item of clothing or the colour of skin (Figure 36).



Figure 36. The same avatar with changed clothing items and texture of the avatar's skin prim

Concerning the **avatar's morphology**, the user can modify around sixty different physical parameters to adapt their avatar. These parameters concern the avatar's body, head, eyes, ears, nose, mouth, chin, torso and legs. Within each category there are a number of different options for the user. For example, in the category 'body' a user can adjust the height of their avatar using a slider from 'short' to 'tall', the body thickness of an avatar from 'body thin' to 'body thick' (see Figure 37), and the body fat from 'less body fat' to 'more body fat'.



Figure 37 : Adjusting avatar body thickness

6.5.Conclusion

In Chapter five, I noted the current lack of a systematic methodology to study interactions in synthetic worlds and suggested that this weakens, to some extent, the current research in this domain. In order to inform our study, in this chapter, I presented a categorization of the different modalities available to users in *Second Life* for verbal and nonverbal interaction and highlighted the interplay between these modes that is pre-built into the environment. This categorization informs choices made concerning transcription in Chapter 9 and contributes in part to the methodological considerations needed to render research into interaction in synthetic worlds more systematic.

**PART III – PEDAGOGICAL
APPROACH TO THIS STUDY
AND RESEARCH METHODS**

Chapter 7. Content and Language Integrated Learning

7.1. Introduction

This chapter focuses on the Content and Language Integrated Learning (CLIL) approach which is at the core of the learning design of the course which provided the research context for my study into multimodality in synthetic worlds. Firstly, I provide an overview of this approach, describing the historical development of CLIL and the defining elements of this pedagogical approach. I then detail the theoretical foundations for CLIL with respect to three theories of Second Language Acquisition, namely the theories of Krashen, Swain and Cummins. This leads us to describe the curricular models that have been proposed for CLIL alongside the parameters which have been suggested for CLIL course planners. I close the chapter by providing the reader with an overview of research into CLIL.

7.2. CLIL overview

In this section, I introduce the CLIL pedagogical approach in terms of its historical context and defining elements.

7.2.1. The development of CLIL

Within Europe, Content and Language Integrated Learning (CLIL) has been introduced proactively as a response to the need to identify "solutions by which to enhance language learning, or some other aspect of educational, social or personal development" (Coyle, Hood & Marsh, 2010:7). This proactive reason has resulted from both bottom-up grass roots movements as well top-down political initiatives (Dalton-Puffer, 2011). With reference to top-down initiatives, the promotion of linguistic diversity and plurilingualism has been on the European agenda since 1958 (EEC, 1958 cited in Coyle, Hood & Marsh, 2010) when the official languages of the European Economic Community were determined and the need for a plurilingual unity stressed as an important consideration. This was followed, in 1978 by a European Commission proposal (EC, 1978 cited in Coyle, Hood & Marsh, 2010) which advocated that school teaching through more than one language should be encouraged. This

proposal was officialised in the 1995 Resolution of the Council legislative (EU, 1995 cited in Coyle, Hood & Marsh, 2010) which promoted "the teaching of classes in a foreign language for disciplines other than languages, providing bilingual teaching" (Eurydice, 2006:8). As this Eurydice report describes, the latter 1995 piece of legislation was drawn up at the same that a White Paper on education and training (Teaching and Learning – Towards the Learning society) stressed the need for innovative ideas and effective practices to help promote plurilingualism in three languages of all European Union citizens. The Paper suggested that, in secondary education, the study of certain subjects should be accomplished in the L2. Coyle, Hood & Marsh (2010) describe that this increasing prioritization culminated in European Council recommendations (EC, 2005 cited in Coyle, Hood & Marsh, 2010) that CLIL should be adopted through the entire European Union. This recommendation coincided with bottom-up promotion for CLIL: families wanting the language education of their children to be improved in order for them to be competitive in the job market (Coyle, Hood & Marsh, 2010) and national governments recognising the socio-economic benefits improved language education could prompt. The term CLIL was adopted in the EU context in 1994.

7.2.2. Defining CLIL

Content and Language Integrated Learning is defined as a "dual-focused educational approach in which an additional language is used for the learning and teaching of both content *and* language" (Coyle, Hood & Marsh, 2010:1). The additional language may be a learner's foreign language, second language or a community / local language. CLIL is a content-driven approach: the learning of the subject content and the additional language are interwoven. In the approach, the additional language is a medium for learning content, and the content is in turn a resource for language learning. Thus, the "non-language subject is not taught in a foreign language but with and through a foreign language" (Eurydice, 2006:8).

The CLIL approach is built on a framework of four guiding principles: content, communication, cognition and culture (the '4 Cs framework', see Figure 38).

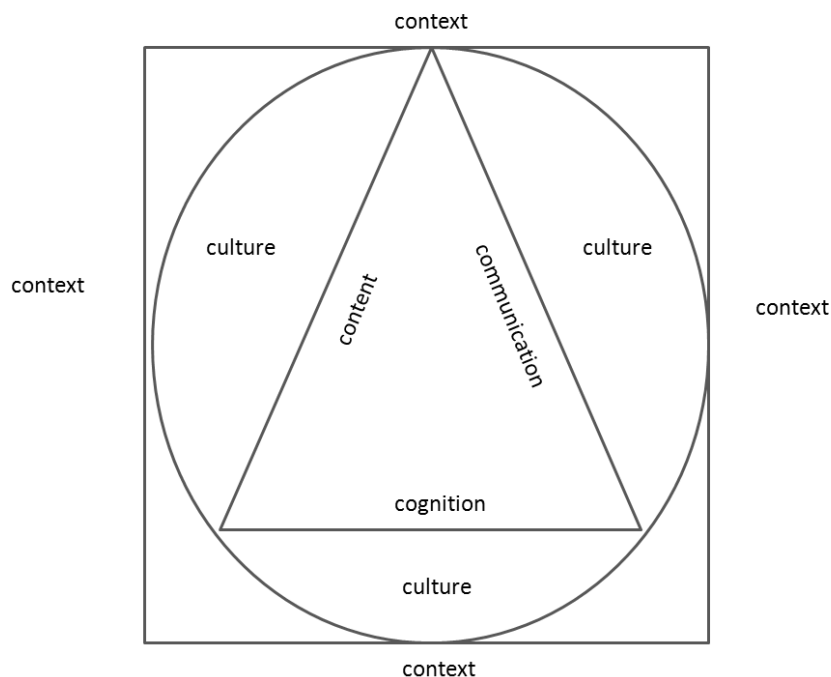


Figure 38: The 4 Cs framework

At the core of CLIL are the processes that are central to content learning where learners are cognitively engaged. 'Content' refers to the progression in skills and knowledge related to the content learning curriculum. 'Cognition' refers to developing the thinking skills which link concept formation and understanding. CLIL, thus, places an emphasis not simply on defining knowledge and skills to be acquired but on how these may be acquired through creative thinking, problem solving and cognitive challenge termed by Coyle, Hood & Marsh (2010) as a 'thinking curriculum'. This approach to content learning necessitates "transparent identification of the cognitive and knowledge processes associated with the CLIL context" (Coyle, Hood & Marsh, 2010:30) based, for example, on Anderson and Krathwohl's (2001) reworked version of Bloom's (1956) taxonomy of thinking in which a 'knowledge dimension' is explicitly added to the 'cognitive process dimension' of lower-order and higher-order processing skills. By explicitly connecting knowledge acquisition and skills acquisition, it is hoped that CLIL can allow individual learners to construct their own understandings, consequently, personalising learning and also developing skills.

'Communication' forms the third principle of the CLIL framework. Communication is seen as both using a language to learn and learning to use a language. Because there may be differences in level between students' cognitive functioning and linguistic competence, CLIL draws on the Language Triptych (Coyle, 2000, see Figure 39) in order to help render the connections between content and language objectives explicit.

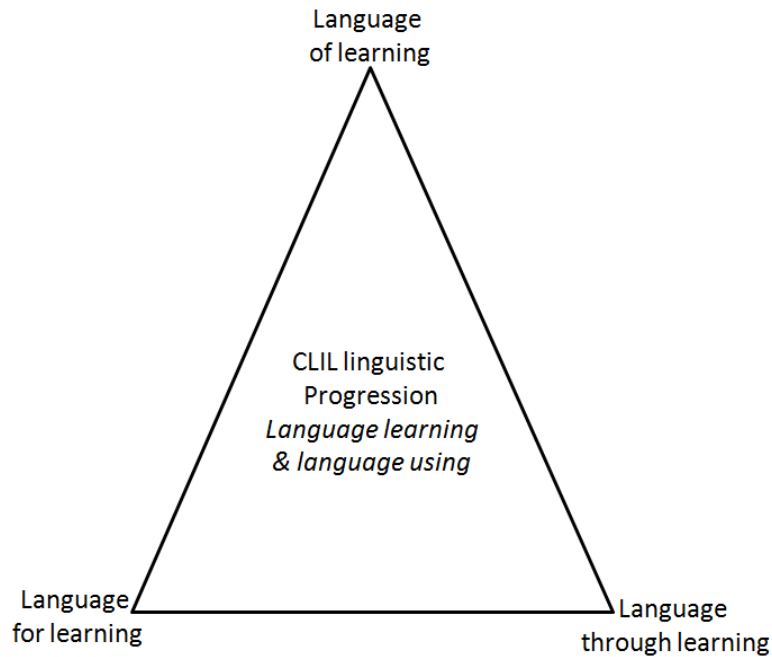


Figure 39: The Language Triptych (from Coyle, 2000)

With respect to the language objectives, CLIL teachers are, firstly, required to analyse the language that is needed in order for the learners to understand the basic concepts presented in the content objectives: the language of learning. Secondly, they must consider the language that the learners will need in order to be able to operate in the learning environment: the language for learning. This will include introducing learners to the speech acts needed for CLIL tasks to be carried out, for example, phrases to help learners describe or evaluate a process. It also refers to the need for learners to be provided with the language structures to allow them to interact during pair work or group work, such as the structures to ask questions, to respond to others or to debate. Lastly, CLIL requires teachers to reflect upon the language that appears through learning. They should provide scaffolding to learners during CLIL tasks regarding language that cannot necessarily be predicted before the task. They should find ways to exploit this language that arises *in situ* and help learners to capture and review this. This includes planning recycling activities in which the learners will 're-meet' the language.

The final C in the CLIL framework refers to 'Culture' and the exposure of CLIL learners to alternative perspectives and understandings. The socio-cultural premise is that culture determines the way in which learners interpret their world and these interpretations are expressed in language. Thus, by interconnecting content learning and the learning of an additional language, CLIL promotes intercultural understanding. It provides the possibility for

learners to understand experiences through a different lens, which would not be possible in monolingual learning. New ideas can be analysed critically from different cultural perspectives and learners. Because learners work between their L1 and the additional language, they can be introduced to the skills needed to mediate between one language and its culture(s) and the additional language and its culture(s).

The CLIL 4Cs framework, therefore suggests that effective CLIL will result as the interaction between content, cognition, communication and culture. Coyle, Hood & Marsh summarise this, stating that effective CLIL is a result of:

Progression in knowledge, skills and understanding of the content;

Engagement in associated cognitive processing;

Interaction in the communicative context;

Development of appropriate language knowledge and skills;

The acquisition of a deepening intercultural awareness, which is in turn brought about by the positioning of self and 'otherness' (Coyle, Hood & Marsh, 2010:41)

7.3.Theoretical foundations for CLIL with respect to Second Language Acquisition

In this section, I review how CLIL is supported by various theories of second language acquisition (SLA) in current academic literature. I examine the contributions of Krashen, Swain and Cummins to SLA. Such theories allow better understanding of the language-learning possibilities to be gained from a CLIL approach and explain certain benefits and challenges for learning, as identified by CLIL practitioners and researchers.

7.3.1. The five hypotheses model for SLA - Krashen

The model proffered by Krashen in 1981 is often cited as one of the most influential theories on SLA (Dalton-Puffer and Smit, 2007, Grabe and Stoller, 1997). Grabe and Stoller (1997:1) describe the model as "a major source of support" whilst Dalton-Puffer and Smit suggest the model is "of major significance as a conceptual reference point for CLIL" (2007:10). Krashen's monitor model offers five hypotheses. I will consider each in detail before examining why this model offers support to a CLIL teaching approach.

The acquisition - learning hypothesis and monitor hypothesis

Krashen argues that when considering SLA, it is important to differentiate between language acquisition and conscious language learning. Language acquisition is described as similar to the process children use in acquiring their first language, in that it requires meaningful interaction in the language, that is to say natural communication. Acquisition is considered as incidental, the result of what the person 'picks up' in natural communicative situations.

Conscious language learning, in contrast, is the conscious process of focusing on language, characterised by attention being paid to error correction and the presentation, explanation and development of explicit, formal, language rules. Krashen and Seliger (1975 in Krashen 1981:40) studied adult second language-learning environments and at the time, found that all the studied teaching systems exploited activities in which linguistic rules were presented and in which error detection or correction was present.

Krashen holds that conscious language learning is available only as a 'monitor' to the language user. Learners initiate utterances based on language they have acquired through natural communication and formal knowledge of the language system acts on the utterance to alter the output of the 'picked up' language, so as to improve accuracy. This monitoring process is deemed as having limited functions: Firstly, it is not possible to consciously learn all the rules of a language and secondly optimal use is rare. Krashen describes that the optimal user is "the performer who uses learning as a real supplement to acquisition" (1981:4). Krashen's critique of form-focused instruction is evident: formal instruction of language systems is of limited usefulness. Too strong a focus on form ('the overuser' of the monitor) is counterproductive because communication is inhibited by paying constant attention to form. Such a strong focus on form may also provoke a fear of speaking due to the apprehension of making a mistake. In contrast, 'underusers' do not seem to monitor conscious grammar use at all.

Should one adhere to the monitor model of Krashen, the major implication for language teaching is that it must support acquisition. That is to say that formal teaching of language rules must be reduced and rather attention must be paid to meaningful, natural communication.

The natural order hypothesis

Researchers into first language acquisition hold that children acquire language in a series of stages which are regular and predictable. Brown (in Krashen, 1981), for example, investigated first language acquisition by children, and discovered that the subjects assimilated grammatical morphemes in a predictable, natural, sequence. Krashen, quoting the work of Dulay and Burt (1974) on morpheme acquisition, and after empirical studies of second language acquisition in his 1981 study, proffers that this is similarly true of second language learners. Krashen and Terrell (1983) suggest the following order (Table 7) for the acquisition of grammatical morphemes by learners of English as a Second Language, non-dependant on the learner's L1.

Stage 1	-ing (progressive), plural, de-lexicalised verb (to be)
Stage 2	irregular past, auxiliary (progressive)
Stage 3	article (a, the), regular past simple tense third person singular –s in present tense, possessive s

Table 7: Order of acquisition of grammatical morphemes for learners of English L2

Note, however, that the researchers make no claims about the order of acquisition for elements in each stage. Since the order of grammatical morphemes suggested does not correlate to the sequence in which the accompanying grammatical rules are taught in formal language-learning contexts and as the order is similar for L1 English learners, Krashen and Terrell suggest that this 'natural order' only occurs in communicative contexts which are monitor free (1983:28-31).

The input hypothesis

Krashen holds that language learning is propelled by receptive skills ('the intake node' 1981:101) rather than productive skills. Analysing 'caretaker speech' that L1 speakers use when addressing young children, Krashen illustrates three characteristics. Firstly, that the language is relevant to the immediate environment. The significance being that the extralinguistic support aids comprehension. Secondly, the speech is syntactically simple, becoming more complex as the child gains maturity in the L1. However, the speech does not simply provide the next structure for the child to acquire, but rather is finely tuned to the current linguistic ability. Lastly, Krashen identifies that all caretaker speech is communication which requires a linguistic or behavioural response from the child.

From these three characteristics, Krashen hypothesises that intake is above all input that is understood, arguing that comprehension is "at the heart of the language acquisition process: perhaps we acquire by *understanding* language that is 'a little beyond' our current level of competence" (1981:32). Krashen refers to this as $i+1$ where i is input and $+1$ represents the fact that the input should be challenging and just beyond the acquirer's current level of competence. Krashen opines that intake must be 'natural' in that it is language used for communication.

As a result, Krashen proposes a positive correlation between the amount of exposure to comprehensible input and the level of language proficiency. The strong emphasis placed on input in his work suggests that production of language is not needed for language knowledge to develop and that production, rather, is the natural result of acquisition. Krashen exemplifies the prolonged 'silent period' of typical learners during which the learner absorbs the language or builds up "acquired competence via input" (1981:68) before s/he starts speaking and that later, when production commences, utterances are always at a lower level of competence than the person's understanding.

A correlate of this position is the various studies quoted by Krashen which suggest that "error correction has little or no effect on subconscious acquisition" (1981:11). Krashen supports this statement by citing the study by Cohen and Robbins (1979 in Krashen, 1981), whose study followed the correction of EFL students' written papers over a period of ten weeks, during which the teacher adopted a total-error-correction policy. It showed that the correction had no significant effect on student errors.

The affective filter hypothesis

According to Krashen, the affective filter as proposed by Dulay and Burt (1977 in Krashen, 1981, see Figure 40) plays a decisive role in the process of language acquisition and can prevent delivery of input to the Language Acquisition Device. Should the learner lack motivation or if the learner is anxious, a mental barrier is formed: a high affective filter which inhibits acquisition by preventing the comprehensible input being processed.

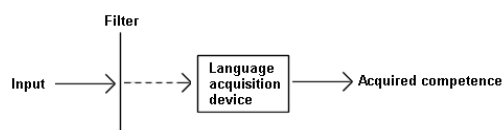


Figure 40: Operation of the "affective filter (in Krashen, 1981:32)

The affective filter hypothesis implies that pedagogical goals should not only include supplying comprehensible input, but also creating a positive atmosphere that encourages a low affective filter. Teaching which focuses on 'formal correctness' and on error correction should be avoided (Krashen and Terrell 1983:21-27). Rather, teaching should focus on providing comprehensible input to ensure a low affective filter and raise the motivation and self-efficacy of the learner.

Krashen's hypotheses with respect to CLIL

Krashen has been frequently cited as a reference point for Second Language Acquisition's theory towards a Content and Language Integrated Learning approach to language teaching. I now wish to explore how the five hypotheses described above and how they relate to the teaching principles of a CLIL approach.

Krashen suggests that language acquisition occurs in natural communicative situations. For the conditions of acquisition to be attained in language teaching, Krashen argues that meaningful comprehensible input must be provided (i+1) and for this acquisition to occur there must be a low affective filter. In teaching situations which adopt a CLIL approach, the target language is used as the working language. Krashen suggests "comprehensible subject-matter teaching *is* language teaching" (1985:16) if the subject-matter is made comprehensible. He goes on to say that "the subject-matter class may even be better than the language class for language acquisition" for in language classes teachers may have difficulty in deciding upon the subject whereas in immersion type environments the subject is automatically provided. Furthermore, in classrooms with a CLIL approach, learners can acquire language in an environment where they are not mixed with native speakers. This allows input from the teacher to be finely tuned in order for it to be comprehensible to the learners' level: it can be targeted at an i+1 level. The emphasis placed on scaffolding within CLIL programmes shows the importance accorded to this concept. Thus, a CLIL classroom fulfils the hypothesis of Krashen both in terms of a high amount of exposure to input and the fact that this exposure is deemed as natural. In CLIL, input is used to communicate about a subject relevant to learners and, consequently, is considered comprehensible. Through scaffolding, this input can be finely tuned to learners' current linguistic abilities in order to fulfil the i+1 hypothesis of Krashen.

Secondly, a CLIL approach can help ensure a low affective filter. Krashen argues that for acquisition to occur it is important to focus on meaning and avoid constant correction of

language errors which often has little effect on subconscious acquisition and does not provide a monitor-free communicative context. Coyle, Hood & Marsh advocate that "content should always be the dominant element in terms of objectives" (2010:115) in a CLIL approach. Krashen proffers that in his view of teaching "content is at the centre and it is only content knowledge which is assessed (1985:17). Consequently, the target language is used as a tool and students can express themselves without the constant assessment of their L2. This can contribute towards creating a positive atmosphere that encourages a low affective filter.

In a CLIL approach, 'translanguaging' (systematically shifting from the first language to the target language for specific reasons) is not discouraged. Indeed, as Coyle, Hood & Marsh explain (2010:16), lessons can involve systematic use of both the first language and the CLIL language. The first language may be used for summarising and outlining the main points with the target language being used for other lesson functions or the different languages made by used for specific types of activities. Allowing learners to use their mother tongue can serve to lower their anxiety level and thus their affective filter. As Coyle, Hood & Marsh describe (2010:16), learners may use their L1 to speak to the teacher but the teacher may address the students in the L2, or learners may use a textbook in the L1 to build confidence and check comprehension whilst completing a task in the L2. Thus, the condition of a low affective filter for successful acquisition, as proposed by Krashen, seems to be satisfied by a CLIL approach.

7.3.2. The output hypothesis of Swain

Swain proposed the output hypothesis in 1985, following field work in French immersion programmes in Canada from which she concluded that learners in this type of programme were of better proficiency in receptive skills than in productive skills. Swain's output hypothesis argues that "student learning depends on explicit attention to productive language skills" (Grabe & Stoller in Snow & Brinton 1997:6). The output hypothesis suggests that language production is, in part, and under specified circumstances, part of the process of second language acquisition. In this section, I turn briefly to the historical context in which Swain proposed the output hypothesis before concentrating on the three functions of output for second language acquisition which are suggested in this theory.

Historical context and explanation of the output hypothesis

The output hypothesis of Swain was proffered after much research into Canadian immersive programmes. Initial results from field-work into these programmes showed that immersive students had a higher level of French as a second language (FFL) proficiency than students who had a short FSL class per day. Indeed, the students in immersive programmes were shown as having achieved near native proficiency in terms of their reading and listening proficiencies when compared to native children of similar ages. However, in terms of their production skills the students achieved "limited L2 proficiency" (Snow & Brinton, 1997:6).

Research (Swain, 1985) showed, firstly, that the students did not speak as much during the lessons which were taught in the L2 as during those which were taught in the L1 and that the utterances in L2 were considerably shorter: only fourteen per cent being longer than clause length. Secondly, grammatical accuracy and sociolinguistic appropriate production were not systematically considered as important by the L2 teachers: fewer than twenty per cent of grammatical errors were corrected by teachers. Students were able to convey messages but these were often not "conveyed precisely, coherently, and appropriately" (Swain, 1985:249). Thirdly, input was restricted to certain language formulations. For example, analysis from fieldwork showed that the use of the present tense and imperative structures accounted for nearly three quarters of the verb types recorded, whereas past tenses rarely were used and the conditional tense never used. Thus, Swain concluded that there was "an additional need to emphasise formal language aspects of the content resources used in immersive contexts" (Grabe and Stoller in Snow and Brinton, 1997:6) because the nature of the language input influences learning opportunities.

Swain argues that teachers needed to 'push' their students towards production with fewer grammatically deviant forms and less sociolinguistically inappropriate language. Interaction needs to have a facilitative function whereby meaning is negotiated and "'negotiating meaning' needs to be extended beyond the usual sense of simply 'getting one's message across'" (Swain 1985:248).

Functions of output

The first function of output, or production, that Swain proffers is that of 'noticing' (1985:129-32.) That is to say that whilst learners try to formulate their production, the learners may consciously recognise their linguistic gap(s) necessary to communicate the

message. Here, it is important to state that this may happen vocally or silently and that the term 'noticing' that Swain accorded to the function differs from the application of the term in the model of SLA as proposed by Ellis in 1994.

Swain holds that noticing is a function whereby, when attempting to produce the target language, the learner him/herself becomes aware that s/he lacks the grammatical structure or the lexical item(s) to produce the meaning s/he wishes to convey. The theory of Ellis, however, holds that the process for explicit knowledge to become implicit knowledge is facilitated through 'noticing,' during which "learners attend to linguistic features of the input that they are exposed to" (Shmidt and Frota, 1986 in Thornbury 2003). Swain suggests noticing as internal attention to a linguistic gap whilst Ellis views noticing as a process in where learners remark on how the target language input differs to their own usage. Both theories concern learners noticing the gap in their knowledge but Swain's use of the term can be seen as an internal process triggered by production in comparison to Ellis who uses the term to describe an internal process which is triggered by input.

The second function of output, as described by Swain is that of hypothesis testing: learners use output to test their linguistic knowledge and to seek feedback on this. That is to say that the errors which occur in the production of the L2 "reveal hypotheses held by them about how the target language works" (1985:131). Output allows the learners to try new grammatical structures and forms of lexical items to test the communicative message of the output and the linguistic accuracy in order: "to see what works and what does not" (1985:132.)

Swain contends that one of the functions of output is that it offers conscious reflection. Swain claims that using language to reflect on language production mediates second language acquisition. Output allows learners to operate on linguistic data and these operations become incorporated into the linguistic knowledge of the learners and, later, become the object of internal cognitive reflection. This relates closely to the sociocultural theory that people operate with mediating tools (Wertsch, 1985), such as speaking.

The output hypothesis of Swain with respect to CLIL

The output hypothesis, as proposed and developed by Swain, corresponds on various levels to the teaching principles of a CLIL approach. The integration of Swain's observations into the CLIL approach is, arguably, what distinguishes a CLIL programme from a language

immersion programme. Above all, the output hypothesis corresponds directly to The Language Triptych for CLIL as proposed by Coyle (2000, see Figure 39).

Firstly, since content teaching through a L2 does not seem to provide all the grammatical structures needed by learners in input, Dalton-Puffer (2007:295) argues that it is vital in CLIL courses for language objectives to be specified.

Content teaching needs to guide students' progressive use of the full functional range of language, and to support their understanding of how language form is related to meaning in subject area material.

The integration of language, subject area knowledge and thinking skills requires systematic monitoring and planning. (Swain 1988:68 in Coyle, Hood & Marsh, 2010:34.)

In Coyle, Hood & Marsh (2010) the authors argue that from a CLIL approach, tasks concentrate on form-meaning mappings. Termed by Coyle as the 'language of learning': the language that the particular type of content uses or the 'content-obligatory language.' Coyle, Hood & Marsh suggest that this language, required by learners to access the basic concepts of the content, needs to be reflected upon during lesson planning.

Due to the wide range of subjects a language learning course with a CLIL approach will address, it is argued that it is possible for learners to see and to use a great variety and diversity of functions. However, as Swain showed with the Canadian French immersion programmes, this does not perhaps suffice. A CLIL approach places emphasis on the planning for variation in task types. Such an organization of task types can help ensure that learners are introduced to certain target linguistic forms, by setting up tasks in which these forms are necessary in output.

Secondly, the CLIL classroom can provide opportunities for production where the topics forming the content can be discussed efficiently and precisely due to the focus of the CLIL approach on 'language for learning'. This is the language needed to operate in the environment, including the strategies to enable the learner to use the L2 effectively. Snow, Met & Genesee (1989:205) describe this language as 'content-compatible language.' The focus of CLIL approaches on this type of language as part of lesson planning addresses in a certain way the part of Swain's output hypothesis which argues for "explicit focus on...contextually appropriate language forms to support content-learning activities in the classroom" (Grabe and Stoller, in Snow and Brinton, 1997:6.)

Lastly, a CLIL approach places a strong emphasis on interaction in the communicative context: "interaction in the learning context is fundamental to learning" (Coyle, Hood & Marsh, 2010:42). Indeed, communication forms one of the 4Cs framework (Coyle, 2002) of

the conceptual mapping of CLIL. Within a CLIL approach, language is seen as a conduit for both communication and learning. As Coyle outlines, the CLIL approach reinforces the notion that language is a tool which needs to be activated in order for the learning context to have sense and meaning for the learners. Tasks must offer opportunities for negotiation of meaning and metalinguistic reflexion. Thus, the approach offers opportunities for interaction so that learners can learn through the language, having opportunities to negotiate the linguistic forms collaboratively. According to Swain, such tasks which require students to negotiate language form collaboratively are especially favourable to grammar acquisition (1995:141).

7.3.3. The bilingualism hypothesis of Cummins

In this section, the bilingualism hypothesis of Cummins, developed after studies observing bilinguals and CLIL programmes, will be examined. In particular, reference will be made to Cummins' interdependence hypothesis, threshold hypothesis and his 1979 Basic Interpersonal Communication Skills and Cognitive Academic Language Proficiency distinction.

Interdependence hypothesis

Cummins (1984 and 2000) argues for a common underlying proficiency (CUP) or interdependence hypothesis in which proficiencies involving more cognitively demanding tasks are common across different languages. According to this hypothesis, all languages a person is in the process of acquiring build on one common underlying proficiency which refers to cross-linguistic knowledge. Such knowledge includes knowledge of academic concepts, world knowledge and meta-linguistic knowledge. Cummins' hypothesis is also referred to as the 'iceberg model' (Cummins and Swain, 1986:81) for he states that, in addition to the CUP, each language has surface features which are language specific, i.e. grammar and vocabulary, and which must be acquired. The model shows one view of how linguistic knowledge may be stored by the brain. The CUP can be considered as an operating system, beneath the water line, with the icebergs representing the parts of multiple languages that are distinct but supported by the shared concepts and knowledge of the CUP. The icebergs can show that learners have separately stored proficiencies in each language which must access the long term memory storage that is not language specific, in order to function.

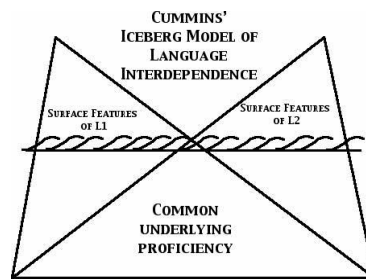


Figure 41: Cummins' 'iceberg' model (from <http://www.jillrobbins.com/gwu/sattp.html>)

Cummins and Swain state that the CUP develops if people use the languages and interact (1986:81). Thus, the languages can be seen as channels by which the CUP can be developed.

Cummins' threshold hypothesis

Cummins identifies two thresholds: the lower and higher thresholds of bilingual proficiency. He proposes a minimum threshold of first language cognitive development which is necessary to avoid negative effects on cognitive development. If this threshold is not achieved, learners will have difficulties in achieving bilingual proficiency. However, he states that the attainment of this threshold does not guarantee cognitive advantages. Rather, language learners must reach the higher threshold in both languages in order to obtain positive effects on cognitive development and successful second language learning. The double thresholds explain, to some extent, the reasons why some children benefit from bilingualism whilst others do not. Cummins' suggestion that learners must reach the higher thresholds in both languages in order to be bilingual shows the importance of linguistic development in L1 on development in L2. Thus, continuing support in the L1 is important for a learner's L2 development.

Basic Interpersonal Communication Skills and Cognitive Academic Language Proficiency distinction

In 1984, Cummins suggested a distinction in bilingual development between Basic Interpersonal Communication Skills (BICS), that is to say conversational fluency in the second language, and Cognitive Academic Language Proficiency (CALP), the use of language in decontextualized academic situations. His distinction furthered research by Skutnabb-Kangas and Toukomaa in 1976 which showed that although Finnish immigrant

children in Sweden appeared to be fluent in both Finnish and Swedish to teachers, their proficiency in verbal academic tasks was below age expectations in both their L1 and L2. Cummins showed similar results in a study carried out in the United Kingdom (1984) which found that although children from minority language backgrounds appeared to have attained fluency in spoken English, they performed poorly on academic tasks.

The phenomenon of children having 'peer-appropriate conversational fluency' in the L2 but not having the proficiency to perform academic tasks was elaborated by Cummins into the BICS and CALP distinction. Cummins suggests that it takes learners two years to achieve functional use (BICS) of a L2 whereas five to seven years are required for full CALP to be achieved. This has been attributed to the varying range of cognitive demands and contextual support involved in tasks. Everyday communication situations where BIC skills are needed are cognitively not too challenging and are strongly contextually embedded: the learner can use external clues such as gestures, tone and objects to achieve understanding. For CALP to develop, however, the contextual clues are reduced whilst the cognitive involvement is increased: communication proficiency is, therefore, more difficult to obtain.

The bilingualism hypothesis of Cummins with respect to CLIL

Two main points arise from Cummins' bilingualism hypothesis with respect to CLIL. Firstly, should one consider that the development of more than one language be interdependent, Cummins' hypothesis suggests that learning in and through a L2 can improve L1 competence since it expands the CUP. It also suggests that the opposite holds true: learning in and through a L1 can improve competence in the L2. As previously explained in Section 1.5, translanguaging is not discouraged in a CLIL approach and lessons can involve systematic use of both the first language and the CLIL language. Translanguaging allows both language channels for cognitive development to remain open and from Cummins' viewpoint, support one another, since both will expand the CUP.

Secondly, Cummins' distinction between CALP and BICS suggests that it is necessary to consider both the cognitive dimension and the context dimension in language learning. Indeed, in CLIL it is argued that teachers need to "develop a learning environment which is linguistically accessible whilst being cognitively demanding" (Coyle, Hood & Marsh, 2010:67). The CLIL matrix (Figure 42) draws specifically on Cummins' work and is used in a CLIL approach as a tool to measure and analyse the interconnectedness of cognitive and

linguistics levels of tasks and materials when developing learning units and evaluation of these.

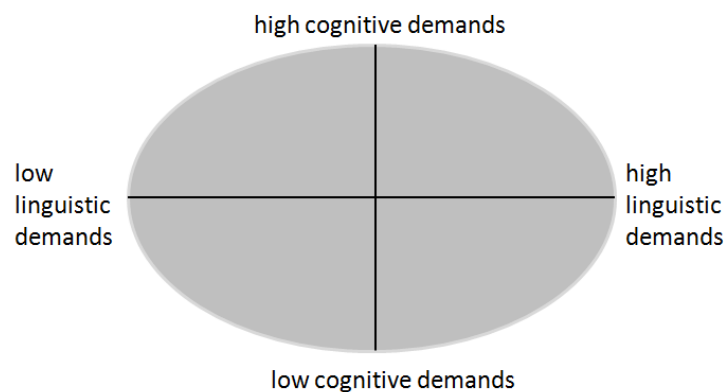


Figure 42: The CLIL matrix

Within a CLIL approach, it is advocated that tasks should follow a route from low linguistic and cognitive demands to high linguistic and cognitive demands so as to match the learners' needs and to monitor the learning progression. Coyle, Marsh & Hood (2010), for example, demonstrate how the matrix can be used to audit tasks (Figure 43).

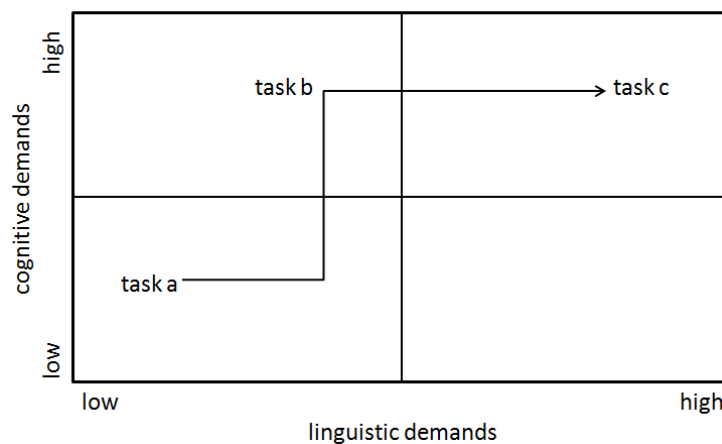


Figure 43: Auditing tasks using the CLIL matrix (from Coyle, Hood & Marsh, 2010)

The authors explain that task (a) was aimed at instilling confidence in the learners by starting with familiar work as a point of reference; task (b) recycled language but introduced new abstract concepts whilst using visuals to scaffold the new knowledge. Task (c) continued to develop the new knowledge but using familiar language and the final task incorporated the

new language and the new content. In this pattern of tasks, one can see a development from using BICS to pushing the learners towards CALP, as advocated by Cummins.

Grabe and Stoller argue that "students need to be learning content information *while* acquiring CALP" (1997:8). Because these academically oriented abilities are more complex, they are best taught within a framework that manipulates more complex and authentic content. The CLIL approach responds to this framework as it aims to equip students with the language needed to manipulate authentic content, that is to say content that native speakers could expect to encounter. CLIL also responds to the need for CALP by focusing attention on subject-specific concepts and, thus, teams, learning skills and the language of thinking processes.

7.4. CLIL Pedagogy

This section provides an overview of curricular models which have been proposed for Content and Language Integrated Learning before describing the parameters which should be considered at the macro, meso and micro levels in CLIL pedagogical scenario planning.

7.4.1. Curricular models for CLIL

Certain authors argue that CLIL models are by no means uniform or that there is no single pedagogical model for CLIL (Coonan, 2003; Coyle, 2005). Coonan argues that in the design of CLIL programmes or CLIL pedagogical scenarios, "any attempt to force local conditions to fit into all-purpose models is avoided" (2003:25); he states instead there is a preference to elaborate purpose-built models, designed at a local level as a response to contextual factors such as local needs, requirements and conditions.

Although within a CLIL approach the contextual factors are always predominant, some endeavours to produce some basic models for CLIL have been forwarded. In general, these models are based on how CLIL programmes could be implemented with different age groups, notably Pre-School (3-6 years), Primary (5-12 years), Secondary (12-19 years) and Tertiary (higher education). It appears, however, that in each category the models remain somewhat vague covering general approaches as to how CLIL could be implemented in the overall curriculum or how it could be adopted with learners of such an age, rather than suggesting specific variables that should be taken into account for the development of CLIL pedagogical scenarios with such learners or indeed suggesting CLIL pedagogical scenario models.

Primary education	Secondary education	Tertiary education
<p>Confidence-building and introduction to key concepts Instructions in L1 and language support for key concepts in L2 CLIL designed materials Communication and production in L2 Content teacher with fluency in L2</p>	<p>Dual-school education Work predominantly in L2 Sometimes linked to external certification</p>	<p>Plurilingual education More than one language used through CLIL in related content programmes Internationalisation viewed as key institutional strategy</p>
<p>Development of key concepts and learner autonomy Key concepts in L1 and L2. Translanguaging involved Bilingual resources Assessment of key principles in L1. Portfolio assessment in L2 Language teacher alongside content teacher</p>	<p>Bilingual education Significant part of curriculum taught through L2 e.g. international streams Linked to international certification</p>	<p>Adjunct CLIL Language teaching runs parallel to content teaching L2 teaching is field-specific with L2 teachers embedded in departments and no as external providers</p>
<p>Preparation for long-term CLIL programme Interdisciplinary approach with integrated curriculum Assessment of key principles in L2 with parallel L1 assessment of major concepts. Content and L2 teachers work alongside each other</p>	<p>Interdisciplinary module approach Specific module taught through CLIL because of international dimension of the content learning Often used in international network partnerships between schools</p>	<p>Language-embedded content courses Content programmes designed from outset with language objectives. Teaching delivered by content and language experts</p>
	<p>Language-based projects Language teacher coordinates CLIL Authentic content learning and communication through L2 (e.g. through international partnerships) Content assessment is formative and complements L2 assessment</p>	
<p>Specific-domain vocational CLIL Specific task-based functions developed in L2 Content and L2 teachers work in tandem Assessment often bilingual and skills based</p>		

Table 8: Curricular models for CLIL education as described by Coyle, Hood & Marsh (2010:21-25)

At the pre-school level, CLIL is integrated with play activities and learning activities introduce sounds, words and structures (Coyle, 2010). At the primary level, three models are

suggested (see Table 8). The first is based around confidence building and introducing key concepts, that is to say introducing the wider context to students who are not yet proficient in a L2. Teachers who follow this model are often content teachers who work alone without help from language teachers. The second model involves the development of key concepts and learner autonomy. Often the activity and discourse surrounding the activity are in the second language and material prepared for the learners is developed by both the content and language teachers and is bilingual. Finally, the third model for CLIL within this age group focuses on preparing learners for a long-term CLIL programme. The content and language teachers work together and aim to prepare in-depth educational resources in a second language (Coyle, 2010).

At the secondary school level, four models for CLIL have been suggested. Firstly, a bilingual education model in which the curriculum is modified so that a significant percentage of any subject matter is taught using a CLIL approach. Secondly, an interdisciplinary module approach in which the second language is used to teach a specific subject matter. Thirdly, a language –based model in which a language teacher is present in the classroom and provides scaffolding for the learners in relation to the content teacher’s presentations and activities. The fourth model is predicated upon specific domain vocational CLIL in which learners learn professional, domain-specific subjects and domain-specific tasks through the L2.

Lastly, at the tertiary education level, three models of CLIL are proposed. Firstly, a plurilingual education model in which it is expected that students master more than one language. Secondly, an ‘adjunct CLIL model’ in which only in one content area is the content learning integrated with the language learning. Subsequently, additional language lessons are provided in parallel. Finally, a language-embedded model in which in one specific domain-focused course content and language learning are integrated but no other language education is provided in parallel.

In comparison, with the depth and detail of research and modelling that is available surrounding the concepts of pedagogical and communication scenarios (see 8.1), the models for CLIL outlined above are very much general indications as to how a CLIL approach could be adopted rather than specific components and axes for reflection. Should we accept the proposals of Coyle, that "teaching through and in the FL/SL [foreign language or second language] can be done at any level (age, ability, foreign language, competence)" (Coyle, no date), or as Graddol states that "the learner is not necessarily expected to have the English [or other second language] proficiency required to cope with the subject before beginning to

study" (2006:86), combined with the suggestion that CLIL can be applied to any non-linguistic subject in the curriculum, then the need for flexible models which allow a great amount of suppleness where contextual factors are concerned seems evident. Indeed, the literature which outlines variables that need to be considered during the planning stages of a CLIL course, rather than on specific pedagogical models or scenarios for CLIL, is perhaps more pertinent. Coonan (2003) suggests that it is the combination of the choices made with respect to these different variables that produce a particular model, or scenario, for CLIL. I therefore now turn to the variables or parameters to be considered when planning a CLIL course. I divide these into variables which concern the macro, meso and micro dimensions.

7.4.2. CLIL pedagogical scenarios – macro level

At a macro level, one of the major factors which will determine the type of model a CLIL course adopts is the general context in which it will take place. Coonan (2003) groups variables at a macro level which will influence any context-dependent model of CLIL into two main categories: first, the local, social and ‘political’ context, and second, the school (or educational institution) context. Concerning what she terms of the ‘local, social and ‘political’ context’, Coonan suggests when planning a CLIL course the influence of languages in the local geographical area must be considered. She adds that course planners should ask themselves the following questions in order to determine the importance that will be given by students to the language that will be promoted by the CLIL course (2003:27):

- Are other autochthonous languages present in the area?
- Are other more recent languages present in the area?
- To what extent is there diglossia?
- To what extent is there individual bilingualism?
- How are these other languages generally viewed?
- To what extent is there cultural integration between speakers of the different languages?

In addition, Coonan suggests that it is important, to consider how the learners’ family will be involved in any CLIL course. Again she suggests a list of questions course planners need to reflect upon (2003:27):

- Are the students' families to be informed? Can they opt out of the experience?
- Do the families work closely with the school?

- Are the students' families generally welcoming of innovation?
- Would the students' families help if this were necessary?
- What do the students' families expect in terms of outcomes?

In terms of the political context, Coonan suggests that it is important for course developers to be aware of any local educational authorities' views on a CLIL approach to teaching and the learning institution's degree of autonomy in order to introduce what is often an innovative approach. Coonan argues that if planners consider the above points in preparing a CLIL course, "the answers to the questions should allow the school [educational institution] to measure the temperature (so to speak) of the external context that will allow the school to gauge the degree of interest and support the experience might enjoy" (2003:27).

Also at the macro level, Coonan suggests when planning a CLIL course, it is important to understand what she terms the school context. For the purpose of this thesis, I will refer to this as the 'educational institution context,' believing that this latter term better encompasses the possibility that CLIL courses may be run at a tertiary level. Coonan states that it is important to consider the educational institution's policy on CLIL -to determine the extent to which any CLIL programme will receive institutional support both from the policy makers and the teaching staff. She also explains that if the educational institution context is considered in CLIL programme planning, an analysis of this context should indicate the extent to which positive conditions for the successful realization of a CLIL programme are available. Such an analysis will show the degree of support, interest and the availability of means for a CLIL course within the institution itself. The importance of institutional support for CLIL programmes is also highlighted in Taillefer's (2004) study of the implementation of a CLIL approach in a French university specializing in social sciences. The study is clearly summarised in the following citation from Flowerdew & Miller with which Taillefer concludes the study: "Effective communication in the cross-cultural lecture theatre comes at a high price; are institutions aware of- and willing to- make the necessary investment?" (2005:370 in Taillefer, 2004).

7.4.3. CLIL pedagogical scenarios – meso level

On a meso level, the parameters which need to be considered involve content and its relation to the target language; the participants in a CLIL course and in particular the roles of the content teacher(s) and language teacher(s); and the pedagogical and methodological underpinnings of the course.

Firstly, at a meso level, great importance is given to the content of the learners' overall curriculum that will be covered using the CLIL approach. Coonan (2003:28) suggests several variables that need to be considered concerning content of a CLIL course for its inclusion in a general pre-established curriculum. Here, I have re-grouped them into three main parameters:

- Whether the content will be curricular or extra-curricular
- Whether, if curricular, the extent to which the CLIL approach will involve all the subjects or disciplines, i.e. cover a broad range of subjects or a narrow range of subjects or indeed a single discipline
- Whether the contents of the CLIL course will be disciplinary or will cover interdisciplinary thematic content from one or more disciplines

Once the content of the CLIL course has been decided, the place that the target language will hold also needs to be considered. For example, it needs to be determined whether the course will be delivered monolingually, that is to say entirely through the target language, or whether there will be bilingual delivery. In the latter case, the importance and place given to the target language will need to be agreed upon.

Concerning the participants in the CLIL course, course planners will need to determine which teachers will be involved in the programme and what their roles will be. For example, it needs to be decided whether the teaching will be individual, undertaken by either the subject teacher or the language teacher or whether there will be collaboration / team teaching and if there is collaboration the modalities that will be adopted. Coonan (2003:33) proposes that collaboration between content teacher(s) and language teacher(s) can be divided into two types:

- **Autonomous collaboration** whereby although there is collaboration to a certain extent the two teachers act independently, for example teaching the same group at separate times. The collaboration exists through teachers sharing the same resources or planning lessons together but that each teacher then teaches separately.
- **Convergent collaboration** whereby teachers plan and share lesson planning and teach together in co-presence, although not necessarily with the same groups. In this type of situation the conditions for Content and Language Integrated Teaching (CLIT) also exist.

Coonan further states that these types of collaboration refer to the degree of collaboration between teachers and proposes a model for the different modalities that are possible should collaboration between content and language teachers be adopted (see Figure 44).

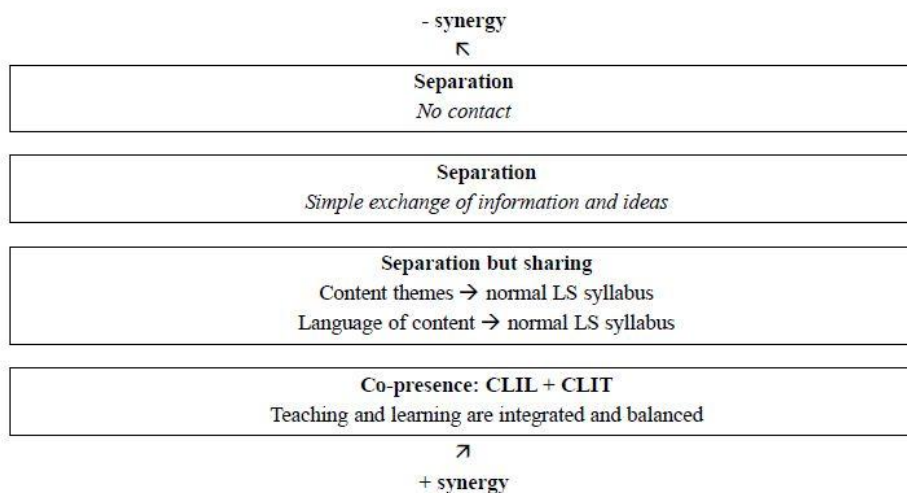


Figure 44: Degrees of collaboration between teachers (Coonan, 2003:33).

When considering how teachers will collaborate within a CLIL course, Coonan (2003:37) advises that several variables or criteria need to be considered in the planning of the CLIL pedagogical scenario or model for a specific course. Firstly, the distribution of responsibilities between the two teachers concerning, for example, the preparation of material or the evaluation of learners. Secondly, the objectives and specific outcomes of the course should be decided upon. Thirdly, the role given to the target language, for example, the weight that will be assigned to the target language with respect to that assigned to the mother tongue and also whether there will be any distinction between teachers concerning who will use which language. Lastly, the teacher movement within a class and the roles that the two teachers will adopt, e.g. leader versus supporter, and any alternation between the different roles that will take place with respect to the activities or tasks planned.

At a meso level of scenario planning for a CLIL course, the pedagogical and methodological underpinnings will be of great importance, considering that teachers of different disciplines will be collaborating and they will not necessarily have the same approaches to teaching / learning nor models for instruction. Coonan states that it will be important to decide on the teaching organisation and approach, including defining the interlocutors that the learners will have for which type of task / activity. For example, whether they will be working individually, as a whole class or in sub groups. Also the type of working

model for scenario development will need to be decided: different teachers will have different habits concerning whether they organise their classes by thematic units or single lessons, for example. Finally, it may be important to consider the place of language within the scenario and decide on the criteria for 'language alternation' (Coonan, 2003:29). Within the scenario, 'micro-alternation' or 'macro-alternation' (Gajo, 2001) may be chosen. For example it might be decided that different teachers adopt different languages or that the use of the target language versus the mother tongue is organised around different skills, tasks or materials, at different stages in the scenario or at different times of the day (macro-alternation). Code-switching from one language to another may also occur as part of the same interactional event (micro-alternation). Coonan's proposal that the criteria of language alternation be considered in the planning of a CLIL course corresponds closely to the proposition of Foucher (2010, see 8.3) who suggests that a communication scenario should take into account the language or languages that will be used during the interactions and any combinations of these.

As we can see, at the meso level there are a number of different parameters which need to be considered for the elaboration of a specific CLIL pedagogical scenario. The choices made with respect to each of these parameters will strongly affect the pedagogical scenario that will be developed and the model of CLIL that will be utilised. As stated earlier, the choices made with respect to each of these parameters will be strongly dependent on contextual factors including those at the larger macro level.

7.4.4. CLIL pedagogical scenarios – micro level

Coonan proposes that the choices made at the macro and meso levels combined with choice made at a micro level that will "lead to the elaboration of a CLIL programme [or CLIL pedagogical scenario] articulated in terms of objectives, syllabus specification (content), skills, evaluation, time" (2003:30). I now turn to the parameters to be considered at a micro level which will contribute to the articulation of a CLIL pedagogical scenario. In this section, we will see that there are important overlaps between the parameters to be considered at a micro level when considering the planning of a CLIL course and the components of a pedagogical scenario as advocated by Daele *et al.* (2002) and Nissen (2006) (see 8.1).

At the micro level, the objectives of the CLIL course which are associated with the non-language content, that is to say the disciplinary content will need to be decided upon and stated. From the content to be included in the course and the content objectives, the language needed by the student in order to obtain the learning objectives of the content should be

identified and described in terms of language objectives or language needs. Coyle, Hood & Marsh (2010) suggest in a CLIL scenario this should be described from three interrelated perspectives:

- the language of learning: "the language learners need to access the basic concept and skills relating to the subject theme or topic " (2010:37)
- language for learning: the language needed for the students to operate in the L2 environment including the strategies needed to allow them to use the L2 effectively
- language through learning: the emergent language that is needed by learners during the learning process to "support and advance their thinking processes"

Lucietto (2009), Coonan (2003:31 and 2003:38) and Coyle, Hood & Marsh. (2010:75-78) suggest a variety parameters need to be stated in the CLIL pedagogical scenario concerning the micro level of planning. These are summarised in Table 9.

Lucietto (2009)	Coonan (2003:31 and 38)	Coyle, Hood & Marsh. (2010:75-78)
Tasks – number, description, times and phases including what the teacher does and what the students do as described in the learning-teaching scenarios	Skills activated	Consideration of the content – what are the learning outcomes, how does the content develop global goals, is progression in learning considered?
Thinking skills	Basic vocabulary	Connection between content and cognition – how to encourage use of lower and higher order thinking, how to deal with linguistic demands of these tasks
Language for learning	Materials	Definition of language learning and using (language of, for and through learning)
Resources (materials)	Tasks and activities (including classroom organisation and task difficulty and the accuracy and complexity of tasks)	Development of cultural awareness – can the content be adapted to make the cultural agenda more accessible? What different cultural implications exist for the development of the content topic?
Content expected outcomes	Form(s) / mode(s) of evaluation – content only? Content and language together?	Design of appropriate materials and tasks
Language expected outcomes	Overall time	Criteria for monitoring and evaluation
Task check / assessment activities		

Table 9: Parameters that need to be stated in a CLIL pedagogical scenario which concern the micro level of planning

At the micro level, Coyle, Hood & Marsh (2010) stress the importance of placing an equal focus on how the students will meet the content subject (input) and what they will do whilst learning (process of the input). They propose the CLIL Matrix (2010:43) to help balance the cognitive and linguistic demands suggesting that in the pedagogical scenario tasks follow a route from "low linguistic and cognitive demands to high linguistic and cognitive demands" (2010:68), see Figure 42. We can see a certain similarity with the parameter Nissen (2006, see 8.1) underlines for pedagogical scenarios which describes the way in which activities are linked.

7.5. CLIL Research

Although pro-CLIL arguments are present in the literature, the theoretical underpinnings of CLIL are often cited as lacking in supportive evidence with respect to research results. The latter has been described as "slow as getting under way" (Dalton-Puffer, 2008:139) and of focusing mainly on language learning rather than content learning (Coyle, Hood & Marsh, 2010). Also the research concentrates on data from CLIL courses mainly in secondary schools.

Different researchers have proposed classifications of CLIL evaluative research studies (Dalton-Puffer, 2008; Coyle, Hood & Marsh, 2010, see Figure 45) including suggestions, based on these classifications about future research directions.

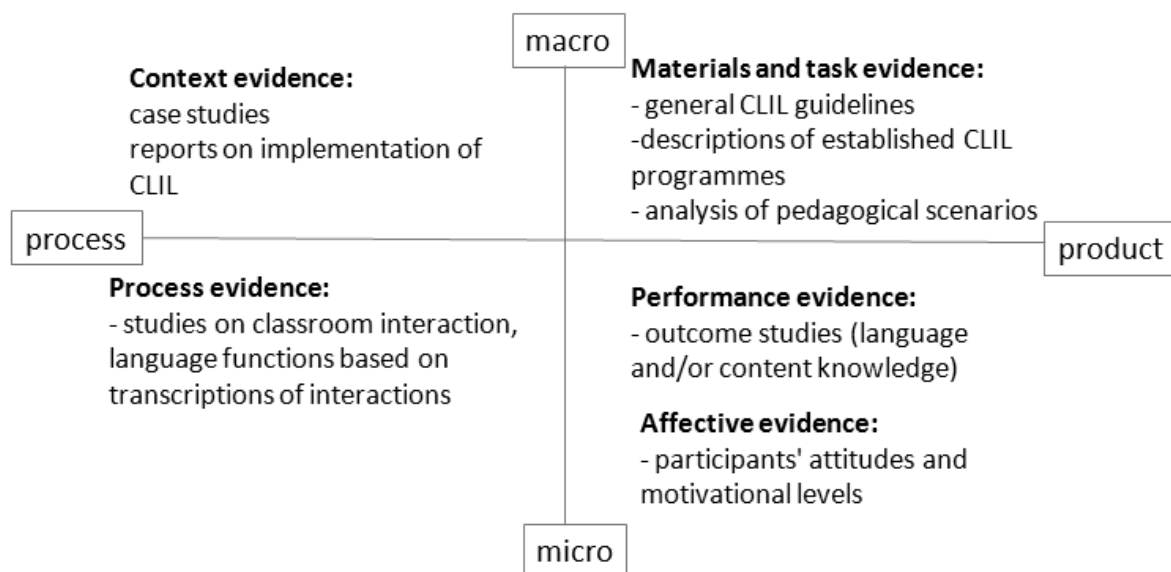


Figure 45: CLIL research approaches (adapted from Dalton-Puffer, 2011)

Dalton-Puffer (2011) describes that the majority of CLIL research studies are in the area of attainment (termed 'performance evidence' by Coyle, Hood & Marsh, 2010) stating that because CLIL is seen as a "catalyst for change" (2011:186) that this research focus is not unexpected. Firstly, because of the risk that as content learning is through an additional language students may have reduced understanding of the concepts and hand and teachers may preempt this by simplifying concepts. Secondly, that language learning will be reduced because in order to overcome conceptual problems participants in CLIL courses may switch to the L1 using this language to bridge gaps in content knowledge by way of a 'conversational lubricant' (Butzkamm, 1998).

The majority of studies which have looked at performance evidence have contrasted attainment in CLIL learning contexts with those of non-CLIL learning contexts, with a variety of studies, with learners of different ages, showing that CLIL learners obtain higher levels in language tests than learners who attend regular L2 classes. Dalton-Puffer (2008; 2011) reports on a number of these studies (often published in the German or Spanish languages) and which draw heavily upon learners' productions e.g. responses to macro-tasks, summative evaluation, summarising the following findings:

- CLIL students, compared to non-CLIL students, have a larger lexicon both in terms of reception and production which includes lexical items from lower frequency bands including technical language and lexical items from these lower frequency bands are employed more appropriately.
- With respect to spontaneous oral production, CLIL students show greater fluency and self-confidence in communicating their intended meanings than their non-CLIL counterparts. They more readily take risks in the L2.
- CLIL students orientate their oral productions more towards their listeners and deal more easily vis-à-vis spontaneous interaction.

Dalton-Puffer (2008) suggests on the one hand that receptive language skills, vocabulary, risk-taking and fluency are favourable affected by CLIL whilst, on the other hand that language skills pertaining to syntax, writing, pronunciation and pragmatics seem unaffected or the research results appear indefinite. Indeed, pronunciation skills have not been explicitly studied in CLIL research but studies of oral production suggest that they do not change significantly compared to non-CLIL learners. Two studies (Collmer *et al.*, 2006 & Llinares & Whittaker, 2006 both cited in Dalton-Puffer, 2008) into writing skills suggest that CLIL students do not outperform their non-CLIL counterparts with respect to discourse

function, grammatical cohesion and coherence and the appropriateness of the style adopted with respect to the task type. These results were found in tests given in both the students L1 and L2 and thus, Dalton-Puffer questions the place given to writing within CLIL programmes. The above conclusions, however, are made in a cautious manner. The author questions the comparison of performance levels between CLIL and non-CLIL populations for often CLIL learners attend regular L2 classes as well as CLIL classes and, thus, their exposure time to the L2 differs to that of a regular non-CLIL learner. Citing the study of Zydati (2006), Dalton Puffer (2008) also describes that CLIL courses attract learners with already higher levels of language skills. Coyle, Hood & Marsh (2010) also question the validity of comparative studies suggesting that sample matching and parallel testing between CLIL and non-CLIL populations need to be fully justified, particularly with respect to adopting identical methodologies for data-collection. One suggestion is for such studies to use generalized testing measures. The fallback being that these may not address the actual teaching and learning that took place in the CLIL classroom. This problem is evoked by Breidbach & Viebroch (2012) who describe that much of CLIL research is driven by a pre-assumed added value and does not necessarily pay attention to the selected learner population / context. It is perhaps for these reasons that research in the CLIL field is now calling for studies to be based on process evidence, that is to say interaction data, to inform studies on performance rather than basing such studies on comparisons of CLIL and non-CLIL learners' productions.

With respect to research studies which focus on process evidence, one area of CLIL which has received research attention is language correction. A study by Nikula (2007) of CLIL classroom interaction discourse suggests that conversation symmetry is a feature of CLIL classrooms with students' verbal participation being more balanced in terms of floor space compared to that of the teacher. Relating this to language correction, correction is frequently initiated by students, particularly with reference to their lexicon (Dalton-Puffer, 2007). When teacher correction occurs, teachers predominantly used recasts, rather than negative correction, with the suggestion that this is in order that the focus of the discourse remains on the content rather than linguistic form. Indeed Dalton-Puffer (2008) shows that in her data content repairs occur systematically whilst "language problems are not attended to with the same likelihood" (2008:153). When teacher repair of non target-like language errors does occur this is often achieved through a content-oriented sequence meaning. The author questions whether students identify this form of correction or not suggesting that "such recasts may obscure to the students that something in their utterance has been corrected since reformulations in follow-up moves are also a common [*sic.*] for signalling acceptance of

correct student answers" (2008:153). For research purposes it is also, therefore, difficult to separately identify instances where content-knowledge is repaired and where correction of the way the content-knowledge is expressed occurs.

Process evidence has also helped CLIL research investigate one of the main risks of CLIL: that the L1 is used to overcome conceptual problems and thus, reducing the potential for L2 language learning. One study by Bonnet (2004 cited in Bonnet, 2012), focuses on process evidence to investigate the acquisition of Chemistry specific skills within a German grammar school context examined interaction patterns from a CLIL classroom. The study showed that using the L1 as a resource to bridge gaps in content knowledge was not necessarily successful. The learners in Bonnet's study did not have the vocabulary in their L1 to overcome the conceptual problems nor help them to find a solution. Rather, the study showed that a change in angle in how the conceptual problem was presented and the use of scaffolding strategies in the L2, which in turn prompted negotiation of meaning and deeper reflection on scientific terms in the L2, was more successful in overcoming conceptual problems rather than a change of language. This finding is also supported in later studies by Heine (2008 cited in Dalton-Puffer, 2008) and Vollmer *et al.*, (2006 cited in Dalton-Puffer, 2008) which both report on German learners who were studying geography though English. The first study, reported in Dalton-Puffer (2008), describes that the CLIL students had a high tolerance level vis-à-vis linguistic frustration when linguistic gaps were evident in their L2. These gaps forced the learners to work more persistently on the CLIL activities and in turn led to a higher degree of procedural knowledge being acquired in the subject. The second study, based on process evidence from think-aloud protocols, suggests that the additional problem-solving activities which result from a lack of linguistic knowledge in the L2 leads to deeper elaboration of the content material.

Alongside literature stressing the need for CLIL studies to focus on process evidence, Wolff (2003) and Järvinen (2008 cited in Costa & Coleman, 2010) stress the need for more research at the tertiary level expressing that whilst there has been a growth in the number of studies on the outcomes of CLIL programmes in primary and secondary schools CLIL studies concerning higher-education are rarer, or to adopt Wolff's term 'scant'. My reading on CLIL research also suggests that studies focus uniquely on face-to-face environments and the use of CMC environments is not apparent in the literature.

7.6. Conclusion

This chapter focused on the Content and Language Integrated Learning (CLIL) approach which is at the core of the learning design of the course *Building Fragile Spaces* which provided the research context for this study into multimodality in synthetic worlds. After describing this approach to language learning, I related CLIL to three theories of Second Language Acquisition. I then provided readers with an overview of curricular models that have been proposed for CLIL alongside the parameters which have been suggested for CLIL course planners. The latter helped inform the learning design of the *Building Fragile Spaces* course which I detail in the next chapter. To conclude this chapter on CLIL, I turned to current research into CLIL. This section showed the lack of research a tertiary education level and which focuses on process evidence and interaction data, rather than performance data.

Chapter 8. Pedagogical Scenario and Study Participants

8.1. Introduction

This chapter presents the context for my study of the interplay between nonverbal and verbal modes of communication and their role in supporting verbal participation and production in a foreign language. Firstly, I explain the global context of my study, namely the European project for which the CLIL course *Building Fragile Spaces* that is the focus of my study formed part. I also explain the reasons why a CLIL approach, described in Chapter 7, was adopted for the course. Secondly, I explain the scenario for the *Building Fragile Spaces* course. With reference to research literature, I present pedagogical scenarios through two lenses: the *communication scenario* (Section 8.3.1) and the *pedagogical scenario* (Section 8.3.2). I then explain the approach that was adopted in the design of the *Building Fragile Spaces* course and why we (Wigham & Saddour) chose to model this pedagogical scenario using the software *MotPlus* (Paquette & Bleicher, 1997). This leads me to detail the *Building Fragile Spaces* pedagogical scenario and its activities (Section 8.4) before focussing on the course participants and their profiles.

8.2. Setting the stage: CLIL and the ARCHI21 project

In European higher education institutions, including architecture institutions, a validated L2 competence is required to obtain Master's-level qualifications (Joint Quality Initiative, 2004) enabling recently qualified professionals, including architects, to work easily throughout Europe. However, at present, there exists a lack of specialized courses for architecture students to gain the specific language skills necessary for their profession. Indeed, language courses currently offered at higher education institutions are often not integrated with the process of architectural learning (Hunter & Parchoma, 2012) and, for students who are non-language specialists, are often depreciated (Bertin, 2009). Thus, it is not necessarily clear what it is at stake concerning language learning. This often leads to student

indifference concerning improving L2 skills. Concurrently, a strategic need exists for architecture institutions to internationalise, attracting foreign students under partnership agreements which also allow their home students to study abroad.

The course which is the focus of this study, entitled ‘Building Fragile Places’ was an action within the European project ‘Architectural and Design based Education and Practice through Content and Language Integrated Learning using Immersive Virtual Environments for 21st Century Skills’ (ARCHI21). The project began in November 2010 and the consortium partners were the *Ecole Nationale Supérieure d’Architecture de Paris-Malaquais*, *Université Blaise Pascal*, *The Open University*, *The University of Ljubljana*, *Aalborg University* and *The University of Southampton*. The aims of the ARCHI21 project were to contribute to the development of a community of students and architecture professionals and to explore the potentials of a Content and Language Integrated Learning (CLIL) approach as a means to resolve some of the issues described above.

Building Fragile Spaces was a CLIL course, run in February 2011, and designed by members of two of the ARCHI21 project’s consortium partners: architecture teachers from the *Ecole Nationale Supérieure d’Architecture de Paris-Malaquais* and language teachers from *Université Blaise Pascal*. With reference to the CLIL pedagogical models suggested in 7.4.1, *Building Fragile Spaces* was a language-embedded content course. The course integrated language learning and architectural design learning in an intensive course lasting five days and which had face-to-face and distance learning components. I now turn to the communication and pedagogical scenarios designed for this course which allowed for architectural design learning and language learning to be integrated.

8.3. Pedagogical Scenario

The use of the word ‘scenario’ with the meaning "a postulated sequence of possible events" (Wordnet 3.0) was first recorded in 1962 (Harper, 2012). Within the domain of education, the term **pedagogical scenario** is employed to describe the instantiation of a specific instructional design model for a given academic subject and a given environment or situation. Current research literature often differentiates the **communication scenario** from the **pedagogical scenario** and, within the pedagogical scenario, the **learning scenario** from the **tutoring scenario**. I now outline the different parameters in each of these scenarios before turning to the approach adopted for *Building Fragile Spaces*.

8.3.1. Communication scenario

A communication scenario is described as all the possibilities for interaction that are available to a learner and which are clearly indicated to him/her in the framework of the course¹¹ (Nissen, 2006:4). Chachkine (2011) argues that the purpose of such a scenario is to identify the role of each participant, to determine the communication choices, i.e. as being public or not, and to anticipate the type of interactions that will take place.

Nissen (2006:4) outlines five parameters which compose the communication scenario:

- 1 The potential interlocutors for a learner within the teaching activity
- 2 The learner's status with respect to his/her interlocutors
- 3 The subject of interaction(s)
- 4 The frequency of the exchanges
- 5 The communication tools to be used

These five parameters are further detailed by Foucher (2010:84). She details that the first parameter expresses who will be the learner's interlocutors during the course, for example teachers, peers and/or native speakers. It also requires the configuration of exchanges the learner(s) will have with other interlocutors to be determined, for example, interactions in pairs, triads or small groups.

The second parameter concerns the learner's status with respect to his / her interlocutors. Foucher (2010) describes that if the communication configuration is that of classmates working in pairs, then the status between the learners will be symmetrical: that of equality. However, if a learner is working with a teacher who is a native speaker, then the relationship will be asymmetrical and perhaps that of a novice-expert. Foucher also describes that this parameter will determine the voice that a learner will adopt, e.g. the voice of a spokesperson for a group or the voice of an individual.

The third parameter, the subject of interaction(s) will determine the type of exchanges a learner will have with which type of interlocutor. For example, with a teacher, the subject of interaction(s) may be methodological, whereas with a technician the subject of interactions may concern technical issues or with a peer or a native speaker, the subject of interaction(s) may focus on foreign language practice.

¹¹ "L'ensemble des possibilités d'interaction qu'a l'apprenant à sa disposition et qui lui sont clairement indiquée dans le cadre de sa formation" (Nissen, 2006 :4). My translation.

Nissen's (2006) fourth parameter concerns the frequency, or rhythm, of exchanges that the learner will have with his / her different interlocutors. The frequency and duration of exchanges, intervals between exchanges or time span in which exchanges must take place will be detailed.

Finally, the communication tools will be detailed in the communication scenario. The modality of the exchanges will be detailed as synchronous or asynchronous.

Foucher (2010:85) adds three further other parameters to the five outlined by Nissen (2006). Firstly, she suggests that a communication scenario should take into account the language or languages that will be used during the interactions and any combinations of these. She cites five examples of language combinations: exolingual, endoglossic-monolingual, endoglossic-bilingual, exolingual-bilingual and exolingual-multilingual. Secondly, Foucher suggests that the aim or objective of any interaction should be detailed in order to exemplify whether the interaction forms a simple exchange or whether it will have an outcome, for example, the communal production of an object. Lastly, Foucher (2010) suggests that the communication scenario should take into account the number of possible interlocutors. This will depend on the communication tools and modalities chosen.

8.3.2. Pedagogical scenario

In terms of online distance education, Mangenot and Louveau (2006:42-43) outline three possible postulates of a pedagogical scenario. Firstly, that it consists of the most precise possible planning of the unfolding of a lesson or part of a lesson: a collection of tasks, albeit open or closed. Secondly, that it is the simulation of a real world situation in which a learner takes on a role. Thirdly, it can be considered as a role play in which a learner takes on an imaginary role in an imaginary situation. In order to compare and contrast the range of definitions which are found in the literature, I will explore the first postulate for, as Foucher (2010:81) argues, the definition is broad and pertinent to didactical programming and engineering.

Paquette (2006) suggests that the pedagogical scenario describes the activities of all participants in a course - learners and teachers, the resources that will be used and produced and the instructions which govern the learning activities. He suggests that any given pedagogical scenario will consist of a learning scenario and a tutoring scenario. This is to avoid any confusion between the role of the participants who are involved in supporting the learners and the learning tasks of the learners. As Chachkine describes (2011:127), this

division is adopted by other researchers including Quintin (2005:19) and Quintin *et al.* (2005:336) who describe a pedagogical scenario as a structured, coherent ensemble constituted of two parts; the learning scenario and the tutoring/supervision scenario.

Quintin (2005:19), furthering a definition given by Paquette (1997), suggests that a learning scenario describes the learning activities which will be presented to the learner as they are envisaged prior to the course and articulates how they are sequenced in the course. He further adds that the learning scenario should define the resources made available to the learners, as well as the outcomes or productions which are expected and the criteria from which any decisions will be made to orientate the learner towards other activities or not.

In order to characterise pedagogical scenarios, Quintin (2005:21) suggests that the learning scenario can be differentiated at two different levels: the scenario's prescriptive nature and the degree of flexibility it offers concerning the articulation of activities. On the one hand, the prescriptive nature of the learning scenario can be determined by the way in which a definition of i) the expected outcomes of the activity, ii) the steps to take to obtain the outcomes and iii) the deadlines for the accomplishment of the activity, are restrictive or not. The degree of flexibility concerning the articulation of activities, on the other hand, can be determined by analysing whether the learning scenario offers possibilities to adapt the learning path with respect to the different learning speeds and learning difficulties of the learners or whether the learning path forces the learners to follow it by way of a predefined logic which is strict and rigid. Quintin suggests that the degree of flexibility is affected by the nature of the links between the different learning activities and the criterion which condition the passage from one activity to another as being interdependent or not. The importance of flexibility is also highlighted by Pernin and Lejeune (2004) who, in their taxonomy of scenarios, use the criteria of constraint and personalisation to analyse the extent to which a learning scenario is flexible. They describe scenarios as either being 'constrained' or 'open' depending on the degree to which the description of the activities to be accomplished gives the actors in the learning situation the freedom to organise the activities or determine their own learning path.

According to Quintin (2005:20) the tutoring or supervision scenario is the document which describes the manner in which the different actors which will aid learning and how students and teachers will intervene during the course in supervisory actions. Quintin *et al.*, (2005), describe that the tutoring scenario can be defined according to factors which fall into two categories; the distribution of roles and tutoring functions and the modalities of

intervention. Quintin (2005:25) suggests that different actors in a course may take on different tutoring roles. These actors include the teacher, co-learners and also elements of the learning environment which provide help for learners in order to help them situate themselves with their learning path. The researcher expresses this, in terms of actors, as ‘awareness’. The roles actors may take on include social roles, organisation roles, pedagogical roles, technical roles and administrative roles. The tutoring scenario will define these roles and the context and modalities in which the actors will intervene. For example, tutoring support may be offered at the start or end of an activity, or during the activity; may be proactive or reactive depending on the learner’s actions and in terms of the temporality the tutoring acts may be continuous or punctual. Finally, Quintin suggests that in the teaching scenario, the receivers of the tutoring support or supervision must be defined as either being a single learner, sub-group of learners or the plenary group. Quintin summarises what he proposes as the distinctive characteristics of a tutoring scenario in a model, shown in Table 10.

Teaching scenario				
Supervised activities	Supervisor	Dimensions		Receivers of supervision
Activity "X"	Teacher Co-learner or Awareness	Roles and principal functions	Social Organizational Pedagogical Technical or administrative	Plenary group Sub-group or Learner
		Context	At the start of the activity During At the end	
		Modality	Proactive Reactive	
		Temporality	Persistent Punctual	

Table 10: Model of the distinctive characteristics of a tutoring scenario (Quintin, 2005:25).

Quintin's distinctive characteristics of a tutoring / supervision scenario are of importance because, as DeLievre *et al.* (2006) state, the more precise the tutoring or supervision scenario, the greater the coherence between the task and the tools to achieve the task. Furthermore, the better one can enact the learning scenario to the benefit of the learners.

Whereas some researchers have suggested a division of the pedagogical scenario into two components, the learning and tutoring scenarios, as described above, other researchers, however, make no division. For example, Maina suggests that the pedagogical scenario "describes a process of interaction between teachers and learners within a specific social setting and learning situation" (2010:3) and that "each participant in their role performs a series of activities directed towards learning, using resources and evidencing acquired knowledge and competencies" (2010:3). Although the idea that participants will play different roles is evoked, there is no clear distinction between a learning scenario and a tutoring scenario. Rather, they are seen as part and parcel of the overall pedagogical scenario. Daele *et al.* (2002) also suggest that although separating the activities of the learners from those of the trainers may facilitate the conceptual elaboration of a pedagogical scenario, doing so may not always correspond to the reality of how a pedagogical scenario is enacted. Their reasoning is that this is due to the connections which are more and more frequent between a teacher's role or function and the learners' role or function within pedagogical scenarios that include information technology.

Whether one divides a pedagogical scenario into a learning scenario and a tutoring / supervision scenario or not, within the literature, the idea of structure is given importance by researchers. By way of example, we see the importance given to the idea of structure in the definition proffered by Peraya & Deschryver (2001:10) who suggest that a pedagogical scenario is the manner in which different learning paths are structured and answers the questions of who does what, when, with what tools and for what results¹². The definition proposed by Schneider *et al.*, also alludes to 'structure'. They propose that the pedagogical scenario consists of a "**sequence** of phases within which students have tasks to do" (2003:3).

Whether a division between the learning scenario and the tutoring / supervision scenario is made or not, the components remain largely the same. Daele *et al.*, (2002:5-6) and Nissen (2006:4) give further details of what information should be included in any pedagogical scenario, as shown in Table 11. We can see that there are links here between criteria intended for the overall pedagogical scenario and the criteria forwarded by Quintin (2005), as in my earlier discussion of the learning and tutoring scenarios.

¹² "C'est la manière dont les différents séquences de l'apprentissage se structurent. Il s'agit de répondre aux questions de qui fait quoi, quand, avec quels outils et pour quels résultats." My translation.

Daele et al., (2002:5-6)	Nissen (2006:4)
Objectives	Course objectives
Planning of learning activities	Pre-requisites
Schedule	Resources and tools available to complete proposed tasks
Description of learners' tasks	Explanation of the manner in which activities are linked
Evaluation modalities	Production tasks that the learner must accomplish
	Possible interlocutors during the course and the types of interactions the learner may have with them

Table 11: Components of the pedagogical scenario as defined by Daele et al., (2002) and Nissen (2006).

We can define the learners' tasks or production tasks in the criteria for a learning scenario as forwarded by Daele et al., (2002) and Nissen (2006) as a "focused, well-defined activity, relatable to learner choice or to learning processes, which requires learners to use language, with emphasis on meaning, to attain an objective" (Bygate, Shekan & Swain, 2001: 12). Ellis (2003: 16) explains that "a task is intended to result in language use that bears a resemblance, direct or indirect, to the way language is used in the real world.

The parameters outlined by Daele et al., (2002) and Nissen (2006) were taken into account when designing the framework and proposed activities for the *Building Fragile Spaces* course.

8.3.3. Approach adopted for *Building Fragile Spaces*

In our approach to the design of the *Building Fragile Spaces* pedagogical scenario in which the dual focus is on architectural learning and language learning, we consider the communication scenario as an integrated component of the pedagogical scenario. As Chachkine (2011:128) suggests "although anticipating the type of interactions [language learners will perform] is central in order to identify the language practice the learners will engage in, disassociating the learning activity from the interactions that the activity generates does not seem pertinent for we esteem that collective action and interaction cannot be disassociated"¹³ (2011:128).

¹³ "Si l'anticipation des types d'interactions nous semble tout à fait centrale pour identifier les pratiques langagières vers lesquelles les apprenants vont s'engager, le fait de dissocier l'activité des interactions qu'elle génère nous semble moins pertinent tant action collective et interactions nous paraissent indissociables." My translation.

Indeed, when the focus of a pedagogical scenario is on language learning and interaction, the use of communication tools is at the centre of the learning activity, and it is through using these tools that language learning will occur. Furthermore, the parameters as defined by Nissen (2006), including the interlocutors within an activity, the learner's status and the subject of interactions and tools to be used, will be defined by the type of learning activity that is designed in the pedagogical scenario and the roles that learners will undertake in that activity. We thus do not see how it is possible to separate the communication scenario from the pedagogical scenario. Rather the communication tools available will inform the pedagogical scenario which in turn will inform how it is envisaged that these tools are employed. Thus, in our description of the pedagogical scenario designed for *Building Fragile Spaces*, the parameters in Section 8.3.1 described as the communication scenario form an integrated part of the pedagogical scenario.

We also see the roles of the learners and the tutors as an integrated whole. The role that the tutor is asked to undertake will influence the interaction and actions of the learners and in turn influence the learning scenario. For example, if in a pedagogical scenario the tutor is asked only to intervene concerning technical difficulties in the environment and is asked to keep feedback to the end of a session, this will influence the learning scenario. This decision in the tutoring scenario may mean learners have to engage more in negotiation of meaning to reach a decision in a decision-making task than if the tutor was asked to offer on-the-spot language correction and to mediate the interaction. Another example is the instructions given to learners. These form part of the tutoring scenario but depending on how they are delivered will affect the learning scenario. We therefore present the tutoring scenario as an integrated component of the pedagogical scenario and in the pedagogical scenario design for *Building Fragile Spaces* the role of tutor as fundamental in the learning design.

8.3.4. Modelling of the *Building Fragile Spaces* pedagogical scenario

Considering the communication scenario and the pedagogical scenario as an integrated whole in which the learners' activities and tutors' activities are interdependent, we (Wigham & Saddour) chose to model the *Building Fragile Spaces* pedagogical scenario using the software *MotPlus* (Paquette & Bleicher, 1997). The advantaged of this software are two-fold. Firstly, the software allows a user to create a model of a pedagogical scenario that meets the specifications of IMS Learning Design (2003), a standardized framework to describe learning

units. Using a standardized formalism to model our pedagogical scenario was central to our research methodology. As described in Section 9.3.5, one of the key concepts of a LEarning and TEaching Corpus (LETEC) methodological approach is to render learning situations re-analysable by researchers who did not participate in the experimentation and also to facilitate comparisons between different online learning situations. Our decision to describe the pedagogical scenario, which forms part of the learning design component of a LETEC corpus (see Section 9.5.2), in a scripting formalism was firstly prompted by the wish to promote the exchange and interoperability of our pedagogical scenario and its materials in order to facilitate the understanding of this by researchers who did not participate in the experimentation.

Secondly, because *MotPlus* draws upon the IMS Learning Design (2003), it allows for the description of any learning event to show the relationships between the learning event, its micro-tasks, the communication environments in which it takes place and the roles of both the tutors and the learners in the event, including their potential interlocutors and the status between them. The possibility to model these different parameters of the pedagogical scenario and to show the relationships between them was the second reason for which we chose this piece of software. I will demonstrate this in my description of the pedagogical scenario for *Building Fragile Spaces* in the next section.

8.4. Pedagogical scenario of *Building Fragile Spaces*

In this section, I describe the pedagogical scenario which was designed for the *Building Fragile Spaces* course. I describe the architectural design learning scenario and the language learning scenario. Although the two scenarios are presented separately here, for ease of understanding, they were planned with convergent collaboration (see Section 7.4.3) and I highlight the links between the two. I describe the communication environments and the possible interlocutors for participants on the course, showing in which communication environments these participants will interact. I then work through the different activities proposed and use our model of the learning design to show the roles of the different actors (tutors and students) in each activity, the environments involved and the procedural aspects of each activity.

The description presented here of the pedagogical scenario draws on the different components in the IMS-Learning design (2003) model. In this model, a theatre metaphor is adopted to describe the pedagogical scenario. The participants are termed as 'actors' and these actors will undertake 'roles'. The use of the term 'role' in the IMS-Learning design (2003) does not imply 'role play,' for which "the pedagogical scenario is founded upon the spontaneous improvisation of participants who are placed in a hypothetical situation¹⁴" (Taylot & Walford, cited in Yaiche, 1996:24) and during which they adopt a fictive identity and must interact and react to others under the pretence of this identity. Rather, the 'role' of an actor refers to the way in which the pedagogical scenario determines how an actor will approach and accomplish a task or activity. The participants, however, are not playing a character.

Similarly, although the reader will learn in the following sections of the actors macro-task to create a model inworld in *Second Life* for which the actors will adopt avatars to accomplish this, the reader should not confuse the pedagogical scenario of the design workshop presented here as a 'global simulation' (cf. Yaiche, 1996; Lehuen & Kitlinska, 2006). Within our pedagogical scenario, the students are accomplishing an architectural construction rather than simulating a place, spatial environment or a property of such an environment. Indeed, the models the actors are asked to build as the course's macro task are mental representations or conceptualisations of their architectural project rather than a thematic place, universe of reference (Debyser, 1996) or fictitious world. These constructions are abstract and within this building process, during the time spent inworld, the actors' avatars are not the people living and acting within a simulation framework but rather the constructors of the abstract representation who also communicate around the object.

8.4.1. Architectural design learning scenario

The *Building Fragile Spaces* course was organised as an intensive design workshop (also termed design studio). This is a typical face-to-face course within the field of architecture education: professionals work in small groups with the students, over a short period of in-class time, developing design ideas.

Do and Gross (1998) describes a design workshop as follows:

¹⁴ "le jeu de role est fondé sur l'improvisation spontanée des participants quand ils ont été places dans une situation hypothétique". My translation.

Traditionally, the practice of architectural design is learned through a project-based "studio" approach. In studio, designers express and explore ideas, generate and evaluate alternatives, and ultimately make decisions and take action. They make external representations (drawings and three-dimensional models) and reason with these representations to inquire, analyze and test hypotheses about the designs they represent. ... In the highly social environment of the design studio students learn to communicate, to critique and to respond to criticism and to collaborate. (Gross & Do, 1998:1).

The studio process focuses on hands-on learning and is organised around project-based assignments for which students are expected to integrate skills learnt in other courses. According to Ledewitz (1985) students are taught three aspects of design education during a workshop. Firstly, students are expected to acquire a new professional language. Secondly, they will learn new skills including those of visualisation and representation and, thirdly, develop architectural thinking. During a design studio, the interaction of students in the absence of a teacher is seen as an important part of the education of the future architect in many schools (Lamunu Ppiyo Lueth, 2008). The students are then expected to continue their work in their own time and an emphasis is placed on 'student-student learning'.

The architectural focus of the '*Building Fragile Spaces*' design studio was the design and fabrication of the immersive environment in *Second Life*, consisting of a virtual territory of 140 000m², to be used as a show front for the ARCHI21 project partner institutions. The virtual territory which would form the collaborative pedagogical space for the project and for the diffusion of work produced by the partner institutions was described as a spatial landscape and a machine which generates contents (Kligerman, 2010). During the design workshop the students would define the temporary evolution of this space through a series of models. The workshop was a hybrid course which intentionally articulated face-to-face and distance learning using a technology-enhanced learning environment (Charlier, Deschryver & Peraya, 2005).

Production macro tasks

Each workgroup had the project-oriented goal of elaborating, using their L2, a working, conceptual or critical model in *Second Life*. The model had to respond to a design brief pertaining to either the theme of 'avatars', '(e)spaces', 'scenario' or 'land+scapes.' One of the architecture teachers, in his description of the 'architectural framework' for the course (Kligerman, 2010) describes that it is hoped that these models would propose an incipient foundation and potential orientations of the on-going work of the ARCHI21 project.

The model types which were asked of the students are described as follows (Kligerman, 2010:2):

- Working models: creative proposals concerning the organization of the working environments, the spaces and sites, that the ARCHI21 partners that will be concurrently occupying —online, inworld, in-situ.
- Conceptual models: identifying the theoretical foundations necessary to address the complex duality inherent to content based language learning, which, in the case of the ARCHI21 project, will attempt to integrate language learning and research into the architectural studio process.
- Critical models: the protocols of communication — feedback loops —emerging from and identified with the studio process, that represent both the project's working model and its data generating processes.

Each workgroup was asked to produce one type of model as a response to a defined problem to be presented in their L2 on the final day of the course using built simulations.

The architectural problem brief assigned to the students was specific to each workgroup. The group land+scapes (GL) was given the definition of what constitutes a territory: "both separately functioning entities and a common tissue that connects them based on functional spatial hierarchies". They were asked how the different parts of the inworld builds belonging to a project partner can come into focus based on the needs of a program or event and were asked to consider the following aspects during the development of their model: stratification, distribution and time.

The (e)spaces group (GE) were asked to consider how to develop the spatial archetypes and architectural models for building a sustainable, singular educational metaverse. The students were asked to consider the aspects of foundation, partition and envelope in their answer to the architectural problem brief.

The problem brief given to the scenario group (GS) was the development of a working diagram of the inworld requirements of the partner institutions of the ARCHI21 project's "usage hypothesis" (Kligerman, 2010). The students were asked to consider surface, structure, organization, media and temporalities in their model and to "integrate the complex programmatic matrix into workable, integrated scenarios of mutually sustainable of inworld territories" (Kligerman, 2010:6). The students' response to the brief would determine the potential patterns of use for the ARCHI21 project and the unique needs of each partner

organisation as well as their common threads. They were asked to consider scenarios as hypotheses and as usages.

Finally, the avatars group (GA), were asked in their working model to consider the aspects of avatars, screens and point of view.

The students were to present the models they had designed in their workgroups on the third day of the course in a 'studio critique' in front of their teachers and peers and on the final day of the course in front of a 'public jury' comprising of partners from ARCHI21. These presentations were held both in the inworld *Second Life* environment and, because the students were connecting to the synthetic world from the same classroom, in the face-to-face environment. The presentations were to be given in the students' L2.

Organisation of architectural activities

On the first day of the *Building Fragile Spaces* course, an introduction to the course was planned. This introduction, which was led by the architecture teachers and organised in the face-to-face environment with the whole class, was divided into four components. Firstly, a presentation of the history, present and future of immersive synthetic worlds. Secondly, a presentation of the learning architecture in synthetic environments. Thirdly, the students were exposed to the architectural objectives of the course and to the production tasks that would be expected of them, as described above. Lastly, the students were made aware of the rules concerning their presence during the workshop. The course teachers expected them to be present in the face to face environment between 9am and 6pm each day of the intensive course. Following the introductory presentation, the students were divided into workgroups and each had a problem identification session with one of the architects to further explore their brief.

Throughout the five-day course, the students had regular contact with the architecture teachers in the face-to-face environment during workshop sessions (see Figure 62). The workshop was organised so that there were fixed times for language activities and otherwise the students were working either individually, in pairs or in workgroups on their problem brief. Concerning the tutoring scenario, it was planned that the structure for a workshop day would follow the circular pattern shown in Figure 46. Firstly, students would work with an architecture teacher on the identification of the problem. The interaction during this activity was in the students' L2. Subsequently, the students would work on brainstorming ideas around their problem brief, creating visualisations and experimenting with models. During this time,

the students would have to research their brief, perhaps finding inspiration in reference texts which the architecture teachers made available in *Second Life* for the students. When the students were working in their groups, the interaction was in the language of their choice. Once a day, each individual workgroup was to have a feedback session with the architecture teacher in their L2. During this session, the students exposed their progress towards creating a model which responded to their problem brief. The role of the architecture teacher was to suggest criticism, offer further paths for exploration or texts to reference, and to help correct the students by redefining their problem with respect to the work they had achieved. Following this, the students would work independently again, without the architecture teacher, be it individually, in pairs or as a workgroup. They would be asked to formalize the correction offered by the architecture teacher and to redefine their problem identification in light of the feedback session before working on or continuing their propositions for a model.

- Problem identification [**workgroup with architecture tutor**] ↷
- Brainstorming, visualization, experimentation [**workgroups**] ↷
- Research, reference texts [**workgroups**] ↷
- Feedback : correction, criticism, reference [**workgroup with architecture tutor**] ↷
- Formalization, propositions [**workgroups**] ↷
- Loop ↷

Figure 46: Typical activity organisation for a day's workshop session: from lower-level to higher-level skills (from Kligerman, 2010)

Pre-requisites for architectural scenario

In terms of the architectural pre-requisites of the course, students were asked to master different representation modes including 3D modelling and physical models. They were also invited by email to familiarise themselves with *VoiceForum* (see Appendix 1) and instructed to sign up for *Second Life*, to select an avatar from the pre-customised selection the synthetic world offers and to befriend their language teacher (see Appendix 2). The students were asked to name their avatar using their first name with the suffix 'rez' including a number, if needed. For example, a student named David would have been asked to name his avatar *Davidrez*. This was to aid the research protocol designed around the course, specifically the data collection. The architecture teachers also required students to explore the synthetic world *Second Life* before commencing the course to facilitate their group work and to encourage

analytic and reflective work on the project and around the problem briefs the workgroups were attributed.

Resources and tools

The resources and tools available to students to complete the architectural macro task asked of them included:

- a variety of computer software programmes including ArchiCAD, Atlantis, Prezi presentation editor, Adobe Photoshop, Adobe Illustrator,
- a series of texts chosen by the architecture teachers and displayed in *Second Life* pertaining to design issues in virtual spaces,
- a set of sample prims available inworld in the ARCHI21 *Second Life* environment to aid students in their construction of inworld models (see Figure 47).

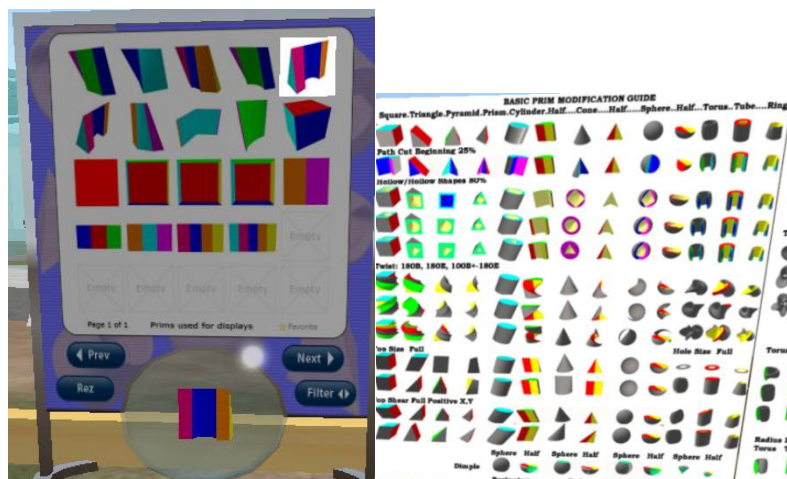


Figure 47: Sample prims available to students inworld

8.4.2. Language learning scenario

The pedagogical scenario for the language activities was articulated around the architectural pedagogical scenario. The didactical approach, thus, offered dual-focused aims for each activity so learning of the non-linguistic subject (architectural design) was not done in a foreign language but through and with a foreign language. The language activities, all conducted at a distance, included three principal types of activities: socialisation, collaborative building and reflection. Each activity (task) included both architectural objectives and linguistic objectives. In this section, I describe firstly, the communication environments (face-to-face and distance) and possible interlocutors for the participants on the

course, before turning to the language activities that we (Wigham, Chanier & Bayle) designed for the *Building Fragile Spaces* course and the character of these activities.

Potential interlocutors for course participants

The potential interlocutors for the course participants comprised:

- students on the course from the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais*,
- language teachers from *Université Blaise Pascal*: one native French speaker and one native English speaker,
- architecture teachers from the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais* of which one teacher was a native English speaker and the other a native French speaker,
- researchers from the *Laboratoire de Recherche sur le Langage, Université Blaise Pascal*.

Figure 48 shows that these participants will interact in two distinct learning environments: a distance learning environment and a face-to-face learning and a help environment. In the distance environments, the students have four possible configurations in which they will work: individually, as pairs, in workgroups or as a whole class. In the face-to-face environment they will work in workgroups or as a whole class. The language tutors are also shown as only interacting in the distance environment. I now describe each of these environments and the configurations of participants in each.

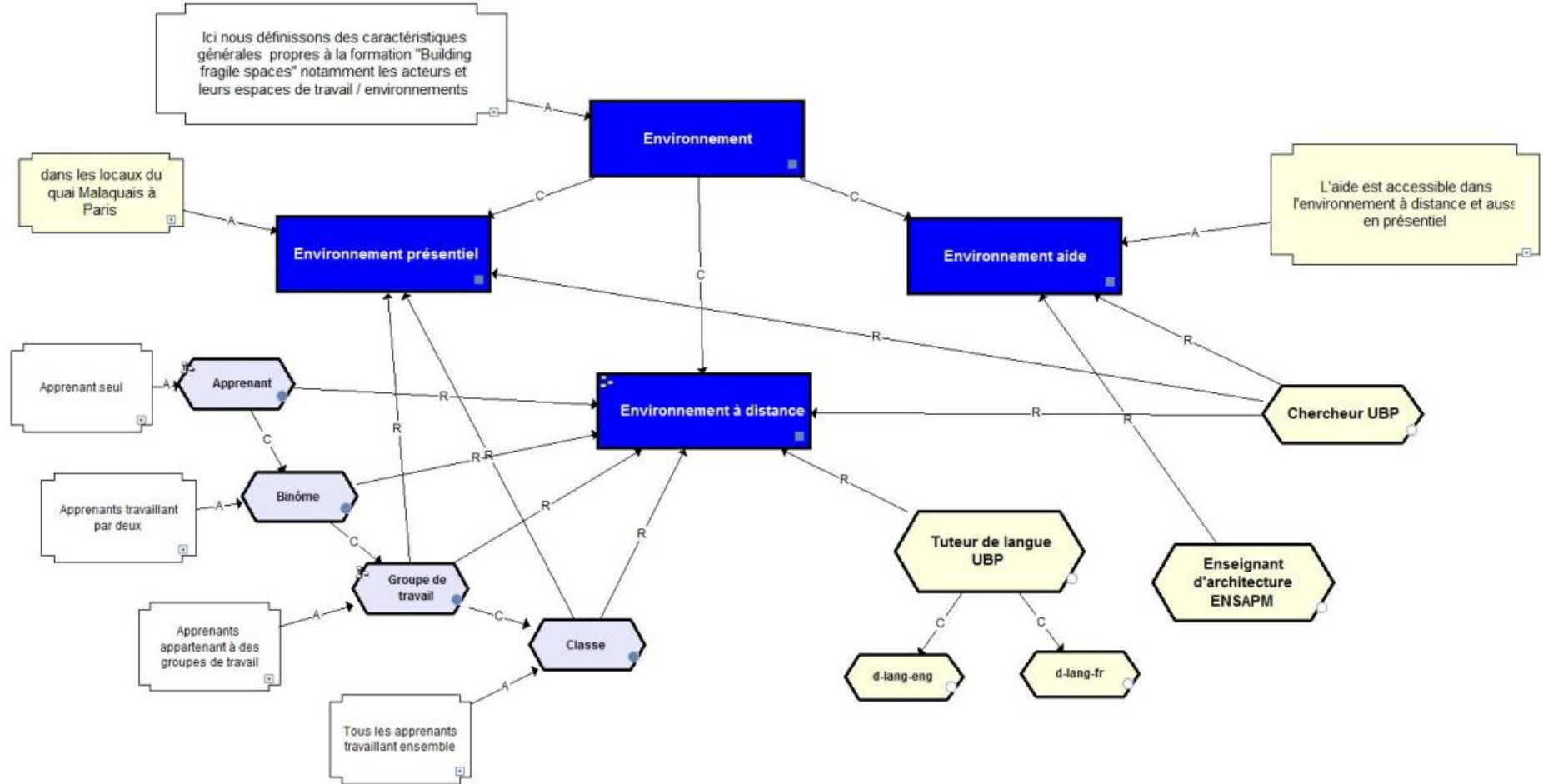


Figure 48: Potential interlocutors for the course, the communication environments and the potential status between interlocutors as given in the modelisation using *MotPlus*.

Face-to-face communicative environment

The communication environments within which the interlocutors interacted included a face-to-face environment within the buildings of the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais*. As shown in Figure 49, this was a classroom containing networked PC computers with headsets organised in a U-shape. The students also had the possibility to connect their personal laptops to the institution's network. A central area was created in the face-to-face environment for communication between the architecture teachers and either individual students, student pairs or workgroups. The room was equipped with an overhead projector and whiteboard. The participants present in the face-to-face environment were the students, the two architecture teachers and a researcher from *Université Blaise Pascal*. The languages used in this environment were French and English. It was agreed that when the architecture teachers were working with the gp-fr groups, the working language was English and when working with the gp-other groups the working language was French. When the language teachers addressed the class as a whole it was agreed that the teachers would speak in their mother tongue.



Figure 49: Face-to-face environment

The student population was sub-divided into students whose mother tongue was French (student-fr) and students whose mother tongue was another language (student-other). The configuration of exchanges the students were to have in the face-to-face was determined. The possible configurations comprised a student working alone, students working in pairs, students in workgroups and the whole class. Concerning the workgroups, the students were divided into four workgroups. As shown in Figure 50, this division was thematic and linguistic: each workgroup received a different architectural brief (see Section 8.4) and had a

dominant second language. Two workgroups, studying the themes of '(e)spaces' (GE) and 'scenarios' (GS) in *Second Life* had English as their target language (EFL) and two groups studying the themes of 'avatars' (GA) and 'land+scapes' (GL) had French as their target language (FFL).

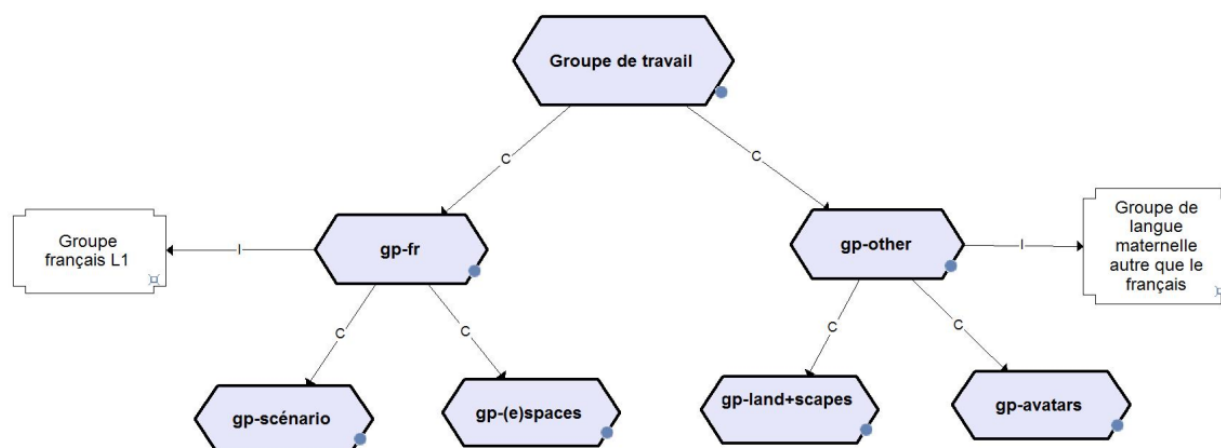


Figure 50: Student workgroup composition

Distance communicative environments

Distance communication environments also formed part of the communication scenario (see Figure 51). These comprised of the synthetic world *Second Life*, an oral communication forum *VoiceForum* and email.

Second Life

Within the synthetic world *Second Life*, two distinct communication areas were used. These comprised an island named ARCHI21 which was bought by the European project. On this island, each group was given a specific workspace and workspaces for the language activities of the course were attributed. A workspace owned by the association *ADALSIC* on the *Second Life* island *Eduction* was also used during the course for language activities. In order to facilitate communication between groups who had activities during the same time period with two different language teachers, the workspaces used were configured so the sound and public textchat was limited to the specific workspace. The language workspaces were used in different activities either as spaces for the construction of objects and/or as spaces for communication in *Second Life*. This communication used the synchronous verbal and nonverbal communication modes (described in Chapter 6). The language for

communication during the activities organised in the language workspaces was the students' L2. The *Second Life* environment was used both by language teachers who worked at a distance and who connected with student workgroups and by students, working individually, in pairs or in groups during the architectural face-to-face phases of the pedagogical scenario (see Section 8.4). The frequency of the exchanges between the students and the language teachers in this environment was daily. The synthetic world was also utilised twice during the course with the whole-class as both a distant and a face-to-face environment; students being simultaneously present in the face to face environment and in the *Second Life* environment (through their avatars). The language during these activities was again the students' L2. The exchanges between the students themselves and between the students and architecture teachers, in the *Second Life* environment were very frequent: the environment being the subject of the architectural brief given to the students as the macro task of the pedagogical scenario (see Section 8.4).

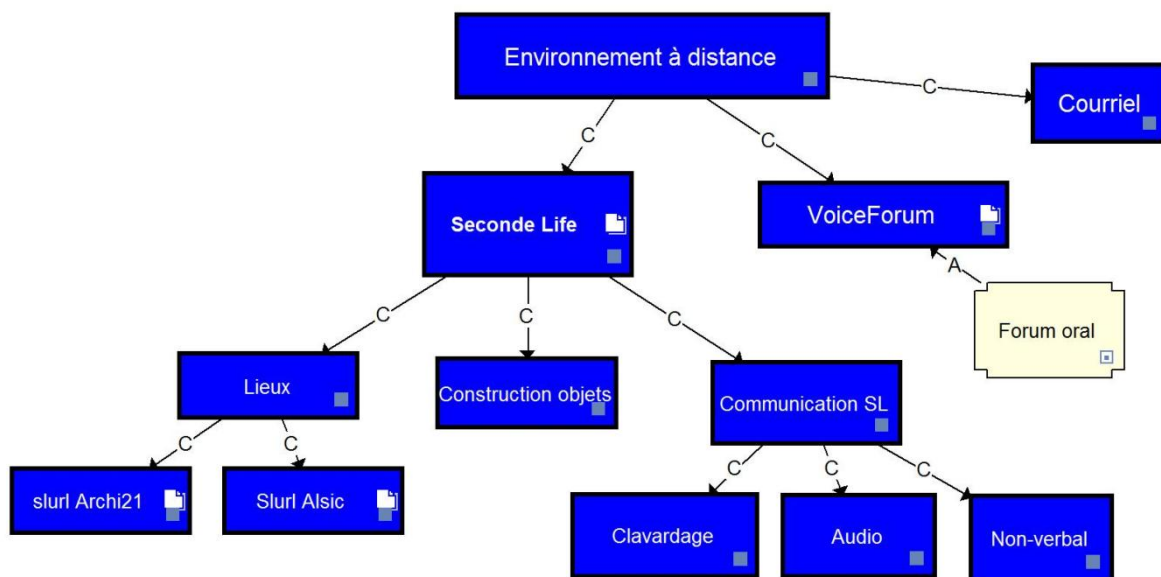


Figure 51: Distance communication environments used during the *Building Fragile Spaces* course

VoiceForum

The web-based platform *VoiceForum* (Fynn, 2007) was another distance environment used during the course. This environment was used uniquely by students working independently and by the language teachers, working at a distance. Each student workgroup had a separate forum on the platform. The frequency of exchanges was daily and the language used was the students' L2, either French or English.

VoiceForum provides for asynchronous oral interaction in a threaded discussion format (see Figure 52).



Figure 52: Asynchronous oral interaction in a threaded discussion format

For message creation, a built-in audio recorder/player is accompanied by a rich text editor. The user posts a spoken message, for example, to initiate a topic, to reply to another user and thus expand an existing thread or conversational branch of the discussion, or, in the case of the teacher, to comment on student messages. Whenever desirable, the teacher steps in via the comment feature to encourage the interactants' appropriate and effective use of language or turn-taking to accomplish the content-driven task. Likewise, insufficiencies in those areas are commented upon with formative feedback, but it is fundamental to understand that all this linguistic guidance is introduced by the teacher at the separate pedagogical level provided for in the software.

At this separate level, it is possible for both teacher and student to engage in a pedagogical dialogue: the teacher may ask the student to reformulate an utterance, for example, or the student may ask the teacher for more advice or explanation. A system of icons, displayed after messages in the list of student interactions, informs the students of teacher feedback and the teacher of student responses to his/her feedback. Associating the pedagogical input and teacher-student interaction to individual student messages is necessarily based on the contextualized needs of the participants. It can be consulted by any of the participants, accessed as often as required and even searched as a resource for future reference.

Email

Email was also used as a distance environment for communication between the language teachers and researchers from *Université Blaise Pascal* and the students. The

frequency of exchanges in this environment was two group emails to all the students, sent in French, before the start of the course and the possibility for students to contact the language teachers, if needed, throughout the course in either French or in English.

Help environment

Finally, a help environment was used for communication between the students and the architecture and language teachers. Help for students from the architecture teachers was accessible through the face-to-face environment and was also available from the language teachers through all three distance environments.

Language activities

In this section, I introduce each of the language learning activities that formed part of the *Building Fragile Spaces* course.

Introduction to Second Life

The introduction to *Second Life* activity was designed as a socialisation activity, in which the students would get to know the others in their workgroup and be introduced to the language teacher who would be working with the workgroup throughout the course. The general objectives of the activity were, in terms of architectural objectives, to introduce the students to the multimodal nature of *Second Life* and to some of the basic functions of the synthetic world. The linguistic objectives were for a communication protocol to be established between the workgroup and the language teacher, for the students to become acquainted with the communication tools in *Second Life* and for them to practise the language of introductions.

The input for the activity consisted of several *Second Life* objects. A welcome posterboard (see Figure 53) was displayed in the environment in which the activity took place. This was to introduce the language teacher to the students. It also served to show the students visually that they were in the correct place in *Second Life*, in case they had problems with the audio or had not yet discovered where the textchat communication was shown in the *Second Life* interface.

**Welcome to this *Second Life* session
for meta[REZ]malaquais**

**My name is Ciara Coveria and I am your
language tutor for this session.**



**When everyone has arrived, we will do some
sound tests and then we'll begin the session.**

Figure 53a: Welcome posterboard

Communication rules

**In each session we will do an audio test – confirm
that you hear the person in the text chat.**

**Please try not to speak all at once in the public
audio.**

**If you have a sound problem, turn off your
microphone and only communicate in the text chat.**

**If someone speaks for a long time – try not to
interrupt them – use the text chat or a gesture to
comment.**

Figure 54: Communication protocol posterboard

A posterboard highlighting the communication protocol was also provided for the students (see Figure 54). A set of pre-built objects (see Figure 55) was also used as input from which to teach the students how to move objects in the synthetic world and how to change the textures and colours of the objects. Four blank posterboards were prepared by the language teacher for the activity alongside a cube on which a text was displayed on one face (see Figure 55). This resource was used during the presentation of the in-camera view in *Second Life* which allows a user to detach their point of view from the avatar they are controlling, allowing the user to gain multiple perspectives (see Chapter 6). Finally, a range of chosen *Second Life* gestures was used as a resource during the activity.

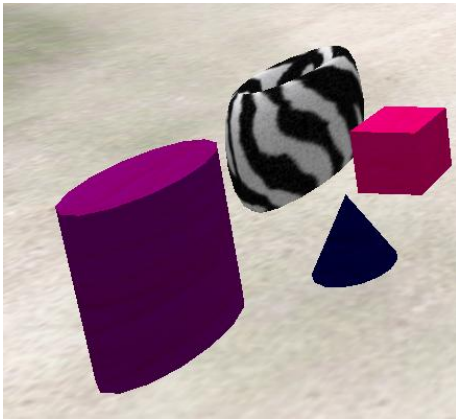


Figure 55: Pre-built objects exercise



Figure 56: Cube provided for camera exercise

Pre-requisites for the activity were that the students were to have already created their avatars and to have accepted a friendship invitation from their language teacher. The detailed procedure for this activity is shown in Appendix 3. The general procedure for the activity was:

- a welcome phase in which the teacher introduced herself and presented the objectives for the session,
- a phase which consisted of introducing the students to the communication tools and protocol and asking them to use these tools to introduce themselves and then ask another member something about themselves,
- an introduction to the camera tool in *Second Life* and to the use of gestures with students practicing the manipulation of these tools,
- a practical introduction to how to share an object in *Second Life*, take an object and place it in the inventory, rez an object and change its size and texture.

Following the activity, the students should have gained a range of gestures, a posterboard and an object in their inventories. They should also have gained the skills to use the public textchat, the audio chat, display a range of gestures, use the camera tool and have acquired basic object editing skills as well as having socialised within their workgroup and exchanged some personal information.

Buildjig activity

The buildjig activity was designed as an introductory building activity in the target language for which the general objectives were two-fold. The architectural aim of the activity

was to introduce the students to building techniques in *Second Life* and for students to assemble a presentation kiosk, which was designed by the architecture teachers and chosen as an example of how the students could present their project work on the final day of the design workshop. The linguistic objectives were for students to i) develop communication techniques in their target language, concerning the referencing of objects with which they were working during the construction, that they could go on to use during the development of their group's inworld architectural project and ii) to practise their oral skills.

The activity was divided into three learning activities (see Figure 57). Firstly, the communication protocol was established with the whole workgroup. This was followed by a building activity in pairs before a reflection upon this activity with the whole group.

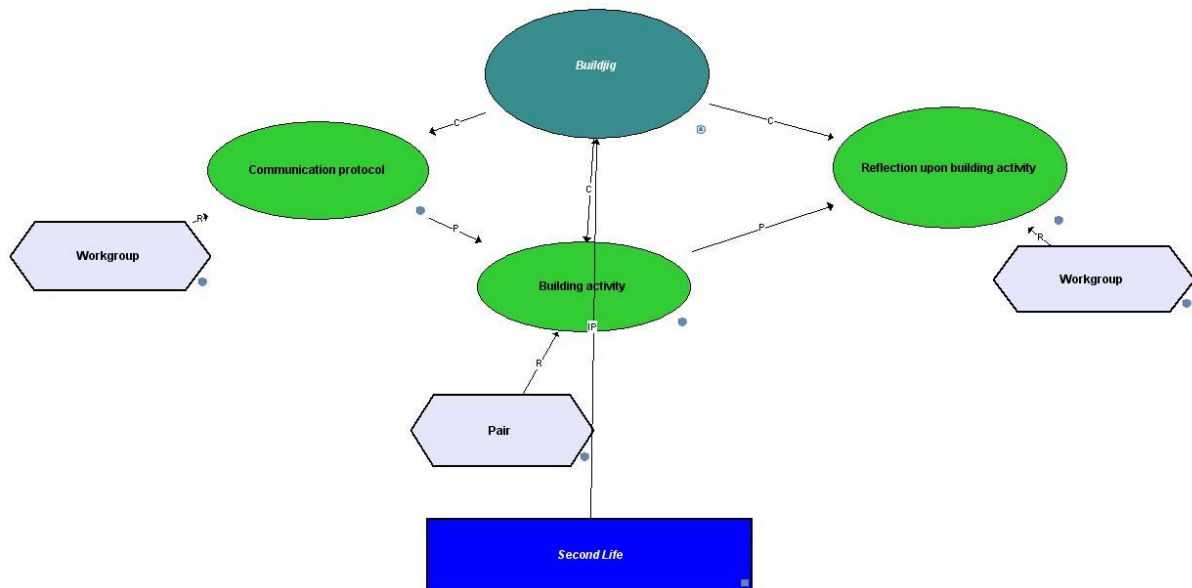


Figure 57: Modelisation of buildjig activity

The building activity was designed to incorporate a two-way information gap, following Long (1981), in order to encourage collaboration and interaction and employed one of the six learnings suggested by Lim (2009:7) for inworld curricular design: "learning by building." The activity required the exchange of information between the students, each of whom possessed some piece of information which was unknown to the other participant but of importance to solve the problem.

As Figure 57 shows, students worked in pairs during the building activity. One student was designated as the 'helper' and the other student as the 'builder.' The helper was asked to direct the builder in the assemblage of the kiosk from a set of objects provided. The helper was not allowed to manipulate the set of objects him/herself.

In terms of input, the student in the helper role was given a notecard containing a two-dimensional photo / representation of the final kiosk to be constructed (see Figure 58). The student in the worker role did not have the final shape of the kiosk but had three three-dimensional objects from which the kiosk was constituted. The procedure for the activity was that students had to exchange information about the two-dimensional characteristics of the objects, as shown in the images, in comparison to their three-dimensional characteristics in-world, shown in the spatial component of the environment. It was, thus, hoped that in order to complete the activity that students were obliged to pool information. A detailed procedure is found in Appendix 4. The activity demanded nonverbal interaction with the objects in the environment, in terms of the building actions, and verbal interaction between the students in order for successful activity completion. The final output of the activity was the kiosk object rebuilt.

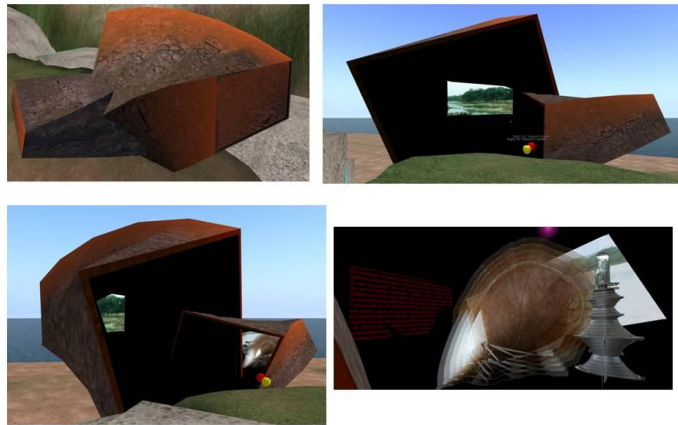


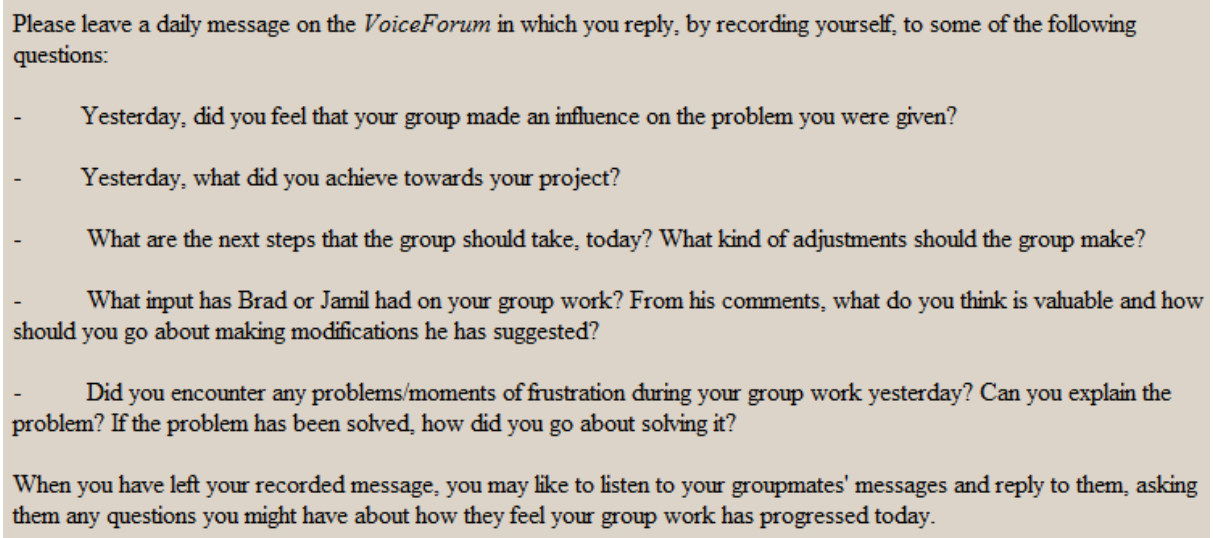
Figure 58: Input provided to the student in the helper role.

Reflective activities

Two reflective activities were integrated into the studio process. The general objectives of these activities were for students to i) articulate and deepen their understanding of their group's studio process by externalizing these and making them overt and ii) develop critical thinking aiding them to distinguish, within the specific context, the pertinent information in terms of the group's overall problem identification (Chanier and Cartier, 2006:8). The reflective activities were designed to provide opportunities to 'stand back' from the macro task to give students better understanding of the ideas explored with their architecture teachers.

The language teachers, unaware of what workgroups had done in ‘workshop’ sessions with their architecture teachers, had to help students clarify their individual roles within the workgroup, negotiate their views about their architectural model’s advancement, and understand what architecture teachers expected from them. This process was encouraged by asking the students to recall and describe the information given to them by teachers, to infer the relevance of this knowledge and to identify and express possible paths of future enquiry or direction for the development of their project work.

The reflective activities took place in two distinct environments: *VoiceForum* and *Second Life*. The *VoiceForum* reflection was an individual asynchronous reflection. The input was the activity instructions given to students, as shown in Figure 59. Every day during the course, from 9-10am, the computers in the face-to-face environment were set up to display *VoiceForum*. The environment remained open during the entire course, so students could also connect from home. Figure 60 shows the distinct roles of the teacher and students during the activity. The students had to record a number of audio messages on the forum. The language teacher listened to these and commented upon the linguistic content. The students were then required to listen to the feedback given in these messages. A detailed session plan is found in Appendix 5.



Please leave a daily message on the *VoiceForum* in which you reply, by recording yourself, to some of the following questions:

- Yesterday, did you feel that your group made an influence on the problem you were given?
- Yesterday, what did you achieve towards your project?
- What are the next steps that the group should take, today? What kind of adjustments should the group make?
- What input has Brad or Jamil had on your group work? From his comments, what do you think is valuable and how should you go about making modifications he has suggested?
- Did you encounter any problems/moments of frustration during your group work yesterday? Can you explain the problem? If the problem has been solved, how did you go about solving it?

When you have left your recorded message, you may like to listen to your groupmates' messages and reply to them, asking them any questions you might have about how they feel your group work has progressed today.

Figure 59: *VoiceForum* individual reflection activity instructions

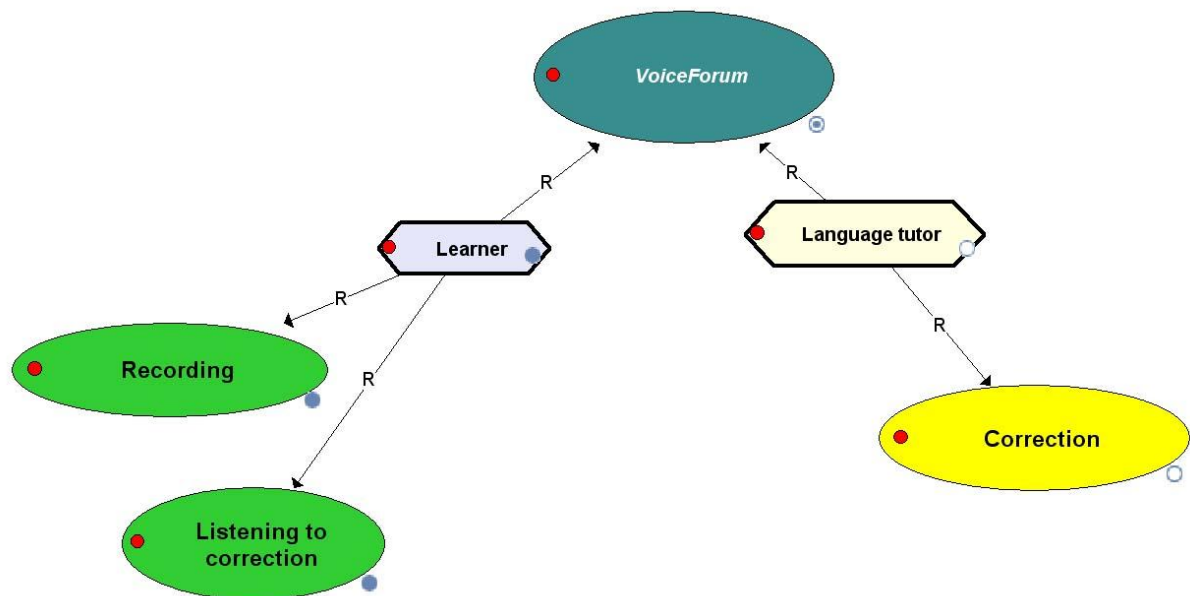


Figure 60: Distinct roles for students and language tutors during *VoiceForum* reflection activity

The synchronous group reflective sessions which took place in *Second Life*, were held on a daily basis and concerned workgroups (see Figure 61). The input for the sessions provided by the language teacher included:

- help for expression on a posterboard displayed inworld (language *for* learning, see Section 7.2.2),
- an image viewer with modified rights so that all the participants could add images,
- chairs for each participant and the management of speaking slots.

The input provided by the students included:

- images of their work which they had uploaded to their inventory in *Second Life* and which they displayed on an image viewer,
- notes which they had taken during the day about their feelings concerning their workgroups progress on the macro task and their individual contributions to this progress and from which they could talk for at least one minute.

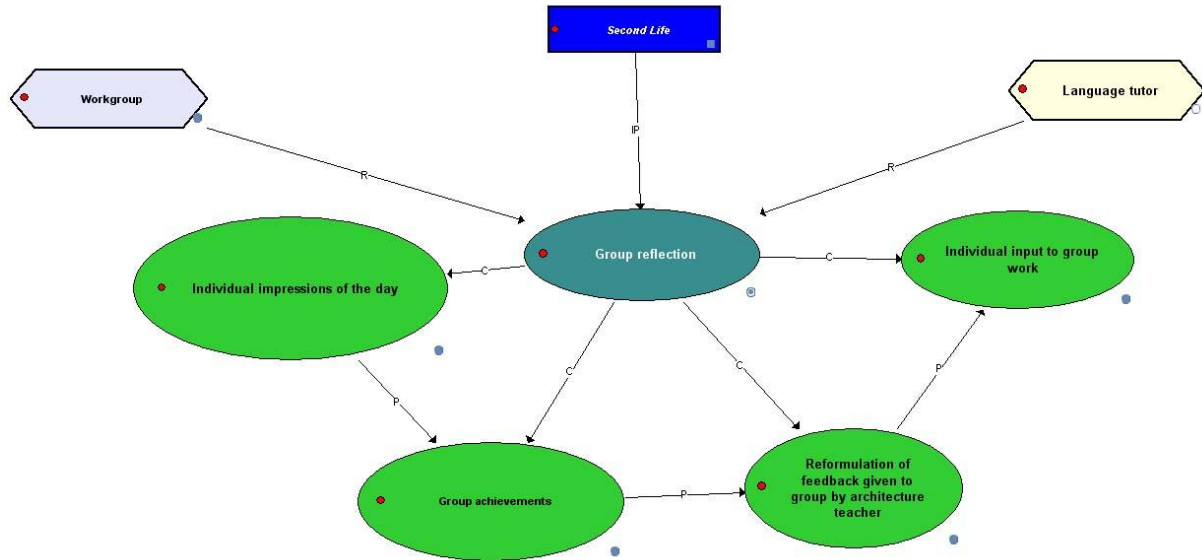


Figure 61: *Second Life* reflective session activities

Each *Second Life* reflective session was divided into four distinctive activities in which the interlocutors were individuals, the workgroup and then individuals. Firstly, each student was asked in turn to speak, from their notes, about his/her general impressions of the day. Secondly, the workgroup was asked to describe what they had achieved during the day, aided by images of their work. Thirdly, the workgroup had to reformulate the remarks of their architecture teacher during the feedback session and explain how the group could take into account these remarks. Finally, individuals were asked to describe their personal contribution to the group's work during the day and their plans for the following day's workshop session. Full details of the session procedure are found in Appendix 6. The output for the sessions were for the teacher to have scaffolded the students' understanding of the architecture teacher's feedback on their work and provide the students with linguistic guidance concerning the description of their project in order to help prepare them for the formative group presentation ('studio critique') and summative group presentations ('public jury') on day three and five of the course. For the students, the output was for them to have a clearer idea concerning the group's overall problem identification and each individual's role towards their collective work.

8.4.3. Schedule

Figure 62, shows a structured representation of the combined content and language integrated pedagogical scenario, as described for the *Building Fragile Spaces* course. In terms

of the 'navigation scenario' (Amiel *et al.*, 2002) through the language pedagogical scenario, the students had to follow the structure of the language activities in a linear fashion. The order of the activities and the articulation between these was predetermined. The content of the language activities was also fairly prescriptive: the expected outcomes of each activity were stated and the steps taken to obtain these outcomes were restrictive in that a scenario for each activity was elaborated beforehand (see Appendices 3-6 for examples).

For the architectural pedagogical scenario, however, the structure was more exploratory. The students had a macro task and the tutoring scenario was predetermined. However, how they organised their work, i.e. the steps needed to obtain the outcomes asked of the students, was controlled by the workgroups and decided by the students themselves. The architectural scenario was fairly flexible: the learning path did not force the students to follow it by way of a predefined logic. Rather, students could organise their work depending on their learning speed and the activities which they deemed as relevant to answering the overall macro task asked of them.

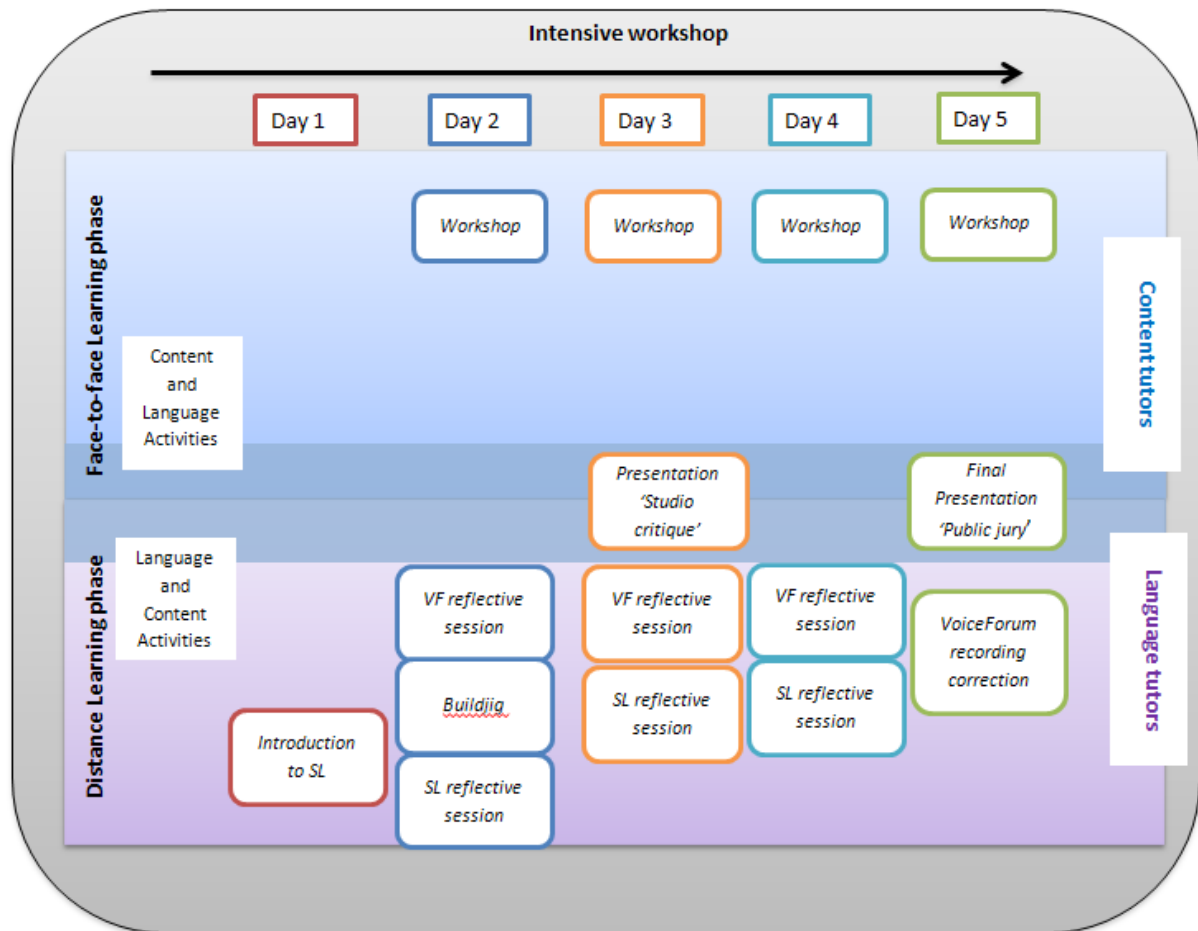


Figure 62: Structured representation of the pedagogical scenario for *Building Fragile Spaces* (Adapted from Rodrigues *et al.*, in press)

8.5. Course participants

Narcy-Combes (2011) argues for the need, when creating pedagogical scenarios and concerning course design, to know the public for whom the course and pedagogical scenario are designed in order to adapt these to this public. In this section, I describe the profiles of the course participants – teachers and students. After describing the profiles of the teachers involved in the course, I describe the student participants with reference to their language, distance communication tools and social networking profiles before turning to each of the student workgroups.

8.5.1. Teachers

Two architecture teachers (one native French speaker and one native English speaker) worked face-to-face with the students during the course. The native French speaking architecture teacher worked as a professional architect and did not teach regularly at the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais* but was involved at least once a year with workshops run in the school. The native English speaking architecture teacher, originally from the United States, was employed by the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais* and also worked as a professional architect.

An English as a foreign language (EFL) teacher (*Tfrez2*) and a French as a foreign language (FFL) teacher (*Tfrez1*) from *Université Blaise Pascal* accompanied students from a distance. The EFL teacher had eight years teaching experience in higher and further education at the time of the course and was a native speaker from the United Kingdom. The FFL teacher had recently been awarded her Master's in Distance teaching of FFL and was a doctoral student studying French didactics at *Université Blaise Pascal*. Both teachers had previous experience of teaching online courses.

8.5.2. Students

Eight female and nine male students, ranging in age from 21 years old to 25 years old, participated in the course. They ranged from first year undergraduates to second year Masters' students. The profiles of the students which I now detail are taken from our pre-course questionnaire results (see Appendix 8).

Language profiles

French was the mother tongue of nine of the seventeen students. The mother tongues of the remaining eight were Spanish, Chinese, Italian, Korean and Arabic (see Figure 63). Two students were bilingual. One student had both French and English as her mother tongues and another student had Chinese and hō-ló-ōe, a dialect of Chinese, as his mother tongues.

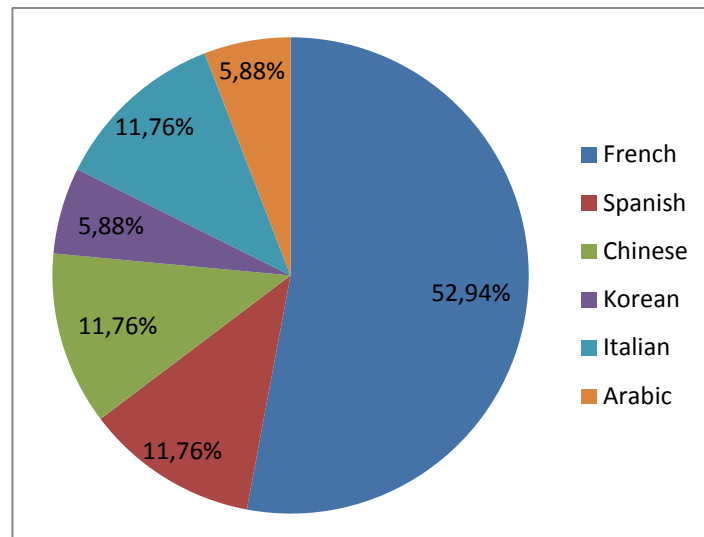


Figure 63: Students' mother tongues

Twelve students had English as their second language. Two of the eight students whose L1 was not French had French as their second language. The students had studied their L2 for an average of 10 years and within the context of an educational institution. Eleven students had experience of using their L2 to communicate with native speakers and whilst travelling in countries where the L2 was spoken. All of the students who did not have French as their mother tongue were foreign exchange students at the architecture school.

Distance communication profiles

The students' experience of using distance communication tools was mixed. All students used email at least once a month with the majority of students (11/17) using the tool nearly every day (see Figure 64). Five students used online discussion forums frequently whilst nine students had no experience of these. Twelve students had experience of textchat tools with eight of these students using them on nearly a daily basis. Twelve students also had experience of audio / video conferencing tools. Their frequency differed greatly with four students using these nearly every day, two students using these at least once a week and five students using these less frequently.

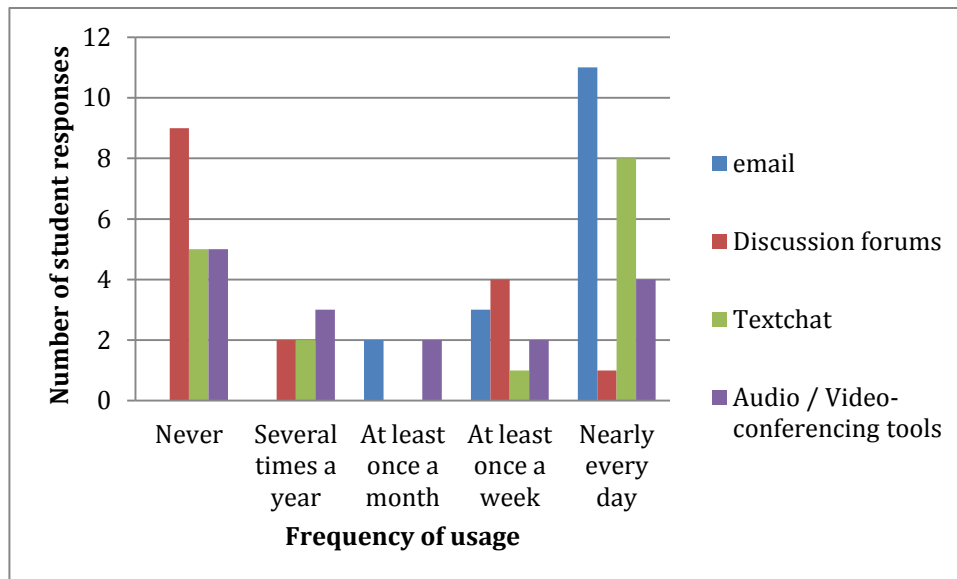


Figure 64: Students use of distance communication tools

Concerning experience of online distance learning, only one student had previously participated in a distance learning course. However twelve students used distance communication tools to communicate in a foreign language including talking to friends met whilst studying abroad and family members from other countries.

Social networking profiles including synthetic worlds

Two of the sixteen students had previously used the synthetic world *Second Life* as part of an earlier architecture design course. This course, however, had not included any language components. Since this earlier course, one of these students had connected to the synthetic world at least once a month, whereas the other had never re-connected to the world. Two other students had previous experience of synthetic gaming worlds; one student connected to these worlds at least once a month and the other several times per year. Fifteen of the 17 students had used other social networking environments (see Figure 65).

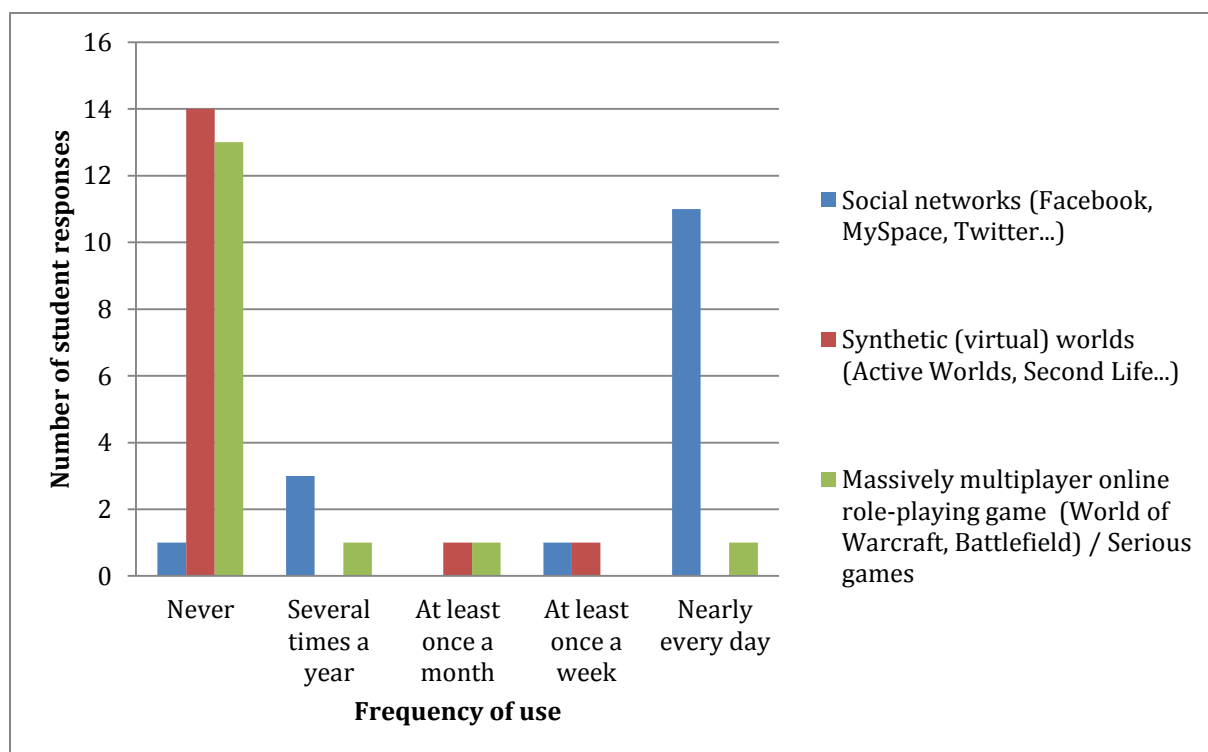


Figure 65: Students' previous use and frequency of this use of social networks, synthetic worlds and synthetic gaming worlds

Student workgroups

The participants were divided into four workgroups. This division was thematic and linguistic: each workgroup received a different architectural brief and had a dominant second language (see Table 12 and Section 8.4).

Workgroup	Target language	L2 level (CEFR)	Student participants (participants' codes)
avatars (GA)	French (FFL)	A2-B1	<i>Emmegi88, Prevally, Crispis, Pjgamez</i>
land+scapes (GL)	French (FFL)	A2-B1	<i>Antoniobri, Zeinarez, Wuhuasha, Hyungyoonrez, Yingrez610</i>
(e)spaces (GE)	English (EFL)	B1-B2	<i>Tingrabu, Hallorann, Quentinrez, Romeorez</i>
scenario (GS)	English (EFL)	B1-B2	<i>Jessieboo, Audreyrez, Arnaudrez, Nathanrez</i>

Table 12: Workgroups

I turn now to the language biography / characteristics of each workgroup.

Scenario (GS)

The scenario group was composed of two female students and two male students, all speaking French as their mother tongue. It included *Jessieboo* who had English as her second mother tongue. The group's target language was English and the other three students in this group had been studying English as their first foreign language for an average of 11 years and 3 months at the time of the course. All of the four students were currently studying English formally as part of their degree programmes. None of the students had previously taken any distance-learning courses. Two of the students used their foreign language to communicate online. One student, *Audreyrez*, having spent a year studying in London, used English nearly every day to chat with people she had met during her time in London. *Jessieboo* also communicated in English several times a year to communicate with her family.

In terms of the group's information technology biography, all students used email nearly every day. The two female students used chat regularly whereas the two male students had never used a chat application online. None of the students had used *Second Life* prior to the course, however one student, *Nathanrez*, was familiar with other synthetic worlds and massively multiplayer online role-playing games (MMORPGs) using synthetic world environments at least once a week and MMORPGs at least once a month. Two members of the group (*Audreyrez* and *Arnaudrez*) knew each other prior to this training course.

(e)spaces (GE)

The (e)spaces group was composed of four male students all of whom had French as their mother tongue. The group's target language for the training course was English. Three of the students had English as their second language and one student (*Tingrabu*) had Russian as his second language and for him English was a third language. The students had studied English for an average of 8 years and 2 months and all of them continued to study English formally as part of their degree courses at the time of the intensive course. Three of the students used English to communicate online: two students used the language frequently to chat with friends or contacts; one used English to resolve computer problems and another student used English to keep himself informed, read blogs and watch videos.

Concerning the students' use of information technology, two of the students used email every day, one student used email at least once a week and one student used email at least once a month. Two of the students did not use chat software at all whilst the other two students using chat software several times a year. One of the students, *Quentinrez*, played MMORPGs nearly every day and also used synthetic worlds other than *Second Life* at least

once a month. Two of the students had previously used *Second Life* having taken an intensive course with the same architecture teachers the previous year entitled 'Building with immaterials'. None of the students had previously taken an online course.

Avatars (GA)

The avatars group comprised of three female and one female student, all foreign exchange students at the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais*. For two of the students, Italian was their mother tongue (*Prevally* and *Emmegi88*). For the other two students (*Crispis* and *Pjgamez*) Spanish was their mother tongue. The group's target language for the course was French: a second language for two students who had been studying French for an average of 5 years and 6 months and a third language for the other students who described their level as intermediate and advanced. Of the two students whose second language was French, one student continued to learn French in a formal setting whereas the second student had stopped formal learning of French four years prior to the intensive course. All of the four students used French online, three of the students nearly every day and one student at least once a week. The principle use was to speak to others.

In terms of the students' information technology biography all four students communicated on a daily basis using chat software and used email regularly. However, none of the students had any experience with synthetic worlds, including *Second Life*, MMORPGs or online education.

Land+scapes (GL)

The land+scapes group was comprised of five students. Of these five students, one student had French as his mother tongue (*Antoniobri*), one student had Arabic as her mother tongue (*Zeinarez*), two students had Chinese as their mother tongue (*Wuhuasha* and *Yingrez610*) and one student had Korean as her mother tongue (*Hyungyoonrez*). The latter student was enrolled as a full-time student at the *Ecole Nationale Supérieure d'Architecture de Paris-Malaquais*, as was the native French-speaking student *Antoniobri* whereas the other three students who did not have French as their mother tongue were foreign exchange students at the school. For the four students who were not native French speakers, English was their second language and French was their third language.

8.6. Conclusion

This chapter gave an overview of the context for my study which focuses on interaction data from a CLIL course entitled *Building Fragile Spaces*. The details of the communication scenario, pedagogical scenario and course participants' profiles will help readers to better understand the research protocol that was elaborated around the course for the purposes of this study. This is detailed in the next chapter.

Chapter 9. Research Methodology

9.1. Introduction

This chapter is divided into five sections in order to present the methodological approach for my study. The latter is heavily influenced by a LEarning and TEaching corpus (LETEC) approach. I firstly, give a general overview of the research methodology adopted for this study to guide the reader during this chapter. In order to introduce LETEC, I then evoke current methodological approaches in corpus linguistics which are linked to language learning/teaching before exploring why we (Wigham & Chanier) esteem these approaches are not adapted to a study focused on multimodal interaction in synthetic worlds. This leads us to describe the reasons why we (Wigham & Chanier) chose to structure our data into a LEarning and TEaching corpus. I give an overview of this type of corpus. Secondly, I describe the research protocol elaborated around the *Building Fragile Spaces* course which was influenced by the LETEC methodology. This section includes a description of the data gathered and the methods used in data collection. Thirdly, I provide an overview of the structure of the ARCHI21 LETEC corpus and show how the data collected fits into each section of the corpus. I finish this chapter by describing the computer-mediated discourse analysis approach that informed this study. Adopting this approach required multimodal data transcription. I detail this transcription process here. The specific methodology for data analysis (e.g. data selection, counts, coding and statistical tests) with reference to each research question, however, is presented in my analysis chapters.

9.2. Overview of research methodology

Huberman & Miles (1991:34) suggest that when dealing with qualitative data, data analysis consists of three concurrent flows of activity. Qualitative data is considered to be the "rough materials researchers collect from the world they are studying; they are the particulars that form the basis of analysis" (Bogdan & Biklen, 1992:106 cited in The Association for Educational Communications and Technology, 2001: no page) and includes recorded sources of behaviour which are central to the study of interaction. Huberman & Miles (1991) suggest that for analysing such data the following processes must be followed after data collection:

- data reduction (selecting data for analysis and transformation of data)
- data display (coding of data and presentation visual presentation (graphs, tables) for analysis)
- conclusion drawing / verification.

The research methodology for data collection and analysis including data display which was followed in this study is more elaborate (see Figure 66). It consists of four phases: before the experiment, during the experiment, post experiment and post research. I now briefly outline these phases as shown in Figure 66. Each phase is later detailed in different sections of this chapter.

9.2.1. Before the experiment

Prior to the course *Building Fragile Spaces* which was the site of experiment, my research questions were elaborated (see Section 1.1). From these research questions, we (Wigham, Bayle & Chanier) elaborated the pedagogical scenario described in Chapter 8 and prepared the conditions under which we could conduct this pedagogical scenario. These included the material requirements for the course and the training of tutors with respect to the pedagogical scenario. Prior to the course, we (Wigham & Bayle) elaborated the research protocol (see Section 9.4), including the design of any documents needed (see Appendices 1-8) and the testing of recording procedures (see Appendix 9) with the team of researchers. This research protocol also required that before the *Building Fragile Spaces* course started that the students familiarized themselves with the course environments *Second Life* and *VoiceForum* and completed a pre-questionnaire (see Section 9.4.1).

9.2.2. During the experiment

During the *Building Fragile Spaces* course, the research protocol was followed. This is detailed in Section 9.4. It involved me explaining the protocol to students and receiving informed consent, data collection from the course environments during the sessions following a recording protocol and performed by the team of researcher and the scheduling of post-course interviews which I carried out with the students.

9.2.3. Post experiment

Following the experiment, I conducted semi-directive interviews with a small number of course participants (see Section 9.4.5). Post-experiment, data reduction also occurred. Unlike, Huberman & Miles (1991) schema, this did not involve data selection for analysis but rather concerned all of the data collected. I, firstly, converted the data to smaller electronic formats to aid data storage (and later download from the Mulce repository (Mulce-repository, 2011) in corpus format). Secondly, all data was anonymised by myself and Saddour to protect participants' confidentiality. Saddour and I then reduced pre and post course questionnaires. A process of data display was then performed on the pedagogical scenario (Saddour & Wigham) and the research protocol (Wigham) using *MotPlus* in order, for the pedagogical scenario, to render the links between activities, environments and participants explicit and, concerning the research protocol to render explicit the processes undertaken prior and during the course.

The major activity post experiment, however, in the research methodology adopted for this study was the structuring of the data, including the data collected during the course and information about the participants alongside the technical, pedagogical and research protocol information about the experiment. This was structured into a global LEarning and TEaching (LETEC) corpus (see Sections 9.3 and 9.5) according to the Mulce format (Mulce, 2011a) and following an IMS-CP formalism (2011) as the global XML content packager for the corpus (see 9.3.5). The post experiment research methodology includes the deposit of the structured corpus in the open-access Mulce repository (Mulce-repository, 2011), which allows the corpus to be attributed an Open Archives Initiative (OAI) identifier. Finally, the corpus was declared in CLARIN (Clarín, 2012).

9.2.4. Post research

Once the data has been structured, can post research begin. For this study, the post research included data annotation and data transcription (Saddour & Wigham) involving reducing the observed reality into written forms (Flewitt *et al.*, 2009) (see Section 9.6) and my marking of patterns in the structured XML data (data coding). This allowed me to perform statistical tests and pattern counts on the data. This post research forms the basis of my analysis with reference to the research questions. Following this analysis a final step exists in our research methodology: the production of distinguished LETEC corpora (see Sections 9.3.5 & 9.5). A distinguished corpus includes a particular analysis of a selected part of the

global corpus. It does not include the structured data available in the global corpus upon which the post research was performed. It refers to the latter data but the corpus includes only the transformed data used for the specific analysis and which is structured in a LETEC format and again deposited in the Mulce repository and attributed an OAI number. The benefits of distinguished corpora are that they give value to the analyses performed by the researcher. The data used for analysis can be presented in parallel with the results of the analysis and distinguished corpora can be cited and referenced in conference papers or published articles as other published works would be (see Section 11.4.4 for an example).

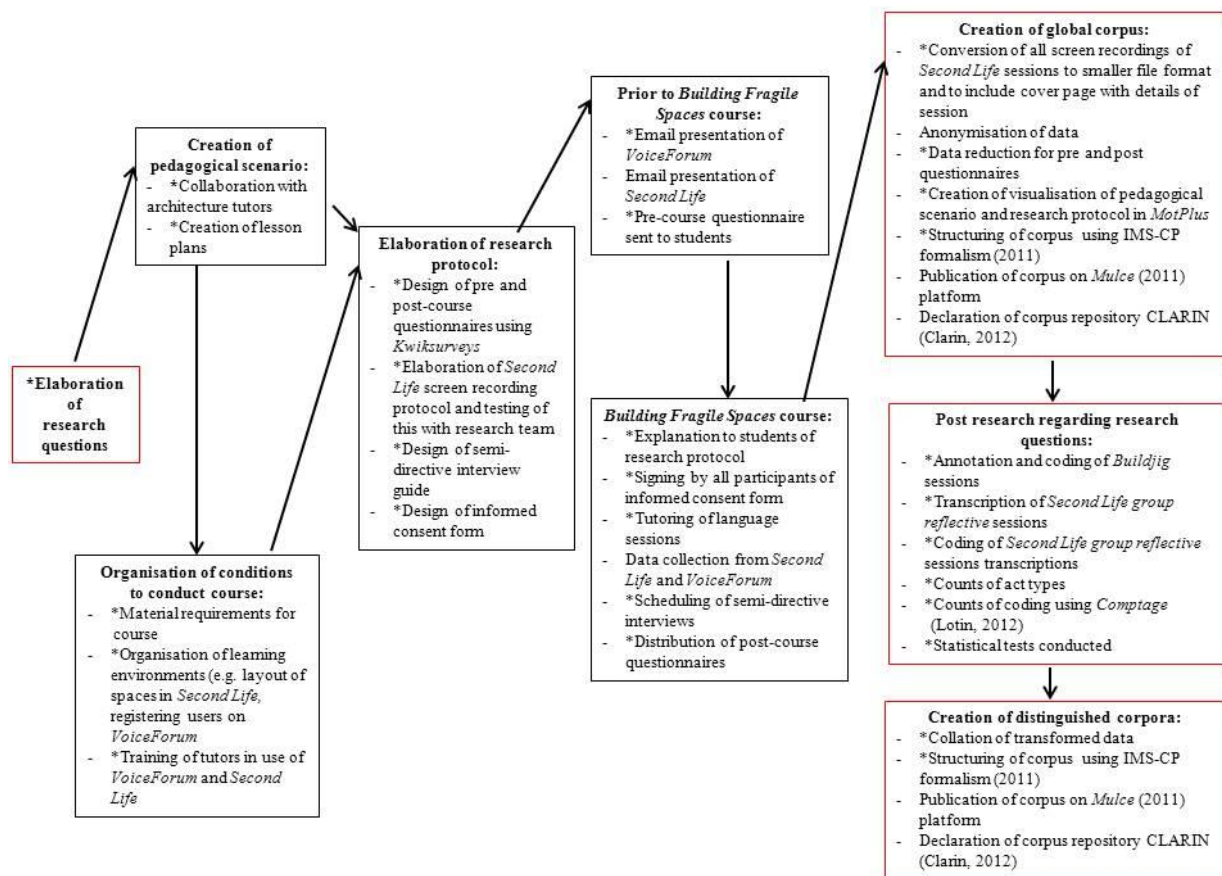


Figure 66: Schematic overview of the research methodology.¹⁵

¹⁵ Black boxes are general to the ARCHI21 research project. Red boxes show tasks specific to this thesis study. I completed or participated in the tasks marked by asterisks.

9.3. Adopting a LETEC approach to the study

In this section, I describe methodological approaches in corpus linguistics which are linked to language learning/teaching. I highlight why these approaches are not adapted to a study focused on multimodal L2 interaction before describing the reasons why we (Wigham & Chanier) chose to structure our data into a LEarning and TEaching corpus. I give an overview of this type of corpus.

9.3.1. Corpus linguistics and L2 learning-teaching

Granger describes corpus linguistics as "best defined as a linguistic methodology" (2002:4) based on electronic collections of naturally occurring texts. One application of corpus linguistics frequently employed in SLA studies is that of 'learner corpora' which consist of collections of texts produced by foreign or second language learners (Granger, 2004:124). Most often they are collections of written texts, rather than spoken texts, and are obtained either in controlled situations where learners' L2 is being tested or from learners' formative assessment exercises, for example academic essays or compositions. Granger (2004) describes that learner corpora fall into two different categories. Firstly, commercial learner corpora which tend to include the L2 productions of learners from a variety of L1 backgrounds. Secondly, those compiled by educational institutions which focus predominantly on productions by learners from the same L1 background. Both categories of learner corpora tend to gather data from learners at a single point in time rather than be of a longitudinal nature. Granger (2004) also suggests that the majority of learner corpora focus on English as the L2, on written language and involve students of intermediate-advanced levels.

A learner corpus may be produced either as a raw corpus or as an annotated corpus. A raw corpus consists of plain texts with no added features. If extra linguistic or textual information is added to these plain texts by a researcher, often using standard annotation software, they form an annotated corpus. In order to allow comparisons between corpora, learner corpora not only includes the texts produced by learners but must contain metadata in which learner and task variables are documented (Granger, 2002). Table 13 shows Barlow's metadata variables (2006:227), based on Granger, 2002.

Setting/Task	A description of the nature of the task that provides the language sample. It could be a written prompt for an argumentative essay, a picture, or cartoon. Additional details may be furnished, depending on the particular nature of the task.
Audience/ Interlocutor	Identification of the person(s) interacting with the student, along with their role (teacher, tester, etc.).
Time Limit	If the task is timed, what is the time allowed?
Use of reference materials	Are dictionaries and other reference materials allowed?
Learner Mother tongue	The primary language of the student.
Other languages	Languages that the student knows with an assessment of linguistic level in these languages in speaking/writing/listening/reading skills.
L2 level of proficiency	An assessment of the level of the student.
Age, Sex...	Age and sex of the learner and any other attributes.
Location	The country or region of origin of the students.
Education	This variable may include general information about education as well as an indication of the nature of language classes.

Table 13 Barlow's variables for learner corpora metadata (2006)

9.3.2. Approaches to learner corpora

Two analysis methodologies applied to learner corpora have emerged since the potential of learner corpora began to be considered at the beginning of the 1990s: contrastive interlanguage analysis and computer-aided error analysis.

Contrastive interlanguage analysis is based on the premise that the ultimate objective for a L2 learner is for his/her language to resemble as closely as possible that of a native speaker. Thus, one important strand of this approach focuses on the comparison of learner production with native speaker data with the aim of identifying features of learner L2 production that are misused, overused or underused compared to similar text and task types produced on the same topic by native speakers (e.g. Hasselgard & Johansson, 2012; Tribble, 2012). A second strand of contrastive interlanguage analysis focuses on the interlanguages of different types of learners and the comparison of these. Corpora are formed from learner data produced by learners with different L1s in order to determine the extent to which specific learner features are shared. The objective is for researchers to determine which language features are invariant and which are connected to the specific use of a L1.

Computer-aided error analysis focuses on errors in identifying, tagging and analysing errors in student interlanguage. The advantage of studying error analysis through a corpus is that the errors are not presented in isolation but alongside their co-text and non-erroneous forms (Granger, 2002). This is important because error tagging is often problematic, in terms of agreeing on error taxonomies. The latter are often agreed upon with reference to the focus of a given individual project, rather than annotation schemes being devised that allow multi-level annotation (Granger, 2004). The computer-aided error analysis approach has led to a more limited number of research publications than contrastive interlanguage analysis (see Rayson & Baron, 2012).

9.3.3. Pedagogical applications of learner corpora

Römer (no date) suggests a dynamic relationship exists between corpus linguistics and language teaching with both fields mutually influencing each other. Whilst language teaching profits from corpus research in terms of resources, methods and insights it provides, the requirements or ‘needs-driven impulses’ of language teaching impact research projects and the development of suitable research tools and resources. Indeed, learner corpora aim to provide detailed descriptions of L2 learners’ language in order to inform SLA research and to improve foreign language teaching (Granger, 2002). Leech (1997) describes that the application of corpus linguistics to the latter can both be direct, whereby learners and teachers interact with the corpora themselves (e.g. data-driven learning), and indirect, for example using corpus linguistics to inform teaching syllabi, L2 reference works and the development of teaching materials.

With regard to direct application, learner corpora prompted ‘data-driven learning’ whereby L2 students themselves analyse either the corpus or the data extracted from the corpus by teachers. The premise behind this method is that students can learn by exposure to negative evidence: asking students to compare their productions with the other learners’ productions or with the productions from native-speaker corpora will encourage awareness raising and may help increase learner autonomy.

Concerning indirect pedagogical applications, learner corpora can give insights into the needs of specific learner populations and help test teachers’ intuitions regarding whether a particular L2 phenomenon is difficult or not (Granger, 2002). They also have applications in reference works, for example, the enrichment of user notes for example in learner dictionaries

and can provide insights into which "collocational, pragmatic or discourse features should be addressed in materials design (Flowerdew, 2001) and how these should be presented.

9.3.4. Drawbacks of learner corpora concerning this study

Reffay, Chanier, Noras & Betbeder (2008) describe, with the view of studying online learning situations, that learner corpora can provide only a restricted view of the situated learning context. Learner corpora focus uniquely on learners' productions in the L2 rather than taking into account all of the participants in a L2 course which, as we have seen in Section 8.4, in our context include teachers and their productions and interactions as well as learners. Furthermore, the data for learner corpora are frequently collected in test situations rather than learning situations (e.g. Schmitt & Redwood, 2012; van Aertselaer & Bunce, 2012). Thus, the context for learning (the environment and learning design) is not considered as an integral part of the corpus. Learner corpora can, therefore, not inform studies into affordances of learning environments which is of interest to this study or into pedagogical design. In online learning situations, including synthetic worlds, the replication of the ecological context is practically impossible to obtain because in "collaborative online learning situations have a number of variables which are difficult to control" (Reffay, Betbeder & Chanier, in press). Even if the same learning design is reused with a different group of learners, the observable phenomenon will not necessarily be the same. This makes scientific cumulative or contrastive analyses difficult to apply. The context for learning, therefore, needs to be an integral part of the corpus in order to allow outside researchers who were not involved in the learning event to understand and be able to re-use the data for further analysis.

In this study, I am interested by participants' (students and teachers) multimodal interactions within the specific synthetic world environment and within the specific pedagogical scenario that was designed for the course. It is therefore necessary for us to make explicit the links between the interaction data (participants' productions) and the context for the study and learning design in order to give sense to the analyses. For these reasons a LEarning and TEaching corpora approach was adopted.

9.3.5. LEarning and TEaching Corpora (LETEC)

LEarning and TEaching Corpora (LETEC) are a structured entity, which are composed of all the elements which result from an online learning situation and which are collected according to a research protocol.

A LEarning and TEaching corpus collects in a systematic and structured way all the data from interactions which occur during a course which is partially or entirely online. These data are enriched by technical, pedagogical and scientific information as well as information about the participants and are organized to allow contextualized analyses to be performed. (Chanier & Ciekanski, 2010: paragraph 59.)¹⁶

The use of the term corpus in the definition of a LETEC corpus does not refer to a collection of authentic digital resources (Chanier & Ciekanski, 2010). Rather, the authors argue that a corpus consists of four different facets each containing certain criteria (see Figure 67) which must be met if researchers are to use the term 'corpus'.

¹⁶ "Un corpus d'apprentissage en ligne rassemble donc de façon systématique et structurée un ensemble de données d'interactions et de traces issues d'une expérimentation de formation partiellement ou totalement en ligne, enrichies par des informations techniques, humaines, pédagogiques et scientifiques, le tout organisé pour permettre des analyses contextualisées." My translation.

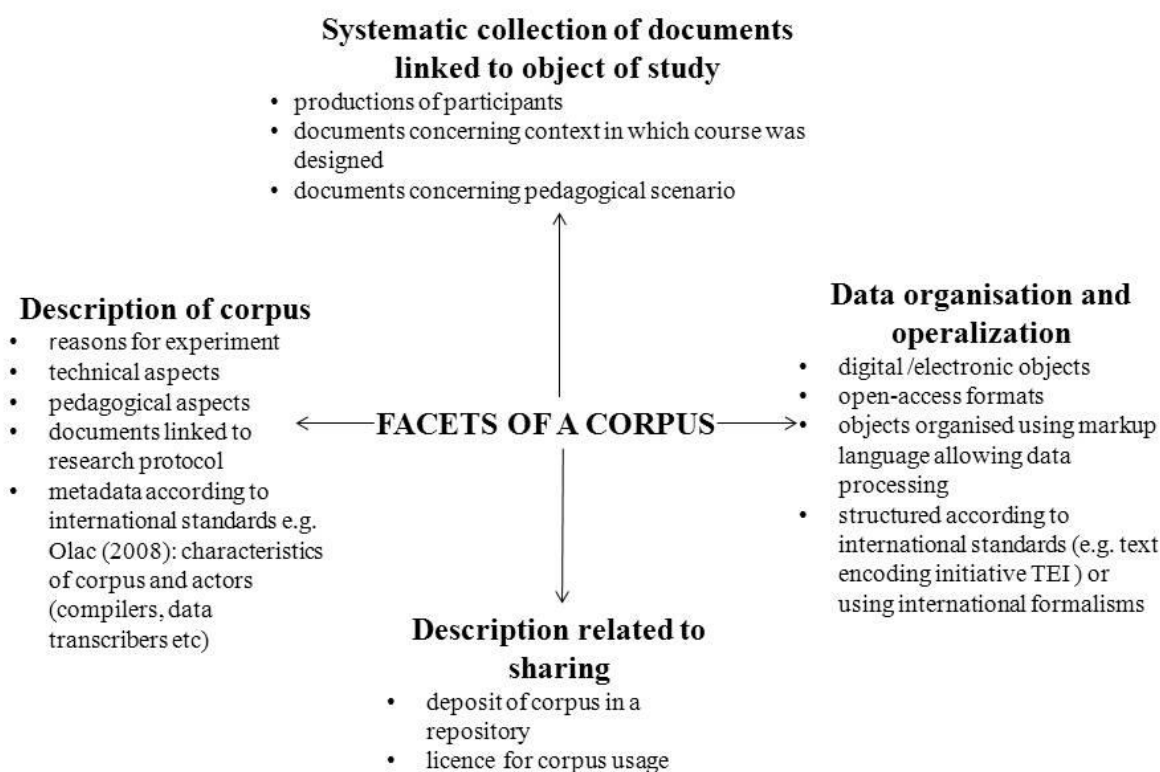


Figure 67: Facets of a 'corpus' (suggested by Chanier & Ciekanski, 2010)

LETEC developed by the *Mulce* project¹⁷ (Mulce, 2011) as new shareable scientific objects respond to each of the criteria that Chanier & Ciekanski (2010) propose behind the term 'corpus'. They render explicit links between interaction data of all participants in a course and not only the learners, the learning context (both the technical context and the pedagogical context) and analyses. The dataset is composed of the context for a given online learning situation (or event), which is described by the learning design. The technical context of the online learning situation is described alongside the research protocol that was designed around the learning situation and these are included in the corpus alongside the interaction tracks produced during the learning situation (see Figure 68). Detailed descriptions of each component, alongside how each component was constituted with reference to the *Building Fragile Spaces* course and its data, are given in Section 9.5.

¹⁷ ANR programme: "Corpus and Tools in the Humanities", ANR-06-CORP-006

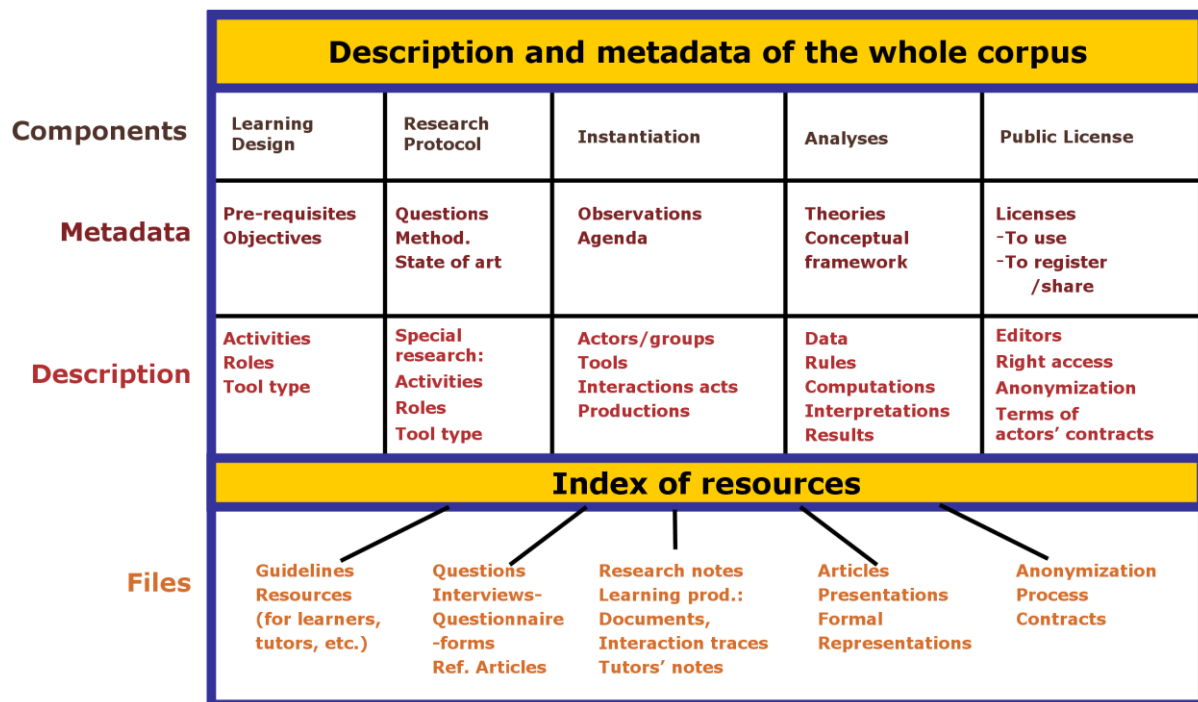


Figure 68: Main components of a LETEC corpus (Reffay, Betbeder & Chanier, in press)

LETEC are structured using the IMS-CP formalism (2011) which allows the corpus' metadata to be expressed in XML alongside the components of the corpus and their different levels of description (see Figure 69). Part 3, of Figure 69, represents the primary data collected from the course, for example, the instructions given to the students, the interaction tracks and the questionnaire results. In order to respect participant privacy, the raw data is anonymised and a licence for their use in an open-access corpus must be obtained. In Part 2 of the corpus, each resource found in Part 3 is given an identity code and is attributed a description. These are collated in an index. This index is structured in order that the data described remains grouped. For example, all of the screen recordings from a particular session will be grouped together as will all of the information concerning the post-course interviews. Finally, in Part 1 the 'manifest', the data are structured, using XML language and according to different determined formalisms and the overall corpus is described by metadata which allows it to be identified in a corpus repository.

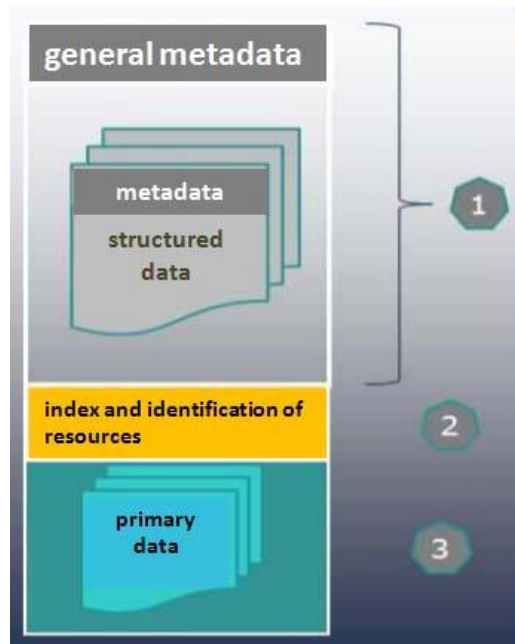


Figure 69 : Structure of a LETEC corpus (from Chanier & Ciekanski, 2010)

As Reffay, Betbeder & Chanier (in press) explain, a researcher, whilst working with the transcription and screen recording of a textchat session (in the Instantiation component), must be able to read the objectives of the activity in which this session took place (described in the pedagogical context, i.e. Learning Design component). The interest of LETEC stems from the fact that the XML formalism allows the researcher to peruse different components of the corpus in parallel and thus analyse interactions within their context. Concerning this research study, the advantage of this organization is that because the manifest is machine-readable, a LETEC organisation rendered our annotated data quantitatively searchable using a programme *Comptage* which counted XML annotations (Lotin, 2012, see Section 12.3.1). Data comparisons were, therefore, easily made across the different synthetic world sessions which involved the different workgroups (GA, GL, GE and GS).

LETEC aim to structure and contextualise data, with respect to pedagogical and technological learning situations, but also, to make the raw data available to the research community, in an independent formalism which does not rely on a specific piece of software or a specific online platform. In doing so, LETEC render the learning situations re-analysable by researchers who did not participate in the experimentation and also to facilitate comparisons between different online learning situations.

LETEC are deposited in an open-access repository (Mulce-repository, 2011) this allows for the publication of the corpora and also the possibility to share these with a larger

community. For example, LETEC correspond to the standards required by the Open Language Archives Community (OLAC) who operate an interoperability framework. Corresponding to OLAC standards means that LETEC corpora metadata can, after validation, be harvested by OLAC and then disseminated (see Appendix 16), increasing the visibility of LETEC corpora. They are also attributed an Open Archives Initiative identifier (OAI) which provides a persistent resource identifier. This allows the corpora to be cited, as an academic article would be, in a conference paper or scientific publication, allowing a researcher to discuss in parallel the data used for analysis and the analysis results thus adding validity to the analysis performed. Rendering the corpora visible, and providing them as open-access corpora means that in turn, other researchers can compare analyses, perform further analyses or re-perform the same analyses on the corpus. This was important to us, considering that the *Building Fragile Spaces* course took place within a European project and thus we worked in collaboration with teachers and researchers from other institutions who may wish to use the data.

Any data analyses, which are connected to the raw data, comprising, for example, of data annotations, data transcriptions or data transformations may also be incorporated into the corpus or may be produced as distinguished corpora. A distinguished corpus is a corpus in itself and a sub corpus of the global LETEC corpus upon which it draws (the corpus which includes all of the structured data from a specific course) (Chanier & Ciekanski, 2010: paragraph 33). A distinguished corpus focuses on a particular analysis of a selected part of the global LETEC corpora. A distinguished corpus is structured in a similar manner to a global LETEC corpus (see Figure 69) but the structured data from the global corpus upon which the analysis is performed are referred to in the distinguished corpus but only the transformed data (e.g. the annotated or coded data) used in the analysis are included. Distinguished corpora can be constituted in two different ways (Chanier & Ciekanski, 2010). Either a researcher can choose a sub-section of the global corpus to analyse (for example one activity session) or the researcher can select data in a longitudinal manner, for example the activity sessions for a particular group of learners). Distinguished corpora are used in three distinct ways (Chanier & Ciekanski, 2010). Either to associate a scientific publication and the data used in the analysis (type 1); to transform data into the specific format needed in order to use a specific piece of software or tool to perform an analysis (type 2); or to share analyses performed on data using a specific piece of software or tool (type 3). This study includes examples of distinguished corpora of types one and three.

In order to illustrate how a LETEC approach was applied to this study, I now turn to the research protocol which describes the data collection (Section 9.4) and then describe how each item of data was structured into a LETEC corpus (Section 9.5).

9.4. Research Protocol

A combination of research instruments, in a process termed triangulation was employed with the aim of increasing ‘the chances of accuracy’ (The Open University, 2001:65) and, thus, the validity of results. In this section I detail each of the research instruments used for data collection.

9.4.1. Pre-questionnaires

On the first day of the course, the participants were asked to complete a pre-course questionnaire. We (Wigham & Bayle) chose the online survey website *Kwiksurveys* (Kwiksurveys.com, no date) to administer this questionnaire to facilitate the administration and data collection. I chose to administer the questionnaire ‘in situ’ to optimize the return rate and in order to allow a teacher to be available to answer any questions the students may have had.

The purpose of the pre-questionnaire was three-fold. Firstly, we wished to obtain personal information about the participants, including their gender and date of birth. Secondly, we wanted to obtain information about the participants’ language background including their mother tongue, their L2 and L3 and for their other languages. For example, how many years they had studied these languages, the learning context (e.g. formal or informal) and any contact they had had with native speakers of these languages. Finally, we wished to obtain information about the participants’ experience of using distance communication tools and any previous experience of online learning as well as whether they had any experience of using *Second Life* and if so their level of mastery for a list of *Second Life* activities. Our pre-questionnaire is given in Appendix 7.

The questionnaire comprised of seven open-ended questions providing us with qualitative data and 25 closed questions providing us with quantitative data. We anticipated that our open-ended questions would allow the participants some degree of flexibility in their responses and, because we did not wish to anticipate the range of possible replies from participants, we hoped that they would allow us greater insight into the subject of

investigation by allowing us to discover unexpected information. The closed questions allowed us to limit the responses a participant could give. They were, thus, quicker to administer but also provided quantitative data. Our closed questions used a Likert scale. For the questions concerning the participants' previous use of distance communication tools a five-point Likert scale was employed. For the question pertaining to the students' mastery of *Second Life* skills, a four-point Likert scale was used.

9.4.2. *Second Life* session data

During the course, screen recordings were made of five fifty-minute language sessions held in *Second Life* for each of the four groups GA, GE, GL and GS: a total of 16 hours and 40 minutes. To this, are added the screen recordings of the inworld presentation sessions midway through the course and on the final day of the course. These total three hours in length.

In order to collect video screenshots of each synchronous *Second Life* session, researchers, present inworld in the form of small animal avatars (see Figure 70), observed the workgroups and recorded screen and audio output using the software *Fraps* (Beepa, 2010). A distinction is often made in research between *participant* and *non-participant* observation. Whilst a *participant observer* takes part in the event s/he is researching and observing, a *non-participant observer* does not take part. The distinction, however, is not straightforward (The Open University, 2001). Indeed, by observing what is happening and by being in the same location as the participants it is argued that you are to some extent a participant. Indeed, in our study, it cannot be said that our researchers were non-participant observers and our data illustrates this. Although the researchers tried to have minimal involvement in the setting being studied there were instances where, for example, the large building object shown in Figure 70 fell onto the researcher's avatar and the researcher had to ask the participants to remove it in order to continue recording the screen shots of the session.

To avoid what Panichi & Deutschmann (in press: 225) term as the 'observer avatar paradox' whereby the task of gathering data is undermined by the researcher's presence itself (Labov, 1962), I chose a small animal figure to be used by the researchers present inworld. I believed that, in comparison to a robot figure, the bear's harmless look would bother the students less and be as unobtrusive as possible. Also, considering the study by Yee and Bailenson (2007) which suggests that the height of an avatar influences users' behaviour, the researchers chose a small avatar that was an animal figure to dissuade participants from

addressing the bear in their interactions. It was, thus, hoped that the researcher's avatar would be as unobtrusive as possible.

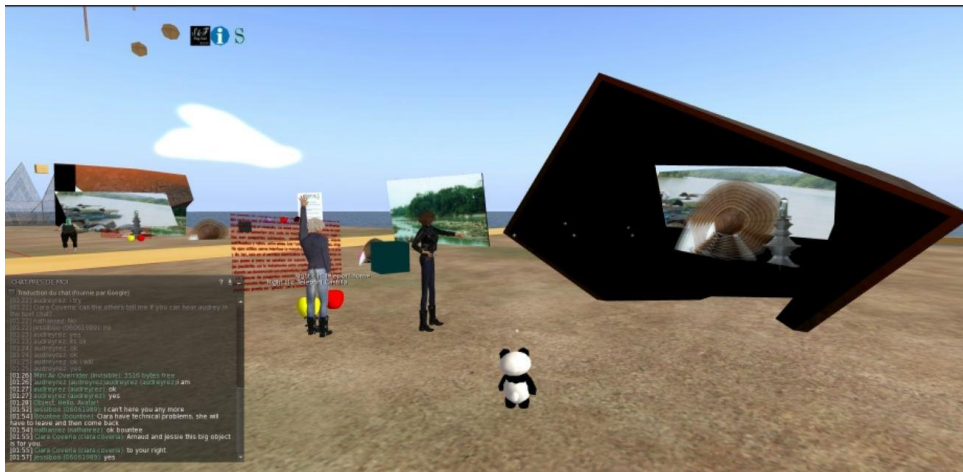


Figure 70: Researcher present inworld in the form of a small bear avatar

Screen recordings were made according to a detailed predefined methodology (see Appendix 9). Following each session, a *PowerPoint* was added to each screen recording and the screen recording exported as a smaller media file. The *PowerPoint* gave information about the session and the participants in order to facilitate the task of data structuring after the course.

Before the sessions the *Second Life* plots used for the activities were divided into subplots and configured so that the sound from one subplot did not transfer to another subplot. This allowed us to hold two group sessions simultaneously and have two researchers observe and record the sessions without sound interference. The researchers' connections to *Second Life* were also configured so that interactions that occurred in the public textchat were automatically saved in a text file. This data showed the author of each textchat message, the time at which it was sent and the contents of the message.

9.4.3. *VoiceForum* activity data

The forums set up on *VoiceForum* for the *Building Fragile Spaces* course were run from an Internet server belonging to the Laboratoire de Recherche sur le Langage (LRL, 2011). During the course, the audio messages left on the *VoiceForum* platform were saved as .wav files on our server alongside any written components accompanying the messages. The *VoiceForum* platform could be accessed by researchers following the course. All messages were also downloaded after the course from the Internet server and saved in .text and .wav

files as a backup. The *VoiceForum* activity data represents 64 forum messages of which 60 contain audio files.

9.4.4. Post questionnaires

Following the course, the student participants were asked to complete an online post-questionnaire (see Appendix 10) which elicited responses in two areas: the pertinence of mixing *Second Life*, architecture and language and an evaluation of the course. It consisted of 48 closed questions. A five-point Likert scale ranging from 1 (1= totally agree) to 5 (5= totally disagree) was used to gauge student responses to the course. A four-point Likert scale from 1 (1=not at all) to 4 (4= a lot) was used to valuate students' impressions of L2 progression. Four comment fields and two open questions were also asked to obtain additional observations, providing qualitative data to illustrate the numerical results from closed questions.

In the questionnaire, two questions reflected questions asked in the pre-questionnaire. We asked students their level of mastery of certain *Second Life* skills. Comparing the results from both questionnaires informed us of the pertinence of the activities in the *Second Life* introduction session run by the language teachers. We also asked the students to list words they associated with the name of each workgroup. This was so that the architecture teachers could study the students' evolution *vis-à-vis* their architectural problem briefs. The majority of questions in the post-questionnaire aimed to collect the participants' opinions. Therefore, rather than asking questions, we presented the students with a list of statements. Certain statements were presented in a negative form in order to test the sincerity of replies. As De Singly suggests (2008), a balance between negatively-framed and positively-framed statements should be sought for in any questionnaire. We also asked the same question framed differently in a few statements in order to verify the coherence of replies given by the participants.

9.4.5. Semi-directive interviews

On day one of the course, I told participants that, after the course, I wished to conduct individual interviews with a sample of participants. On the last day of the course I approached individual participants and decided upon meeting dates and times. Five interviews were conducted. A student from each of the workgroups GA, GE and GS was interviewed and two students from the workgroup GL. In order to reduce any bias I assured the students that the

interviews would not be consulted by the architecture teachers who were responsible for grading the course.

I decided that the interviews would adopt a semi-directive approach (Blanchet, 2011) in that they would "introduce a variety of questions during the dialogue...whilst adopting the non-directive technique and attitude¹⁸" (D'Unrug, 1974:87). The interviews were conducted at a distance using the audio conferencing software *Skype* (Microsoft, 2011) and the researcher made an audio recording of each using the software *MP3 Skype Recorder* (Nikiforov, 2011). Each interview was scheduled to last around 30 minutes. The interviews were conducted in French which was the L1 of two of the students and L2 of the other three students. One of these interviews was of a critical-event-recall type: the student viewed images and a video from the data.

An interview guide was developed and during the interview the researcher took notes (see Appendix 12). This was done in an open-ended fashion whereby the researcher noted down points of interest e.g. 'observation' rather than commentary about or interpretation of the participant's answers. The post-questionnaire results for each participant was consulted before the interview and any points of interest arising from these were added to the interview guide. The interview guide also included a list of neutral phrases the researcher could use to ask the participant to elaborate upon a comment.

The interviews were divided into eight sections, as shown in Table 14. Depending on the responses of the students, this structure was not necessarily adhered to in the order presented. The researcher was free to decide if, for example, the student evoked the role of avatars in the course during a reply to a question concerning the general impressions of the course, to move on to the topic of avatars rather than the role of the groups.

Welcome and verification of audio settings
Presentation of interview procedure
General impressions of the course
Groups / Second Life reflection sessions
Languages
Individual aspects
Avatars
Other information / closure

Table 14 : Semi-directive interview structure

¹⁸ "introduisent plusieurs questions au cours du dialogue ... tout en adoptant la technique et l'attitude non-directives". My translation.

The audio data of the semi-directive interviews totals 2 hours 30 minutes for the five participants interviewed.

9.4.6. Ethical dimension

Any discussion of technology in second language research would not be complete without raising the ethical challenges that researchers face in SLA [Second Language Acquisition] research in general and particularly in research involving the collection and archiving of personal performance data that reveal personal attributes (Chapelle, 2004:599).

The main ethical issues underpinning this study are those of participation and confidentiality. Mackey & Gass state that the notion of obtaining informed consent from human participants with respect to SLA studies is a "cornerstone of ethical practice in research involving human subjects" (2005:26). They suggest that a research study should fulfil three conditions (2005:27). Firstly, researchers should give the participants full disclosure about the experiment. Secondly, this information should be understood by the participants. Lastly, participation in a study should be voluntary and participants should not undergo pressure or be intimidated to participate.

Concerning our research study, participation was voluntary. I made explicit to all participants on the first day of the course, using a PowerPoint presentation, the details of the research study, including the scientific character of the work, the methods of data collection, the intended use of the data and the final objectives of our studies, including the study presented in this thesis and our wish to produce open-access LETEC corpora from the data collected. This presentation included asking students to create an avatar and avatar name which would only be used for the purposes of the *Building Fragile Spaces* course. The participants were also informed of who to contact should they have questions concerning the study, or if following the *Building Fragile Spaces* course they wished to retract from the research study. Detailed informed consent forms were obtained from all participants (see Appendix 13). These forms detail the questions of private protection: it was explained that the data would be made anonymous before any treatment or publishing of results. They also detail the author's intellectual rights and consent to release the data online to be used by other researchers. The right to privacy was ensured by each participant being assigned a code number. The key for these codes, used to cross-reference and track data, has been kept secure.

9.4.7. Data collection coverage

Table 15 shows a summary of the data collected during the *Building Fragile Spaces* course, including its coverage.

Data collected	Pre-questionnaires	<i>Second Life</i> sessions data	<i>VoiceForum</i> data	Post questionnaires	Semi-directive interviews
Quantity of data	17 student questionnaires	20 group sessions 2 presentation sessions representing 19 hours 40 minutes	64 forum messages of which 4 do not include audio messages	16 student questionnaires	5 student interviews representing 2 hours 30 minutes.
Format of data collected	Spreadsheet file	Screen recordings (.avi)	.wav files and access to online forums	Spreadsheet file	PDFs of researchers' notes .mp3 audio files

Table 15 : Summary of data collection

9.5. Applying a LETEC corpus approach to the data

In this section, I explain, with reference to the different components of a LETEC which I introduced in Section 9.3.5, how the data collected during the *Building Fragile Spaces* course, as described in Section 9.4, was structured into a LETEC corpus (mce-archi21-letec-all, Chanier & Wigham, 2011) which is consultable on the *Mulce* repository (Mulce-repository, 2011).

9.5.1. Instantiation

The *instantiation component* can be described as ‘the heart’ of a LETEC corpus (Reffay, Betbeder & Chanier, in press). This section of the global corpus contains all the raw interaction data from the learning event including the online productions of the participants in the learning event (collected according to the research protocol) and information about the profiles of each participant.

A specific XML schema is used to structure, in a hierarchical fashion (see Figure 71), the data in the instantiation component: the Structured Interaction Data model (Mce_sid, 2011).

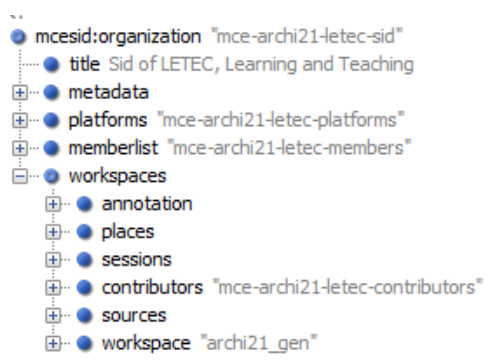


Figure 71: Hierarchical organisation of the instantiation component using the structured interaction data model

The XML part of the Structured Interaction Data model, first of all, provides metadata concerning the contributors to the corpus (*metadata*), according to the roles determined by the Open Language Archives Community (OLAC). A copy of metadata describing the LETEC Archi21 corpus as accessible on the OLAC (Olac-archi21, 2011) is provided for readers in Appendix 16. It corresponds to the standard followed by OLAC archives (Olac-metadata, 2008). The instantiation component then describes the technological environments used in the online course (*platforms*). Information concerning the participants is found in the *memberlist* which includes a list of participants, a list of divisions of participants e.g. learners, teachers, researchers, groups, and a list of participant research codes. The data related to the interactions is then given under the *workspaces* component.

For example, for our corpus *mce-archi21-letec* (Chanier & Wigham, 2011), the *metadata* provides the name and institution of the compiler of the corpus and then the names of the researchers from the Laboratoire de Recherche sur le Langage who worked on the ARCHI21 project. These researchers are listed as contributors. The two *platforms* on which interactions took place during the *Building Fragile Spaces* course are then listed, using descriptors in order to categorize the type of environment and web links provided to them. For example, *VoiceForum* used for asynchronous interactions during the course is listed in the platforms section as an 'Asynchronous Discussion Forum' and *Second Life* is listed here as a 'Synthetic World'.

Concerning the ARCHI21 corpus' *memberlist*, each participant on the *Building Fragile Spaces* course is listed by their research code and information is given according to the participant's status during the course, their institution, their country of origin, gender, age and language spoken. This information was gathered from the pre-course questionnaire (see Section 9.4.1). Figure 72, for example, shows the data entry concerning the female French teacher *Tfrez1* from *Université Blaise Pascal* who at the time of the course was aged 24 and whose L1 was French and L2 English.

```
<actor id="Tfrez1" designation="xxx" status="teacher"
institution="Université Blaise Pascal" country="fra" gender="female"
age="24" L1="fra " L2="eng" L3="esp"/>
```

Figure 72: Example of an entry in the *memberlist* for a course participant

The *memberlist* also details information about how the participants were combined into groups. In the *Building Fragile Spaces* course, the students were divided into four groups. An entry is given for each group. For example, in Figure 73, we see the entry for the group GA. The group id is provided, alongside the members and their roles. We see, thus, that the group was constituted of the French teacher described in Figure 72 *Tfrez1* and four students.

```
<group id="av">
<role_members role="teacher" members="Tfrez1"/>
<role_members role="learner" members="Prevally Pjgamez Crispis emmegi88"/>
</group>
```

Figure 73: Group information given in the *memberlist*

The raw data of the participants' interactions during the online course is structured in the *instantiation* component using *workspaces elements*. Any given *workspace* includes:

- A list of *places elements* which organised the learning space. Each *place element* defines a reference and description of a virtual learning space within a given *platform*.
- A list of *sessions* that splits the time into meaningful periods. Each *session element* includes a reference and a description for a dedicated period of time, for example, a synchronous activity.
- A list of communication *tools* available to participants during any given session.

- The list of *sources* which, in general, is a reference to a textchat log, audio or video track.

Regarding the ARCHI21 corpus that we (Chanier & Wigham) constituted, the *place elements* give the specific space within the *Second Life* synthetic world described above where a session took place. In our context, these often refer to the *Second Life* plot owned by the academic journal *ALSIC* or the *Second Life* island owned by the ARCHI21 project. Our *sessions* are described firstly, by a code referring to the activity session type and the group, and then by the data and time at which the session took place. Any extra information about the session, e.g. technical difficulties, is provided.

The typology of nonverbal and verbal acts in the synthetic world *Second Life* which I elaborated (see Chapter 6) allowed us to define the communication *tools* for the corpus constitution (see Figure 5). For any given session, the communication tools available to participants are listed. For *VoiceForum* sessions, for example these tools include audio acts (tpa) and written verbal acts (tpc). For the *Second Life* sessions, however, the all acts of verbal communication and the nonverbal modalities of entrance-exit (es), movement (mov), production (prod) and kinesics (kin), as listed by their codes in Figure 74 were available to the participants.

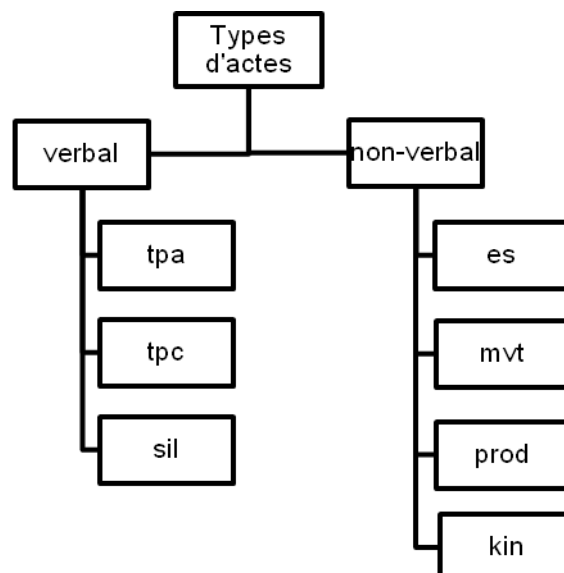


Figure 74: *Typology of nonverbal and verbal modalities by code*

Finally, in the *workspace* area, a list of *sources* is given. Each source refers to the video screen recording of the synchronous *Second Life* session, the textchat log collected during the

session or the audio file of any recording made on the asynchronous platform *VoiceForum*. The file format is given alongside the duration of the file.

Concerning the asynchronous interactions that took place on *VoiceForum* during each group's *VoiceForum* reflection activity, the titles and textual contents of messages were saved alongside the audio files for each message. In order to allow other researchers to access the structure of the forums, without necessarily accessing this through the *VoiceForum* platform, a spread sheet file was created for each forum. Each spread sheet showed each message which was attributed an identification number, each message's author, title and textual contents and the time at which the message was sent. Alongside which information was given concerning the name of the audio file corresponding to each message posting and whether the message posted was a new parent structure within the forum or whether it responded to a previously posted message. The spread sheet files for each forum, alongside the audio files, were saved as a zip file and constitute a *source* within the global ARCHI21 corpus.

An extract of the ARCHI21 LETEC manifest is given in Appendix 17. This includes a full list of the sources included in the corpus.

9.5.2. Learning design

The *Learning design* component of a LETEC corpus includes the pedagogical scenario (see Section 8.3.2) for the online learning situation. Within this component, a description of the activities is provided, alongside the role of each participant for each activity and the list of tool types that were to be used during the activity. Metadata is given concerning the prerequisites for the course and the overall objectives for both the course and each activity. Resources linked to the *learning design* component will, therefore, include the guidelines provided to learners about the course and any resources given to participants (learners and teachers) for the course and for specific activities. The *learning design* component of a LETEC corpus uses an IMS-LD structure (2003) as its organization model.

With respect to our corpus *mce-archi21-letec*, as explained in Section 8.3.2 we (Wigham & Saddour) elaborated a graphical visualisation of the pedagogical scenario designed for the *Building Fragile Spaces* course (see 8.3.2). Because of the need to structure the learning design component of a LETEC corpus using an IMS-LD structure (2003), as previously explained (see Section 8.3.4), we used the graphical editing software *MotPLUS* (Paquette & Bleicher, 1997). We adopted this software in order to render visible the explicit links between the interaction data provided in the *instantiation* component of the corpus and

the context described in the *learning design*. In the *MotPlus* model, we describe the role of each participant in the course and the environments used (see Figure 75). We then show the overall learning design for the course (see Figure 78) and at each activity level the roles of the participants for the activity and the environments used in the activity (see Figure 59). The resources provided to the teachers or learners, for example, the activity scenario provided to the teachers, are linked to each activity and provided in .pdf files. Examples of an activity scenario included in the *learning design* component of the ARCHI21 corpus are provided in Appendices 3-6. The visualization of the learning design for the course is provided in *MotPlus* and .html formats in the ARCHI21 corpus.

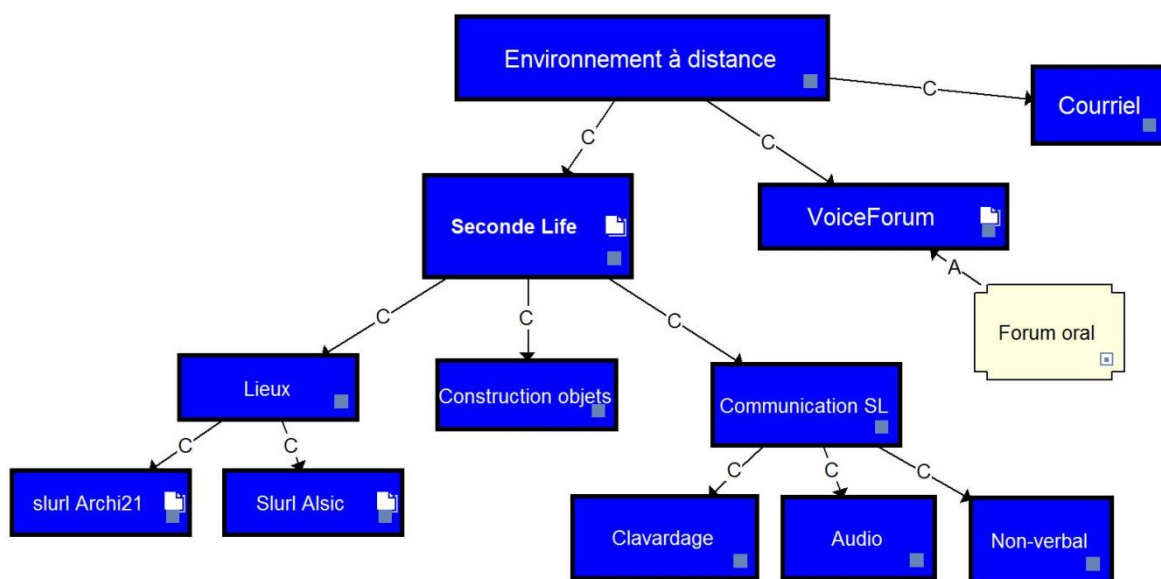


Figure 75 : Distance communication environments used during the *Building Fragile Spaces* course

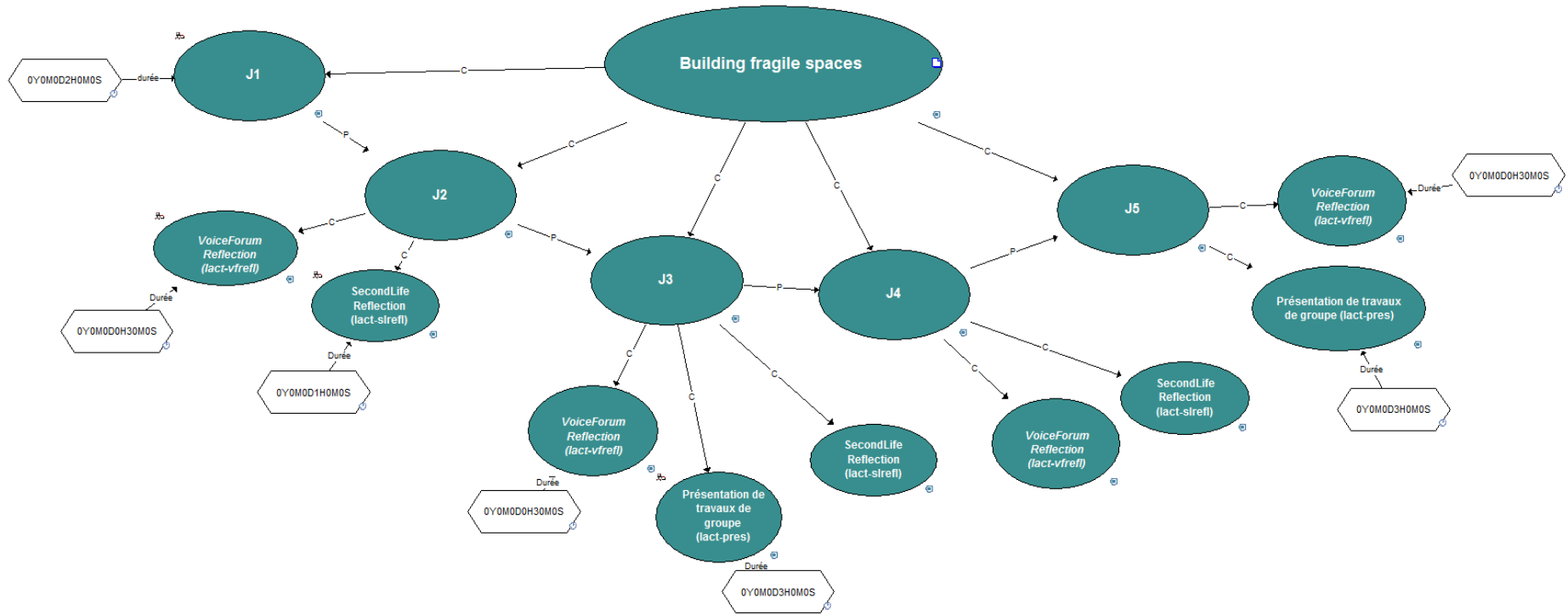


Figure 76 : Visualisation of the overall learning design for *Building Fragile Spaces* organized by day

9.5.3. Research protocol

The *research protocol* component of a LETEC corpus includes a description of the research activities designed around the online learning situation and the documents designed for the research protocol and collected during the experiment. The research protocol description includes a description of the activities, the roles of the researchers involved in the project and a description of the research tools utilized for the research. The LETEC component also includes metadata concerning the research questions addressed and the protocol employed. For example, the component might include as resources questionnaire forms, interview grids and data. It may also include research articles written as a result of the research designed around the course. The *research protocol* component of a LETEC corpus uses an IMS-LD (2003) structure as its organization model.

Concerning the *mce-archi21-letec* corpus, I decided to elaborate a graphical visualisation of the research protocol designed around the course (see Figure 77) in order to help other researchers not involved in the course understand our methodology. In line with the *learning design* component, this visualization was created using the software *MotPlus*. This visualization, available in *MotPlus* and .html formats in the corpus, shows all the research activities, as detailed in Section 9.2, and when they were introduced in the course. The visualization includes hyperlinks to the documents designed for the research protocol. This includes, for example, the *PowerPoint* used to explain the research protocol to participants, a sample blank informed consent form (see Appendix 13), the interview guide and the instructions to researchers as to how to proceed with screen recordings of the *Second Life* sessions (see Appendix 12). It also includes blank samples of the pre and post questionnaires as well as spread sheet documents in which the results of these questionnaires have been summarized, and the audio recordings and researcher's notes taken during the semi-directive interviews.

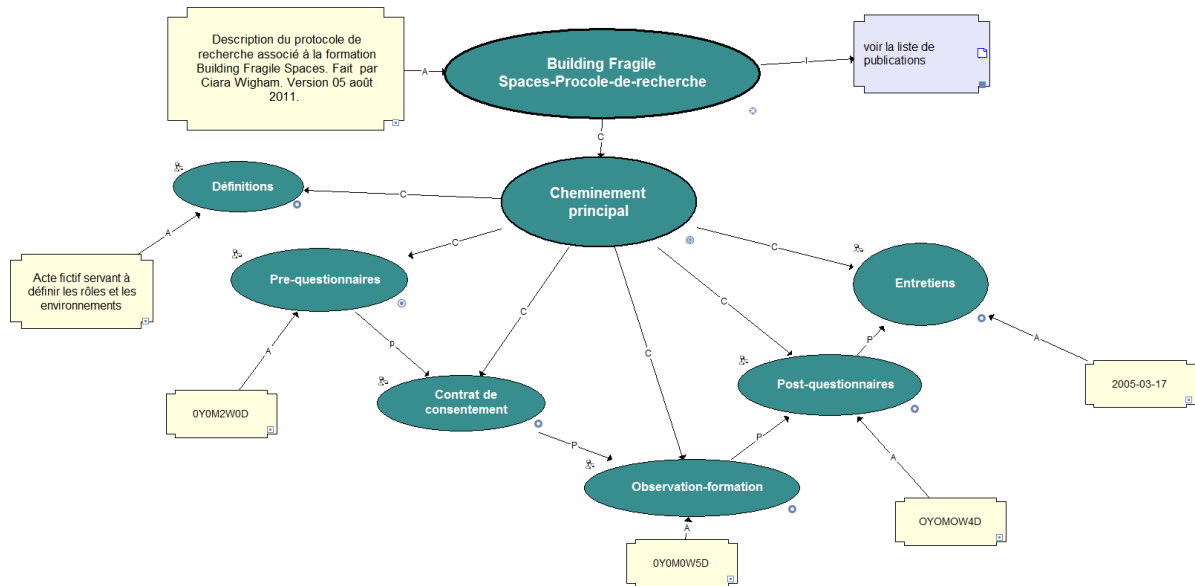


Figure 77 : Visualization of the overall research protocol

9.5.4. Public and private licences

LETEC corpora's license components specify both "the corpus publisher's (editor) and the users' access rights and the ethical elements concerning the course participants" (Reffay, Betbeder & Chanier, in press). As described in Section 9.4.6, before the course, all participants were asked to complete an informed consent form (see Appendix 13). Part of the information given on the informed consent forms is private. In order to protect individuals' identities, part of the license component which details the participants' personal information is private. This component is held by the person in charge of the corpus and is not made available to users through the repository. Should any participants make claims related to ethical issues this *private license* may be used.

The repository on which LETEC corpora are stored (Mulce-repository, 2011) also requires users to agree to a Creative Commons license when accessing the repository (Mulce, 2011b; Mulce, 2011c). In order to moderate this access, users are asked to create an account in order to assure that the corpora are used for research or educational purposes. LETEC refer to this as the *public license*.

9.6. Overview of data analysis approach and operationalisation

In this section, I detail the computer-mediated discourse analysis approach which guided this study of multimodal discourse characteristics that support L2 verbal participation. This approach required us to make multimodal transcriptions of the *Second Life* reflection session. I detail this process here. The methodology (e.g. details of counts, coding and statistical analysis) employed with reference to my specific research questions, however, is given alongside the results and discussion in Part III of this study.

9.6.1. Computer-mediated discourse analysis approach and theoretical premises

Herring (2004) proposes that at the heart of a definition for computer-mediated discourse analysis (CMDA) is the analysis of online communications logs which is grounded in empirical, textual observations and that this analysis is informed by a linguistic perspective. The CMDA framework is termed as an 'approach' or 'tool' rather than a 'theory' or 'method' for it does not allow for predictions to be made about the nature of CMC discourse but rather enables "diverse theories about discourse and computer-mediated communication to be entertained and tested" (2004:341), using a range of methods which a researcher will select and apply with reference to his / her specific research interests. These methods are adapted from the disciplines of language sciences, linguistics, communication and rhetoric and apply methodological paradigms that originated in studies of spoken and written language.

The theoretical premises of the CMDA approach are largely taken from linguistic discourse analysis. The first theoretical premise of CMDA is that "discourse exhibits recurrent patterns" (2004:341) which may be produced consciously or unconsciously by the participant. The objective is, thus, to identify and demonstrate these patterns which may not be immediately obvious to the discourse participant or an observer. A second theoretical premise is that "discourse involves speaker choices" (2004:341) which reflect cognitive and social factors as well as purely linguistic considerations. Thus, the analysis of discourse can offer insight into both non-linguistic and purely-linguistic phenomenon (Herring, 2004). These first two theoretical premises are also true for linguistic discourse analysis and the CMDA approach adds a further premise to these. This is that "computer-mediated discourse may be,

but is not inevitably, shaped by the technological features of computer-mediated communication systems" (2004:341). Instead, CMDA seeks to investigate whether, in what ways, in which contexts / conditions and to what extent CMC technologies shape the discourse that takes place when discourse participants use them.

9.6.2. Analytic methods and data selection

Discourse analysis and other language-related paradigms are drawn upon in the analytic methods of CMDA. There are two entry points into research conducted using the CMDA approach which allows both for the analysis of new and comparatively undescribed forms of CMC and for comparisons of non CMC with CMC. The latter is cautioned unless the researcher can ensure a comparable sample carried out using comparable methods. Indeed CMDA suggests that using studies of face-to-face discourse in interpreting results from CMDA studies is preferable to comparing face-to-face and computer mediated discourse. The two entry points into CMDA are either to "let the phenomenon of interest emerge out of a sample of computer-mediated data and devise coding strategies based on the phenomenon" (2004: 353) or, if specific research questions have been set or the research wishes to investigate discourse patterns across different communication modes, the researcher can turn to one of the five discourse analysis paradigms which to which CMDA appeals: text analysis, conversation analysis, pragmatics, interactional sociolinguistics or critical discourse analysis. Herring stresses, however, that when this approach is adopted it is more often inductive than deductive: the researcher first selects a discourse characteristic which is of interest based on prior observation, then formulates a research question and selects the methodological tool/ analysis paradigm which is most suitable. Herring (2004) suggests it is, therefore, potentially preferable to use the re-organization of these paradigms around domains of language as an entry point into CMDA, proposing the following language domains: structure, meaning, interaction, social behaviour and participation. For the premise of this thesis, the domain of participation is the central interest.

Domain	Phenomena	Issues	Methods
Structure	typography, morphology, syntax, discourse schemata	genre characteristics, expressivity, efficiency	structural / descriptive linguistics, text analysis
Meaning	meaning of words, utterances (speech acts)	speaker intention, accomplishment through language	semantics, pragmatics
Interaction	turns, sequences, exchanges, threads	interactivity, timing, interaction as co-constructed	conversation analysis
Social behaviour	linguistic expressions of status, negotiations, face management, discourse styles	social dynamics, power, identity	interactional sociolinguistics, critical discourse analysis
Participation	number of messages, responses, message length	power influence, engagement, roles	descriptive statistics

Table 16: Domains of language considered in CMDA (adapted from Herring, 2004: 55)

Once a discourse characteristic/ phenomenon has been selected for analysis and the domain into which this fits chosen, in the CMDA approach the phenomenon must be operationalized in order to be coded; coding categories must be chosen and the reliability of these categories established before applying them to the data selection. This includes identifying appropriate discourse transcription and statistical tests. The data to be analysed must equally be identified.

CMDA proposes that sampling with reference to time preserves the richest context and that this method and that of the thematic selection of data are preferred by CMDA. In particular, because it is possible to sub-divide data selected according to these categories into samples by individuals or groups which allows the researcher to achieve an additional focus.

CMDA calls for data interpretation to take place on three different levels and, where necessary, to be supplemented by data from questionnaires and interviews. The three levels of interpretation are:

- close to the data,
- close to the research question,
- beyond the data.

Interpretation close to the data involves providing a summary and synthesis of the results obtained including the patterns of results that were identified. A researcher, at the next level, should then refer back to the research question and infer the results with reference to this. This will include stating whether results were expected or not and providing suggestions

for the unexpected results. Finally, in CMDA the researcher should infer from the study's findings the theoretical, methodological or practical / design implications, providing leads for future research.

The study presented in this thesis draws on quantitative approaches to data analysis. This choice was influenced by two factors. Firstly, a belief that any qualitative study must firstly refer to and, indeed, depend on quantitative approaches. Quantitative approaches are necessary to give a global view of whether the pedagogical scenario described in Chapter 8 was 'acted', i.e. whether it has given way to a minimal amount of participation and interaction, for example, in the case of this study, a minimum use of the verbal and nonverbal modes. A quantitative approach allows research to determine whether the pedagogical contract has been met. If it has not, and the pedagogical scenario has given rise to an insignificant amount of participation and interaction, further analyses can not be conducted because they risk falling into the trap of drawing upon anecdotal examples of interactions rather than accounting for the reality of the interaction data collected. We thus see data analysis as a two-step process. Firstly, quantitative analyses are a necessary for they are a precondition for qualitative analyses. Secondly, if the quantitative analyses show that the pedagogical contract has been met in terms of participation and interaction, then analyses can be furthered using mixed methods.

The introduction of any new environment or technology, such as synthetic worlds, will naturally give rise to initial studies of a speculative, impressionistic nature. However, for research to progress beyond anecdotal or speculative studies concerning the use of the new environment or technology it needs show the reality of any interaction data collected. This must be achieved through quantitative methods. It is with this endeavour in mind that the study outlined in this thesis presents the first step in the data analysis process and adopts a quantitative approach to data analysis. However, this approach does not rule out future mixed-method approaches if the quantitative analyses determine a minimal level of multimodal participation and interaction. This is however, beyond the scope of this thesis, considering the time and detail needed to prepare the data for the quantitative analyses presented.

9.6.3. Annotation of *Second Life* Buildjig sessions and transcription of *Second Life* group reflective sessions

Adopting a computer-mediated discourse analysis approach to investigate participation in both verbal and nonverbal modes, and interaction between these, required us to make multimodal records of the *Second Life* sessions. Two approaches were adopted: data annotation and data transcription. Both required us to ‘translate’ the nonverbal data it into the verbal mode (Flewitt *et al.*, 2009). This process, detailed in this section, allowed us to provide quantitative data from which to calculate the number of acts per participant by type, the average length of acts of each type by participant and also the total length of acts of each type by participant.

The *Second Life* Buildjig sessions were annotated using the qualitative data analysis software package *Nvivo* (QSR International Pty Ltd., 2010). The software allowed us to qualitatively annotate screen recordings and code the verbal and nonverbal acts of all participants in each modality, using the typology presented in Chapter 6. To accomplish this, I identified each verbal and nonverbal act by its actor, by a time in the audio-track, which is synchronized with the screen recording, and by the duration of the act. The qualitative data analysis software attributes a colour to each category of act coded. After annotating several buildjig sessions, however, I was confronted by the limitations of the software and, in particular, the lack of flexibility concerning the spatial disposition of the coded acts. For example, the visual representation does not use the same colour to visualise an act of the same type for different participants. So a kinesic act made by one participant would be shown in orange whilst the same type of act made by another participant would be shown in green. Visual interpretation of the coded data was, therefore, difficult. The visual display is also shown by alphabetic order of the code attributed to the act. For this reason, I had to systematically use the participant code in the code attributed to the act so that, in the visual representation, acts were grouped by participant. The software, however, did not allow us to change this order, for example, to view the annotations by modality with the participants’ acts in each modality grouped. I found these features particularly limiting. Although the annotation of the Buildjig sessions allowed me to accomplish the analysis presented in Chapter 10, I felt it more than necessary to turn to another annotation software package which was better adapted to our needs in the continuation of my study.

Multimodal data transcriptions were, thus, completed for the *Second Life* reflective sessions, which comprise the majority of the language learning sessions (see Figure 62) using the software *ELAN* (Max Planck Institute for Psycholinguistics, 2001). I chose this software because it was open-access and because it was specifically designed for the analysis of language, including sign language. Thus, it was adapted to the transcription of nonverbal acts. Another important consideration was that the software offered a XML export of transcriptions. This was highly important because LETEC are structured using an XML formalism. Thus, having a XML export option facilitated the task of structuring our transcribed sessions in distinguished LETEC corpora. Also the export in a mark-up language format facilitated data processing, allowing for XML coding of data to be used in our analysis methodology (see Section 12.3.1).

The manipulation of the software and visualisation of the transcriptions made using *ELAN* was a lot easier than the annotations made using *Nvivo*. As Figure 78 shows, the screen recordings of the *Second Life* sessions were inserted into the top left-hand corner of the interface. To the right, the view bar allows users to visualize the transcriptions, participants and length of the transcription. The navigation bar allows a user to navigate along the transcriptions and to move them along the timeline. Finally the workspace area allows the user to insert transcriptions and manage these.

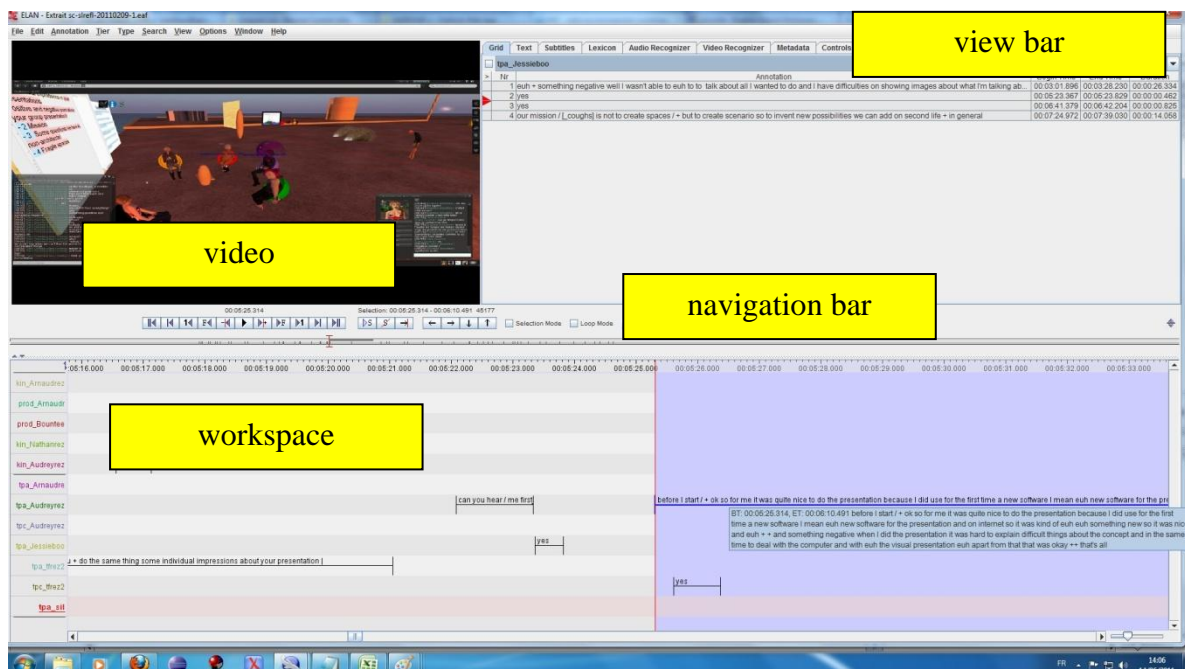


Figure 78 : *ELAN* interface

The types of verbal and nonverbal acts which we (Wigham & Saddour) transcribed are shown in Figure 74. Each act type made by a participant is transcribed on a separate horizontal line in *ELAN* in the format *act type_participant code*. For example, the line *tpa_Tfrez2* corresponds to audio turns made by the participant *Tfrez2*. Our transcriptions take into account all of the verbal and nonverbal acts executed by the participants / avatars present in the environment, as well as all the visible or audible acts for participants which are unknown. For example, if an object in the *Second Life* environment moves but we cannot identify which participant moved the object. If we were unable to identify the participant, the participant ‘*unknown*’ is used. Each transcription indicates the modality which is used and the participant. All silences more than three seconds in length are shown by the annotation reference ‘*tpa_sil*’. Each annotation is aligned with reference to time with the video. The contents of annotations is given in Unicode but can be exported in XML format. Each session transcription we complete is linked a metadata file to the transcription using *IMDI Editor*.

9.6.4. Transcription of verbal acts

For the transcription of verbal acts, we (Wigham & Saddour) based the methodology employed on that suggested by the Mulce project (Mulce, 2011a) for multimodal transcription (Chanier, Ciekanski & Vetter, 2005; Ciekanski, 2008).

Audio modality

Verbal acts that were transcribed with reference to the audio modality consisted of three types of act (see Table 17). Full details of the annotations codes used to detail the contents of the audio turns are given in Appendix 14. Transcribing verbal acts allowed us to move from the oral interactions between participants to a written trace of these. As Cicurel (2011) highlights the transcription process allows an *image* of the oral interactions to be provided and researchers must adhere to rendering as faithful an image as possible.

modality	value	start, end
tpa	Audio turn	Start time = start of the turn End time = end of the turn
tpc	Textchat turn	Start time = End time (instantaneous action)
sil	silence	Interval between two tpa acts made by the same participant for which the gap is greater than three seconds or interval between two tpa acts made by two different participants for which the gap is greater than three seconds.

Table 17 : Types of verbal acts

Textchat modality

Our transcriptions of the acts made in the public textchat modality are taken directly from the textchat *sources* for each session. The times given in these files for each textchat act are given in *Second Life* time and therefore did not correspond to the time intervals of the video files. Thus, in our transcription we have taken out the *Second Life* times and annotated the textchat acts with relevance to the timeline used in *ELAN*.

Any textchat acts between the language teacher and the researcher in the private textchat modality are transcribed directly from the video. This textchat modality is coded differently in the annotation lines in order to distinguish between the private textchat and the public textchat used by the same participant. For example *tpc_Tfrez1* refers to the annotation line for textchat acts made by the participant *Tfrez1* in the public textchat. *Tpc_Tfrez1_pri* refers to acts made by the same participant in the private textchat.

9.6.5. Transcription of nonverbal acts

For the transcription of nonverbal acts we extended the transcription methodology as described by Chanier, Ciekanski & Vetter (2005) and Ciekanski (2008) for nonverbal acts in synchronous audio-graphic conferencing. We added to the latter a range of transcription conventions of the types of nonverbal acts found in synthetic worlds according to the typology I elaborated for nonverbal acts in the synthetic world *Second Life* (see Section 6.4)

The nonverbal acts were only transcribed if they were visible to the transcriber. Indeed, at certain times due, for example, to a production act or an avatar showing an image, the nonverbal acts of all the avatars in the sessions are not always visible.

Entrance into and exit from the environment

The appearance or disappearance of avatars, their entrance into or exit from the *Second Life* environment and into and from the allocation session space (*place*, see Section 9.5.1) is shown by the code *es*. The annotation line is therefore *es_participantcode*. The annotation shows whether the participant appeared or disappeared using the codes *appear* and *disappear*.

Movement

This modality concerns the movement of avatars within the session space. This movement might be horizontal (walking, running, moving backwards etc.) or vertical (sitting down, standing up, flying, jumping etc.). The code we adopted for each act of movement was the base form of the verb (infinitive without to). Table 18 shows the complete list of codes used.

Annotation code	Description
sit_down	The avatar sits down.
stand_up	The avatar stands up.
fly	The avatar flies.
take_off	The avatar takes off.
land	The avatar lands.
turn	The avatar turns to change direction.
walk_forwards	The avatar walks forward.
move_backwards	The avatar moves backwards (for example, moving backwards sitting on a chair).
walk_backward	The avatar walks backwards.
jump	The avatar jumps.
run	The avatar runs or moves forwards quickly.

Table 18 : Codes used to transcribe different types of movements by avatars in *Second Life*

Kinesic modality

The kinesic acts include avatar gestures and any movements made by an avatar's body part. Table 19 gives the complete list of annotation codes used for this type of act.

Annotation code	Description	Examples
spectator_pose	The avatar leans forward and lowers his head. The avatar's user has previously chosen if the system shows this kinesic act after 2,5,10 or 30 minutes of inactivity.	-----
type	The avatar shows a typing gesture. The contents of the textchat may not however be shown in the public textchat as it might comprise of a private message.	-----
drink	The avatar makes a repetitive gesture which shows that he is drinking something during the session. These gestures are coded as well as their length. Sometimes, this gesture prevents us from seeing that the avatar is typing.	-----
move(X)	The avatar moves one part of his body. We indicate which part of the body is moved between brackets, separating words with _.	move(arm_L) : The avatar moves his left arm. move(arm_R_L) : The avatar moves both arms. move(upper_body) : The avatar moves his upper body whilst remaining sat. move(legs_apart) : The avatar moves his legs apart. move(arms_apart) : The avatar lifts his arms.
look_up	The avatar moves his head and looks upwards.	-----
lower_head	The avatar lowers his head.	-----
stretch	The avatar stretches.	-----
shake head	The avatar shakes his head horizontally.	-----
nod	The avatar nods.	-----
dance	The avatar performs dance movements whilst standing.	-----
lean_forward	The avatar leans forwards.	-----
lean_back	The avatar leans backwards.	-----
clap_hands	The avatar claps his hands.	-----
rotate_head	The avatar rotates his head.	-----
eat(X)	The avatar eats something (X)	eat(popcorn)
smoke	The avatar smokes	-----
point	The avatar lifts his arm and points to an object in the environment.	-----
animate(X)	The avatar activates an animation designated by X	animate(flashing_light)

Table 19 : Codes used for transcription of kinesics

Production

Production acts correspond to acts accomplished by the avatars with the aim of producing or displaying an object in the *Second Life* environment. We have categorized these

actions and established codes. First of all, we code the object, then in brackets we show the action performed on the object and the name / title of the object, shown by Y in Table 20. Should there be an object receiver this is shown (by X in Table 20).

Annotation code	Description	Examples
img(post, X)	The avatar displays an image on a screen. X is the file name of the image.	img(post, image1.jpg)
vol_up	The avatar increases the sound volume.	-----
vol_down	The avatar decreases the sound volume.	-----
obj(rez, X)	The avatar rezzes an object by moving it from his inventory in the <i>Second Life</i> interface and into the <i>Second Life</i> environment.	obj(rez, chair)
obj(move, X)	The object moves an object designated by X.	obj(move, chair)
obj(open, X)	The avatar opens the inventory. It is the researcher who is filming the session who produces such a production act.	obj(open, inventory)

Table 20 : Codes used for the transcription of production acts

9.6.6. Distinguished LETEC corpora from transcribed sessions

Seven *Second Life* reflective sessions were transcribed according to this methodology. Each transcribed reflective session has been produced as an open-access distinguished LETEC corpus (Chanier, Saddour & Wigham, 2012a-g). This type of corpus refers to a particular analysis of a selected part of a global corpus. Here, the ARCHI21 global corpus. The distinguished corpora only contain data from the global corpus which has been transformed for specific analysis. Here, for example, a selection of the original data (seven *sessions* from the global corpus) has been taken and transformed for multimodal annotation. In each distinguished LETEC corpus the tools used for analysis are described and referenced in order to allow other researchers to extend or repeat the analysis.

9.7. Conclusion

In this chapter, I presented the methodological approach for this study. After exposing the reasons why we chose to structure the data into a LEarning and TEaching corpus

ARCHI21 (Chanier & Wigham, 2011), I gave a description of the research protocol elaborated around the *Building Fragile Spaces* course, including the data that was gathered and the methods used to collect this data. Triangulation was used in data collection together with different tools supporting both quantitative and qualitative analyses of the data.

I illustrated each LETEC component and gave examples of how the ARCHI21 corpus was compiled using this method for data structuring. Finally, I described the methodology employed for making multimodal data transcriptions. This methodology was based upon my typology of communication acts in *Second Life* (see Chapter 6) and is one of the originalities of my work.

Extending the transcription methodology proposed by Mulce (Mulce, 2011) to include the types of nonverbal acts found in synthetic worlds, the transcriptions of the multimodal data will allow us to generate a detailed picture of the tendencies and frequencies of usage of the different modes and modalities available in *Second Life*. They allow us to examine participation with reference to the communication modes and modalities available. This study's data analysis methodology also allows us to examine interaction with reference to how turns in the different modes and modalities and across the different modes and modalities are structured.

PART IV – ANALYSES

Chapter 10. Interplay between the nonverbal and verbal modes

10.1. Introduction

My first analysis chapter examines the interplay between nonverbal and verbal communication during the collaborative building activity ‘buildjig’ (outlined in Section 8.4). I begin by outlining the specific research questions with reference to the theoretical background presented in Part I and the research context presented in Part II. I then describe the analysis methodology that was employed in order to address the research questions alongside the data coverage used for the analysis. This leads us to the presentation and discussion of results. This section refers to the methodology of CMDA described as analysing close to the data and close to the research questions (Herring, 2004). I conclude this chapter with a synthesis of my observations with regards to my initial research questions.

10.2. Outline of the research questions

As I evoked, in Section 5.6 when presenting synthetic worlds, one perceived affordance of synthetic worlds for L2 learning is the opportunities their object-oriented nature offers for co-creation of the environment through building activities and also the potential of synthetic worlds for collaboration. These were taken into consideration in the pedagogical scenario of the *Building Fragile Spaces* course: the participants’ macro task was to collaboratively build a model in their L2 which responded to a problem brief and, to help them achieve this, the Buildjig activity (see Section 8.4) was designed with the architectural objective of introducing the students to building techniques in the synthetic world and the linguistic objectives of helping them develop communication techniques in their target language, concerning the referencing of objects with which they were working during the construction.

In Chapter 3, I discussed the role that the nonverbal mode, alongside the verbal mode, plays in activities of a collaborative nature both in face-to-face and computer-mediated environments. I presented studies which illustrated how the modality of proxemics helped participants to initiate verbal communication (Allen, 1977; Kraut, Fussell & Siegler, 2003) and how the modality of kinesics is used in correlation with the verbal mode when

collaborating with objects, particularly the use of deictic gestures to help anchor referents in the verbal mode (Piwek, 2007), and also the use of iconic gestures to provide procedural information (Fussell *et al.*, 2004). This leads us to two research questions which I address in this chapter:

1A: During a collaborative building activity, are nonverbal acts autonomous in the synthetic world or does interplay exist between the nonverbal and verbal modes?

1B: Do nonverbal acts of communication play the same role as in face-to-face communication?

In Section 7.5, I indicated that most CLIL research focuses on performance attainment in terms of content knowledge and contrasts this with performance attainment in terms of language knowledge. I also suggested that process research into participants' interactions is rare. In this chapter, I look at participants' interactions. I suggest although the learning design of the Buildjig activity, so as to encourage collaboration and interaction, was planned to incorporate a two-way information gap intended to require the exchange of information between students (see Section 8.4), that the architectural objectives may take precedence over the linguistic objectives: The learners' primary interest being their subject learning rather than in the learning of their L2 (see Section 8.2) may mean that the students focus more on the building process through nonverbal acts than on the linguistic interaction which requires verbal acts.

I aim to understand whether, during the specific buildjig CLIL activity and concerning its learning design, it was possible to balance the students' participation related to the architectural objectives with participation related to the language-learning objectives. To do so, I analyse:

1C: With reference to participation, how are nonverbal and verbal acts distributed during a collaborative building activity?

The above three research questions form the basis for the first section of this analysis chapter.

10.3. Analysis methodology and data coverage

As described in Section 9.6.2, to analyse the use of the verbal and nonverbal modes during the buildjig sessions and the interactions between these modes, the screen recordings

(sources) of the sessions were annotated using the qualitative data analysis software package *Nvivo*. The qualitative data analysis software was used to i) make qualitative annotations on all screen recordings ii) code the verbal and nonverbal communicative acts of the participants in each modality and iii) code the verbal acts which included a reference to an object(s) used in the Buildjig activity by type of reference made. This third category of coding helped us to analyse the interplay between referents to objects in the verbal mode and the nonverbal mode. A list of categories used is given in Table 21.

Type of verbal reference to object	Example from audio transcription with coded part of utterance underlined
name	the first <u>dome</u> + don't touch don't touch
size	<u>the big</u> the hole is in front of uS: okay <u>the big</u> is good
description	it seems like <u>two squares</u> + <u>two twisted squares</u>
colour	I think it's it's easier to err just err pick up the + <u>the black</u>
left, right	this is <u>the left one</u> and there is a smaller one+ <u>on the right</u>
face	erm you've got to + put <u>the top</u> on the on the floor
position in relation to avatar	the big the hole is <u>in front of uS</u> : okay the big is good
deictic	<u>this one</u> on the + yeah+ and <u>this one</u>
<i>Second Life</i> prim number	take <u>space image six</u>
foreground or background	in <u>the first plan</u> there's a brown

Table 21 : Categories used to code references to objects in the verbal mode

In terms of coding the verbal and nonverbal acts of the participants, each act is identified by a participant (either 'Helper', 'Worker' or 'Teacher'), by a time in the audio-track, which is synchronized with the screen recording, and by the duration of the act (see Figure 79).

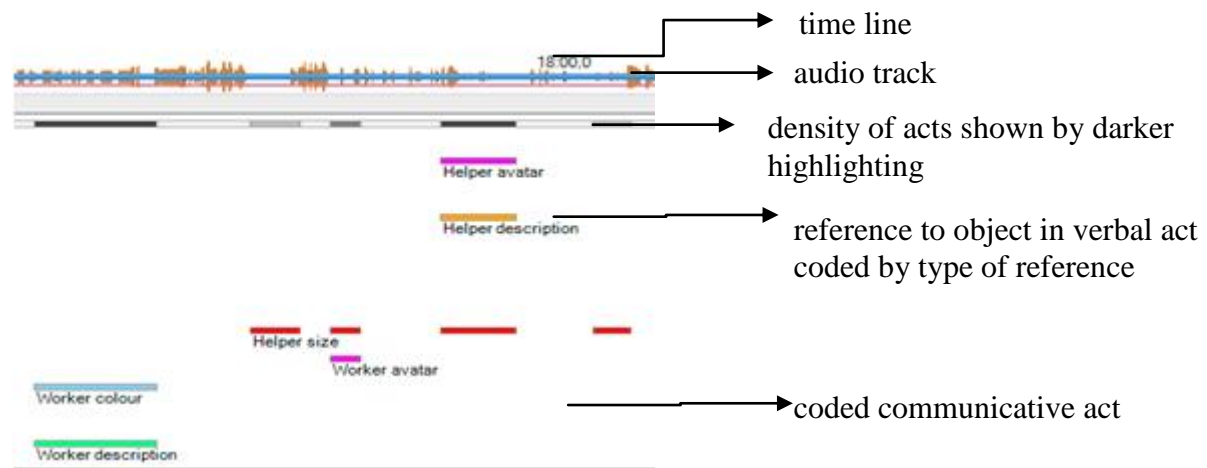


Figure 79: Example of coding of audio track with reference to references to objects using *Nvivo*

The coding of a verbal act which included a reference to an object took into account the duration of the reference within the overall verbal act. To illustrate this, examples 10A and 10B show the transcription of two verbal acts in which a reference to an object was coded. The part of each verbal act that was coded is underlined. In the first example, the part of the verbal act which relates to object reference was coded under the category of reference by colour. In the second example, the part of the verbal act which is underlined in the transcription was coded for reference by description.

(10A)

tpa, *Quentinrez*, [mm:ss]: I think it's it's easier to err just err pick up the + the black

(10B)

tpa, *Romeorez*, [mm:ss]: it seems like two squares+ two twisted squares

In my analysis, I consider four resources of the buildjig activity with subgroups of the four workgroups (resource-archi21-lact-buildjig-av-j2-avi, resource-archi21-lact-buildjig-es-j2-avi, resource-archi21-lact-buildjig-ls-j2-avi and resource-archi21-lact-buildjig-sc-j2-avi). The two ESL subgroups were composed of pairs, whilst the FFL subgroups were composed of three students with one ‘helper’ and two ‘workers’ (see Section 8.4) due to the uneven number of participants on the course. The screen recordings, each 50 minutes in length, included the activity introduction and a debriefing activity. Here, I focus solely on the building activity itself. For each subgroup, the screen recording lasted, on average, 25 minutes.

10.4. Results and discussion

In this section, I present the results of my analysis and discuss these in light of my research questions. This section is divided into eight sub-sections.

10.4.1. Floor space related to verbal acts

Analysis of the use of the verbal and nonverbal modes was conducted with reference to floor space. Floor space is considered as the sum of the total length of all acts within a specific mode for an individual participant with reference to the total length of all acts communicated in this mode (including silence for the verbal mode) by all participants present. Figure 80 shows the distribution of public audio floor space within the groups, according to participants' roles.

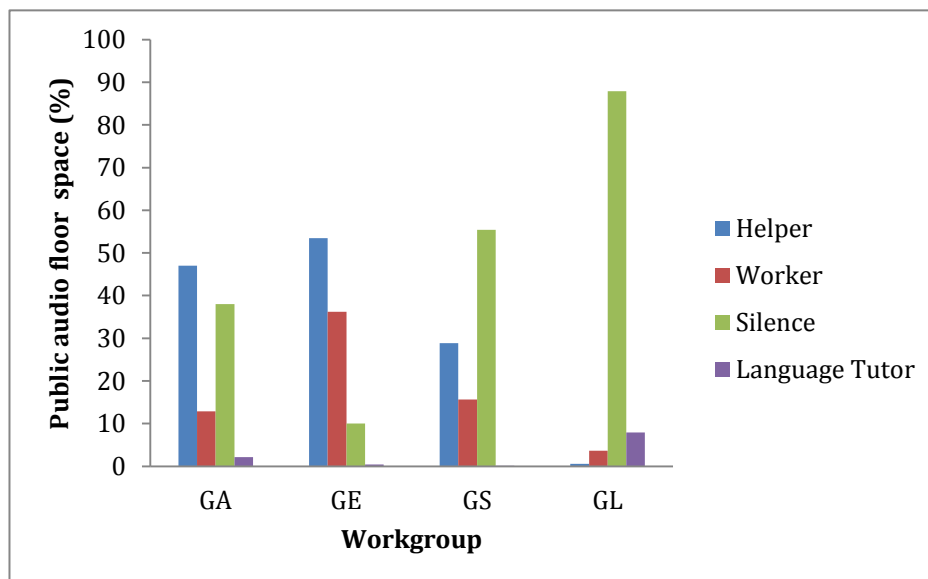


Figure 80: Distribution of public audio floor space with respect to role during activity and workgroup

In GE, the students' (both helper and worker) verbal (audio only) acts accounted for 89.62% of the possible verbal floor space, compared to 59.87% for GA, 44.51% for GS and 4.17% for GL. In the two groups in which the students accounted for the majority of all verbal acts (GA and GE), the language teacher accounted for less than 2.2% of the verbal communication. This is significantly different for groups GS and GL. For group GS the language teacher accounted for 0.11% of the total verbal communication, and in group GL the

teacher occupied nearly double the amount of verbal floor space compared to that of the students (7.91% compared to 4.17%).

The results show verbal floor space was not balanced between students in the roles of helper and worker. In groups GA, GE and GS the helper occupied, on average, 21.56% more of the verbal floor space than the workers in each group.

10.4.2. Textchat modality

The group textchat modality was infrequently employed in the verbal mode, accounting for only 31 acts compared to 781 verbal acts in the public audio modality. One possible reason for a reliance on the audio modality is the nature of the activity: speaking frees the participants' hands, allowing the participants to communicate whilst carrying out the building actions or whilst moving their avatar in order to view objects from different perspectives, both of which require the use of the computer mouse and keyboard.

The group GL utilised the public textchat modality more than any other group with 23 acts in total. This is of interest when compared to their use of the public audio modality. Concerning the latter, the participants in this group performed 38 verbal acts, of which 31 were performed by the language teacher. In this group, the student in the helper role [*Wuhuasha*] continuously placed his avatar at a considerable distance from the other students. One interpretation of the choice of modalities is that students adapted their communication strategies to the environment: there is an emergent understanding that as the distance between avatars increases, the users can no longer 'hear' each other because the public audio channel takes users' proximity into account (see Section 6.3).

Group GL's advancement of the object construction was near none compared to the other groups. This may be explained by their reliance on textchat which did not allow students to manipulate objects and communicate simultaneously. Another interpretation is that the proxemic distance between avatars impacted on the students' involvement in the activity. The majority of the textchat acts did not concern the activity *per se* but consisted of the workers trying to establish communication with the helper and the language teacher (*Tfrezl*) encouraging students to move into a closer task space so as to encourage audio communication (see examples 10C and 10D).

(10C)

tpc, Zeinarez, [02:01]: *Wuhuasha*

(10D)

tpc, Tfrez1, [02:04]: *Wuhuasha* vous pouvez vous déplacer (*Wuhuasha can you move ?*)

The verbal acts performed by *Wuhuasha* occurred when the language teacher placed her avatar near to the student's avatar. When the teacher moved physically away, *Wuhuasha* had no further participation in the communicative exchange. This suggests that, as in the first world as Allen (1977) showed, distance matters for communication purposes. The probability for the participants to initiate interaction decreases when the physical space between them increases.

I note that *Wuhuasha*, at A2 level, was the weakest student of the FFL groups. Instances which may be clear for students in face-to-face environments may indeed require extra 'effort' in synthetic worlds. Students, particularly at lower levels may have difficulty in "performing" their avatar (Verhulsdonck & Morie, 2009:6) whilst focussing on the activity and their language production. *Wuhuasha* had difficulties managing the different facets of SL and did not recognise the importance of proxemic distance in the environment's communicative rules.

It appears important to stress to learners the need to place their avatars proxemically near to each other so as to encourage verbal communication (and specifically audio communication). This is in order to avoid communication difficulties and breakdown in collaboration.

10.4.3. Floor space related to nonverbal acts

I now focus on the nonverbal communication mode and floor space distribution within this mode. Apart from GS, the nonverbal floor space distribution between the students in the helper-worker roles was considerably different (see Figure 81). The language teachers' usage of nonverbal communication occupied between 3.49% and 10.98% of the floor space within each group.

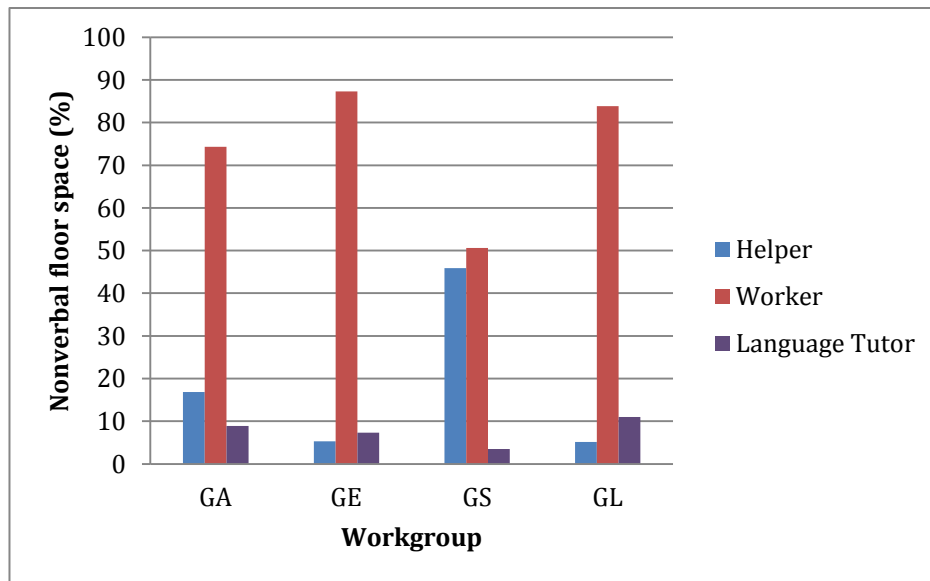


Figure 81: Distribution of nonverbal floor space with respect to role during activity and workgroup

Deictic gestures accounted for 60% of nonverbal communication in the four workgroups (see Figure 82). 78.17% of deictic gestures were performed by students in the worker role. This predominance can be explained by the nature of the activity: interaction with objects in the synthetic world, e.g., modifying the position of an object, requires the avatar to touch the object. The environment portrays this as a pointing gesture. No iconic gestures or emblems were used by the participants in the activity studied. However, pantomimes of typing, dancing and eating were present.

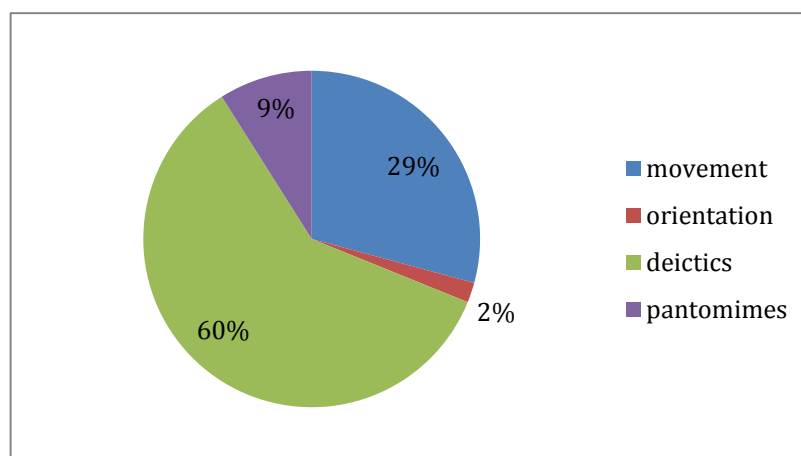


Figure 82: Distribution of nonverbal communication cues identified for the four workgroups

In all four workgroups, students in the worker role occupied more nonverbal than audio floor space (see Figure 83). The results for the students in the helper role were more varied. In the FFL group GA, the helper occupied more audio floor space than the worker but less nonverbal floor space. The helper occupied more audio floor space than nonverbal floor space. In the FFL group GL, the helper occupied slightly less audio floor space than the worker and significantly less nonverbal floor space. The helper occupied slightly more nonverbal floor space than audio floor space. In the EFL group GE, the helper occupied significantly more of the audio floor space than the nonverbal floor space whilst in the GS group the helper's communication was more evenly distributed between the two modes. Due to the nature of the helper-worker roles, it appears the modes the students used were organised differently.

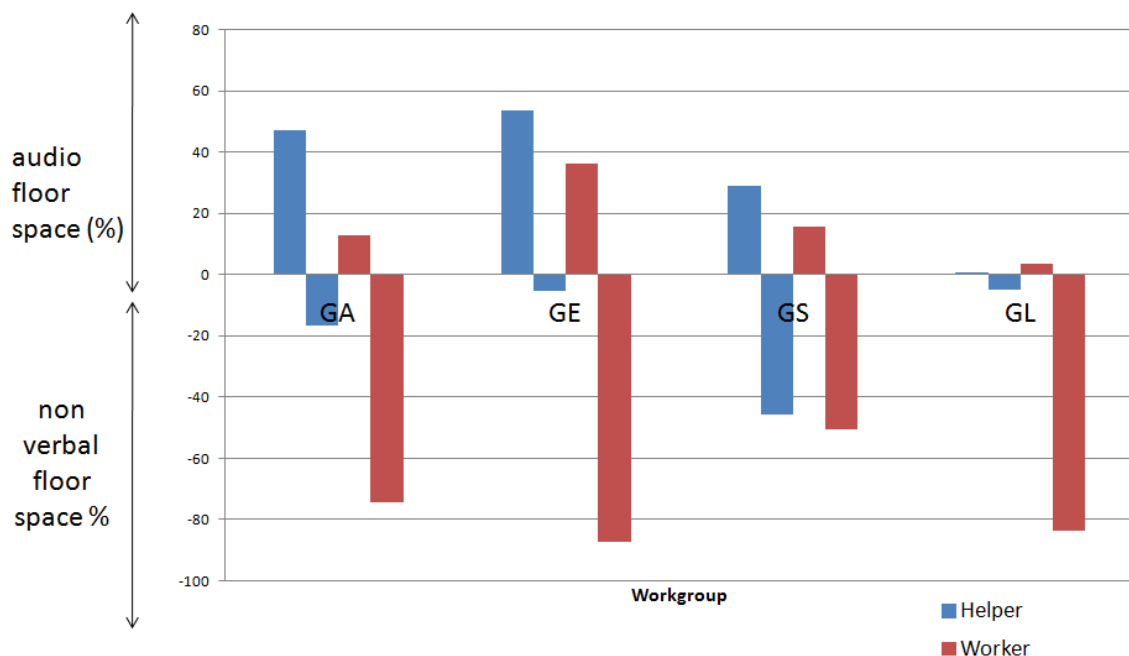


Figure 83: Distribution of nonverbal and audio floor space

The dominance of deictic gestures in the nonverbal communication is of interest. No verbal acts draw a peer's attention to such a gesture and verbal deictic references were very infrequently used. They accounted for only 5.16% of all verbal acts made which included a reference to an object. One possible explanation is that when a worker interacts with an object, if the helper displays both the worker and the object on his computer screen, s/he can ascertain with which object the worker is interacting. Students may not have needed to draw

attention to objects through verbal communication because they were always obvious in the nonverbal mode.

Another, more plausible, explanation is that the students preferred verbal references to objects (instead of verbal deictic references) which pertained to more specific characteristics to avoid ambiguity. Although the number of verbal references to objects differed depending on the students' role, both helpers and workers most frequently employed references concerning the object name, the object size or a description of the object (see Table 22). Thus, students adapted their communication strategies to the environment: uncertain of their peer's view of the environment, they chose references to objects which lacked ambiguity to help identify and refer to objects quickly and securely.

Type of reference to object made in verbal act	Example from audio transcription with coded part of utterance underlined	Percentage of 247 acts (helpers) referencing objects	Percentage of 134 acts (workers) referencing objects
name	the first <u>dome</u> + don't touch don't touch	19.22%	4.39%
size	<u>the big</u> the hole is in front of uS: okay <u>the big</u> is good	13.64%	3.06%
description	<u>it seems like two squares+ two</u> <u>twisted squares</u>	10.10%	3.03%

Table 22: Top categories of verbal acts referencing objects by type and student role with examples

10.4.4. Shared visual space for collaborative activity

This explanation is strengthened when we consider the acts performed in the nonverbal modality of movement. To help object identification, avatar movement, positioning and orientation were frequently employed in parallel with a reference to an object in the verbal mode. Students used the position of an avatar as a static point from which to refer to an object to be identified. This strategy, however, was frequently unsuccessful in identifying the object. In example 10E, the student in the helper role refers to an object "in front of us". The worker does not correctly identify this object because his subsequent nonverbal act prompts the helper to tell him "don't touch don't touch the BIG:". The reference is misunderstood by the student.

(10E)

tpa, Quentinrez, [17:38-17:54]: okay so I've got the euh + euh ++ because we can + I + I think it's it's easier to euh just euh pick up the + the black and the the big and the little hole (Romeorez: yeah but) so (Romeorez: the) just (Romeorez: the big) which one of them (in front of us)

tpa, Romeorez, [17:53-18:03]: the first big dome + don't touch don't touch the bIG: the big the hole is in front of uS: okay the big is good but the little I one I think umm

In the post-questionnaire, this student stated that he used the synthetic world's camera view nearly all the time. The camera allows users to detach their point of view from the avatar they control, allowing the user to gain multiple perspectives (see Chapter 6). In a subsequent interview, the student stated that his use of this view had no impact on the interaction for at all times he could clearly hear his partner. However, no students asked their partners, before making a reference to an object in relation to another static point (e.g., the student's avatar), whether their counterpart was using the camera view or not: the students did not try to establish common ground in terms of their shared visual space before communicating verbal references to objects.

Kraut, Fussell & Siegler (2003) and Clark & Krych (2004) (see Section 3.4.1) argue that in distance collaborative activities participants must have shared visual access to the collaborative activity space so as to help establish deictic references. This is perhaps one of the reasons that students used few deictic references in their verbal communication. I also suggest that shared visual access is essential when searching to establish references with reference to the position of an avatar: it appears fundamental that both students involved should be aware of their physical orientation to one another. It is perhaps for this reason that students preferred avatar movement and orientation as a form of reference.

10.4.5. Language difficulties and nonverbal acts

As explained, students used avatar movement and orientation to help mark the position of an object. In example 10F, the helper specifically decides to position his avatar in the same place in which he wishes the worker to position the object with which the pair is working.

(10F)

tpa, Romeorez, [1:19-1:30]: oh do you know what I'm going to take my avatar and put me where you have to put the things I think it's useful like that ... (it's easier you know)

mvt, Romeorez, [1:24-1:34]: walks towards dome object

tpa, Quentinrez, [1:29-1:34]: (yeah yeah) totally yes totally (*Romeorez*: so) + you respect it

tpa, Romeorez, [1:34-1:37]: so the little fountain is like here

tpa, Quentinrez, [1:38-1:47]: okay I see it (*Romeorez*: okay) okay so (*Romeorez*: and the + like here) it exactly on your place or

tpa, Romeorez, [1:47-1:49]: exactly on my place

tpa, Quentinrez, [1:49-1:51]: okay so I do that okay that's it

In a post-course interview, of the 'critical-event recall' type, after having viewed the video corresponding to example 6, the student *Quentinrez* described the fact of moving his avatar to where the object had to be placed as a strategy to overcome his poor vocabulary concerning position and direction:

in fact it's because + I'd say directions and rotations because we have a very poor vocabulary when we're speaking and try to describe a position or a direction or something to do with orientation in fact that is the specific area where we are really missing lexis + orientation [authors' translation]

10.4.6. Ambiguity of verbal deictics and nonverbal acts

I observed that, in all instances when the students decided to adopt, for the first time, the strategy of moving an avatar to refer to an object or to mark the position of an object, it was following a non-successful verbal communication to try to describe the object or how to position the object.

For example, GA group encountered a difficulty in the verbal communication concerning which object was to be manipulated. This difficulty arose because the students were not aware of what was in their partner's field of vision when they used determiner 'cet' (see example 10G). When the worker asked a question to try to decipher which object the helper was referring to, the helper decided to move her avatar, running over to the object in question. Thus, in her later verbal communication we can see that she moves from talking about 'cet' to talking about 'celui'. To compensate for the difficulties in knowing what is in her partners' field of vision and not rely on deictic words alone, the student uses nonverbal communication to make explicit her verbal communication. Indeed, at first, the deictic word 'cet' was entirely context dependent. Its meaning could shift and was non-unique. By using nonverbal communication alongside a verbal deictic word the student secures the context for

her reference, anchoring the deictic word to a specific object in the environment. I suggest that, because in this situation shared visual access to the collaborative activity space is not guaranteed, that explicitness in the nonverbal communication helps to secure the reference.

(10G)

tpa, Crispis, [14:14-14:17]: vous allez deplacer le + cet object (*you're going to move the + this object*)

tpa, Prevally, [14:18-14:19]: lequel (*which one*)

tpa, Crispis, [14:20-14:21]: ah je vais m'approcher (*ah I'll go over to it*)

mvt, Crispis, [14:20-14:22]: runs over to object

tpa, Prevally, [14:22-14:23]: ah ca (oui) (*ah that (yes)*)

tpa, Crispis, [14:23-14:23]: (celui) + (*this one*)

mvt, Crispis, [14:24-14:25]: moves backwards from object towards *Prevally*

tpa, Crispis, [14:24-14:26]: euh de rien (*euh no problem*)

The numerous examples of the use of avatar movement and positioning to clarify verbal acts and the importance the students attach to this for their communication beg the question as to whether synthetic worlds enable the direct transfer of face-to-face strategies as regards spatial reference to objects. In these examples we note that users must accommodate to the properties of the environment by using nonverbal communication in association with verbal communication or they risk miscommunication and, thus, reduced success in the building activity.

10.4.7. Proxemics and verbal interactions

The verbal mode was also used in association with the nonverbal mode to organise the proxemic positioning of the students' avatars. I found that students did not instinctively move or orientate their avatars when forming groups at the beginning of activities and did not naturally position their avatars to face each other as I believe they would in face-to-face situations. For an example, see Figure 84, in which we can observe an avatar using the audio modality to communicate (indicated by the wave icon) and another avatar replying using the textchat modality (shown by her pantomime gesture of typing in the kinesic modality). These avatars are interacting; however, they are turned away from each other.



Figure 84: Avatar proxemics

Bonfils (2007) describes, in a similar fashion, the lack of transfer of face-to-face proxemic norms inworld. His study concerned a course followed by 81 undergraduate students studying Image and Sound Techniques at the Ingemedia Institute at the University of Toulon. During the course, the students, divided into workgroups, had to design a communication campaign. Bonfils (2007) showed that students during the earlier course sessions did not instinctively organise their avatars according to proxemic norms, for example, in grouping avatars around a table empty chairs were left between students. However, student avatars' proxemic norms developed with time spent inworld. By the fourth inworld session, the students became more alert to the proxemic positioning of their avatars and did not leave any gaps around the discussion table.

In our study, we see that the language teachers try to accelerate proxemic inworld norms: our data also shows that at the beginning of sessions, the language teachers (*Tfrez2* in the example), on numerous occasions, explicitly asked the students to organise the proxemic positioning of their avatars using the verbal mode before beginning activities (see example 10H). During this organisation, the language teachers systematically use the names of the students' avatars. I interpret this as a shift from a face-to-face strategy concerning forms of address to one which is more suited to the synthetic world. Indeed, in face-to-face communication it is uncommon to mention interlocutors' names in each utterance when they are in front of the speaker. Rather, gaze and orientation of the speaker are used to establish a connection with a student (Harper, 1985 cited in Quinslink, 2008) and coordinate the verbal communication with a desired action (Kraut, Fussell & Siegel, 2003, see Section 3.4.1).

(10H)

tpa, Tfrez2, [1:14-1:29]: Please can you just come and stand in a circle around me so perhaps Hallorann you can just yep + Hallorann can you turn around so you are facing me + great and Romeorez a little bit forward please

As highlighted in Section 6.3 Ventrella (2011: 8-9) explains the impact that nonverbal communication may have on the communication and perceptions of communication in synthetic worlds should users not be aware of their virtual "faux pas". Ventrella explains that the computer-generated nonverbal communication meant that the avatar's gaze was frequently directed at nothing in particular. Although the user was not aware of snubbing people, the nonverbal communication of her avatar meant that she gained a bad reputation with other users. The language teachers in our experimentation seemed sensitive to the impact that nonverbal communication may have on users' perceptions of each other. They used the verbal mode to organise the nonverbal mode, so as to facilitate verbal communication but were also aware of class dynamics: they helped students become aware of their avatar behaviour and positioning with respect to others.

10.4.8. Activity achievement

The activity which we have analysed in this chapter was a CLIL activity and had not only language-learning objectives but also architectural learning objectives. In terms of architectural aims, the activity was designed to introduce students to building techniques in the environment and, once completed, to show students an example of how they could present their workgroup's model at the end of the course. With respect to L2 learning, the activity was designed to encourage interaction between the students in the helper and builder roles and to develop L2 communication techniques concerning the referencing of objects. For a sub-group to achieve these aims they therefore had to both use nonverbal acts with respect to the building inworld and also use the verbal mode, with respect to interacting between the helper and builder, to accomplish the activity.

The Buildjig activity was the second time that the students met inworld with the language teachers (see Figure 62). Although the building involved in the activity was beyond abilities of the language teachers, who were not sure whether they could complete the building activity alone, our data shows that the activity was pitched at the level of the students. In the post-questionnaire, when asked whether it was too difficult to communicate with their partner during the activity, on a scale from five (totally agree) to one (don't agree at all) the students rated the activity at three (no opinion) (see Appendix 11). Although none of

the groups fully completed the activity within the allocated time, the work of groups GE (EFL) and GS (EFL) strongly resembled the finished design. Our analysis shows that, of the four groups, these two had the most balanced verbal floor space between helper and builder showing how the verbal interaction was vital for the building activity to be achieved.

GA (FFL), after taking some time to get into the activity had started the activity and, after the activity, decided to remain inworld to finish their work. The time this sub-group needed to start the activity is shown in the difference in the number of nonverbal acts used by the worker compared with the number used by the successful groups GE and GS. The worker in GA holding 50% of the nonverbal floor space compared to over 70% in the successful groups GE and GS. The building work of GL (FFL), on the other hand, had barely commenced, a student in the worker role trying to build the kiosk object by himself. Our analysis shows that this group's failure to accomplish the activity was directly related to little use of the verbal mode and the floor space in this mode being held by the language tutor and worker, rather than the helper who, in the activity design was meant to give the verbal instructions to complete the building. The lack of progress concerning the building in itself may also be due to the group also used the textchat rather than the audio modality and the large proxemic distance that the students placed between their avatars compared to that of other groups.

10.5. Synthesis of observations

This first analysis chapter studied the interplay between the nonverbal and verbal modes of communication firstly concerning a collaborative building activity. To complete this chapter, I return to my research questions, provide a synthesis of my observations in response to these and suggest some pedagogical implications that result from my analysis.

1A: During a collaborative building activity, are nonverbal acts autonomous in the synthetic world or does interplay exist between the nonverbal and verbal modes?

1B: Do nonverbal acts of communication play the same role as in face-to-face communication?

1C: With reference to participation, how are nonverbal and verbal acts distributed during a collaborative building activity?

My study of the collaborative building activity Buildjig, suggests that the distribution of the use of the verbal and nonverbal modes is dependent on the role that the student undertook

during the activity and the particular instructions that the student in each role was given: students in the helper role predominantly preferring verbal communication whilst students in the worker role preferred nonverbal communication. However, interaction between the two modes was apparent. The nonverbal modality of avatar movement was used as a strategy to overcome verbal miscommunication in particular concerning direction and orientation. Avatar movement also had the function of securing the context for verbal deictic references to objects. Such references were infrequently used in the verbal communication. Both helpers and workers preferred references to objects by object name, size and colour. I suggest that this is a sign that the students adapted to the environment: such references avoid ambiguity whilst deictic references are hard to understand due to participants being unaware as to whether they share visual access to the collaborative activity space or not. The camera feature of the environment, unavailable in the first world, contributes to this uncertainty. Should language teachers wish to exploit the synthetic world environment, thus, for collaborative learning through building activities, it may be important to develop the proficiency of learners to express orientation and direction in the design of the pedagogical scenario, for example, by providing scaffolding activities.

Interaction between both modes was also evident concerning the proxemic organisation of students. Proxemic norms for communication from the first world were not immediately transferred inworld: students did not instinctively place their avatars in the formation of groups or facing each other. The data analysis further suggests that the proxemic organisation of students had an impact on the quantity of the students' verbal production. This echoes results from Kraut, Fussell & Seigel's (2003) study (see Section 3.3.2) which suggests that the more proxemically close two individuals are, the more likely they will be to communicate with each other. My analysis also revealed that the proxemic organization of students had an impact on the topics discussed in the verbal mode. When groups were proximally distant, topics moved off-task and teachers intervened concerning the proxemic management of the group. This study shows that proxemic closeness is important for L2 activities which involve collaboration and, more specifically, building. There is, thus, a need in pedagogical scenarios to explicitly introduce students to the nonverbal communication in the environment to accelerate the emergence of communication norms when students work together. In doing so, I believe, language production and learning in subsequent collaborative activities can be facilitated.

Chapter 11. Role of the nonverbal mode in identity construction related to L2 verbal participation and interaction

11.1. Introduction

In this section, I present my research questions, analysis methodology and data coverage concerning the role of the nonverbal mode in identity construction. I present the results and discussion of my analysis which relates identity construction to L2 verbal participation and interaction.

11.2. Outline of research questions

Identity plays an important role in self-concept (Zhao, Grasmuck and Martin, 2008): an individual's perception and beliefs of him/herself in relation to a number of characteristics. Our identity is the part of self by which a person is known and recognised by others. Identity construction, therefore, is a public process which combines both how an individual claims his/her identity ('identity placement', Zhao, Grasmuck and Martin, 2008:1818) and how other people approve, or not, this claimed identity ('identity announcement', Zhao, Grasmuck and Martin, 2008:1818). Social identity theory suggests a person's conceptualisation of self is formed of multiple parts (or identities) depending on the social groups with which the person interacts (Hogg, Terry and White, 1995) and aspires to join (Cabiria, 2008).

Nagy (2010) explains that in face-to-face contexts, social identity claims are consistent with the visible part of a person's physical characteristics and the shared knowledge of each other's social backgrounds and personality attributes. Identity construction occurs through changing physical environments, appearance and language. In face-to-face contexts in which strangers meet, whilst a person's identity placement may differ in the information they communicate about his/her social background and personality attributes, "identity claims still cannot go beyond the limits set by embodiment" (Nagy, 2010, p.171).

By way of contrast, in synthetic worlds, users are free to construct the identity(ies) they wish because interactions are free of physical constraints due to users being represented by avatars. As we saw in Section 5.6, the literature regarding the affordances of synthetic worlds highlights the anonymity that avatars provide as a potential affordance of these environments for language learning suggesting that they reduce learners' apprehension and embarrassment concerning verbal participation in the L2, and in terms of production allow learners to take risks in the L2. However, the use of avatars and their communication as the object of learning as well as the tool in language-learning situations raises certain questions. As outlined by Lamy and Hampel (2007) these include i) whether and how learners use avatars to develop an identity; ii) what avatar embodiment means for interaction; and iii) the extent to which the character of an avatar influences interactions.

In this analysis section, I address the following research questions:

2A: Do students construct inworld identities using the nonverbal mode?

2B: Does interplay exist between the students' use of the nonverbal mode for inworld identity construction and their L2 verbal interaction and participation?

Firstly, I examine students' perceptions of the importance of the avatar. I then consider whether learners distinguished between first world and inworld identities and constructed inworld identities using the nonverbal modality of appearance. I relate these results to students' L2 verbal interaction and participation. I then investigate whether acts in the nonverbal kinesics modality contributed to inworld identity construction and if use of these impacted students' level of L2 verbal participation.

11.3. Analysis methodology and data coverage

The data employed to analyse the role of the nonverbal mode in identity construction and interplay between this and students' L2 verbal interaction and participation includes the quantitative data produced from transcriptions of the *Second Life* reflective sessions (see Section 8.4 and Section 9.6.2). This provided us with calculations of the number of acts per participation by type, the average length of acts of each type by participant and also the total length of acts of each type by participant. I examine this data in particular for the groups GA and GS concerning the *Second Life* reflective sessions held on day two of the course

(distinguished corpora Chanier, Saddour & Wigham, (2012b) mce-archi21-slrefl-av-j2 and Chanier, Saddour & Wigham, (2012f) mce-archi21-slrefl-sc-j2).

A Shapiro-Wilk test of normality and a one-way ANOVA test were conducted on a data from groups GA and GS' *Second Life* reflective session on day two of the course in order to statistically analyse variance. The employment of these tests is explained in the body of the study's results and discussion section (11.4). The data transcriptions of the *Second Life* reflective sessions were also coded and counted with reference to how the participants' referred to each other (e.g. by name) during the sessions.

The screen recordings from each of language session (Introduction to *Second Life* (introcomm), Buildjig and *Second Life* reflective sessions) were annotated with respect to changes made by each participant to customize the appearance of his/her avatar during the course. A change was considered to include a change in item of clothing (e.g. replacing trousers with a skirt), a change of item of clothing (e.g. colour, size) and also a change to the morphology of their avatar's body (see 6.4).

Finally, data from the students' post-questionnaires (see Section 9.4.4 and Appendix 11) and from the semi-directive interviews (see Section 9.4.5 and Appendix 12) were utilised.

11.4. Results and discussion

11.4.1. Students' perceptions of the importance of the avatar

Student questionnaire and post-course interview data suggest the importance placed on avatars as 'social capital' (Bourdieu, 1999): the expected collective benefits from the cooperation between the participants achieved through being able to communicate through their avatars. Once students could manipulate the environment to move their avatar, perform gestures and change their avatar's appearance, they believed that their avatar allowed them to engage more in L2 interaction (see Figure 85.)

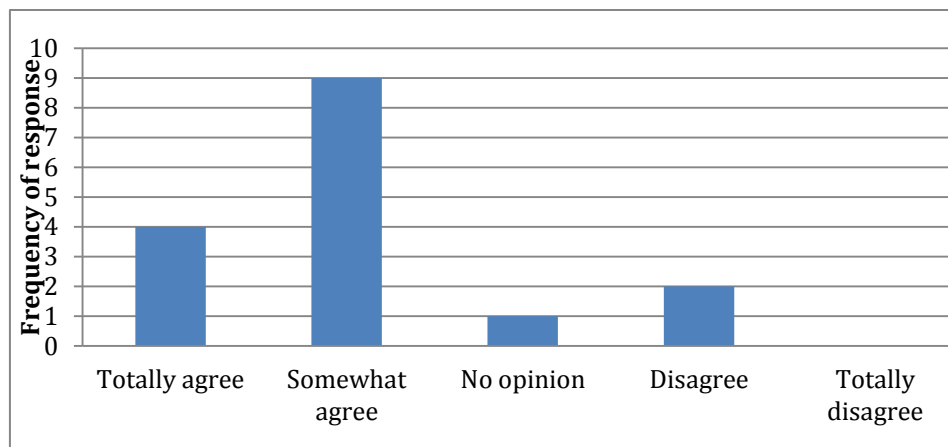


Figure 85: In distance learning situations, being able to communicate through an avatar (movements, gestures, appearance) allows you to engage more in L2 interaction with other *Second Life* users

In the post-course interviews, from which quotes are shown as originally formulated, one student explained that L2 communication was facilitated by using an avatar because she was less afraid of making mistakes when interacting with others, albeit strangers with whom she had established an inworld relationship or other student participants:

(11A)

Zeinarez, (FFL) [10:30-11:20]: si on se trompe ce n'est pas tout à fait un problème parce qu'on n'est pas là dans un sens physique le problème de parler un autre langage c'est le peur de se tromper ...il faut pas dire des bêtises en français ... quand c'est l'avatar c'est pas tout à fait un problème

If we make a mistake it's not really a problem because we're not there physically. The problem with speaking another language is the fear of making mistakes...you mustn't say anything silly in French...when it is the avatar it's not really a problem

The students also expressed not being comfortable with their avatar identity being similar to that of another user of the networking environment:

(11B)

Hyungyoonrez, (FFL) [23:01-24:42]: c'était la même chose que Zeinarez et mon avatar c'était vraiment similaire...j'ai pas vraiment changé beaucoup de choses...c'est juste donner un peu de différence entre les autres

it was the same thing as Zeinarez and my avatar it was really similar...I didn't really change a lot of things...it is just to show a difference from the others

(11C)

Audreyrez, (EFL) [20:26-20:41]: j'ai changé non seulement les vêtements et puis l'apparence physique non le but était de faire quelque chose d'assez de loufoque et d'amusant le plus différent possible de soi et des autres

I changed not only the clothes and then the physical appearance the aim was to create something which was kind of crazy and fun as different as possible to me and the others

Such statements suggest that in the students' subjective perception of the conceptualisation of their avatars, social capital was highly important and demanded individual inworld identities. One reason for this may be that students did not wish to appear as 'newbie' users, in order to network and integrate more quickly with more experienced/knowledgeable users. The students' perceptions of their avatars as social capital may also be related to *Second Life* being the students' object of study as well as the environment in which they were studying: their avatars influenced how the students reflected upon their projects and the image of themselves reflected, in part, the architectural stance they wished to adopt in the synthetic world *vis-à-vis* their workgroup and other users of the synthetic world. As one student explained, her avatar was the object which represented her thoughts and character:

(11D)

Hyungyoonrez (FFL) [23:55-24:52]: l'avatar est une chose pour représenter notre notre pensée et notre esprit comme ça du coup l'apparence est une première chose de montrer comment je pense

the avatar is the thing which represents our thoughts and our spirit therefore the appearance is the first thing to show how I think

To link the above student impressions to my research study, I now examine, firstly, whether students made distinctions between their first world and inworld identities, how their inworld identities were constructed by changes in avatar appearance and any impact of this on L2 verbal interaction. Secondly, whether nonverbal communication acts contributed to inworld identity construction and whether using these impacted on L2 verbal participation.

11.4.2. First world –inworld communication and identity distinctions

Our interview data (see example 11E) suggests students distinguished between first world and inworld interaction during the course.

(11E)

Zeinarez (FFL) [23:55-24:52]: avec la personne avec qui j'ai travaillé même si on était juste à côté des fois on se communiquait avec des avatars...quand par exemple quand elle voulait me montrer quelque chose dans l'île elle me regarde pas elle me parle pas mais je trouve une invitation de téléportation alors ok je vais elle est juste à côté de moi mais c'était marrant d'aller voir son avatar qu'est-ce qu'il veut

With my partner even if we were just beside each other [in the face-to-face environment] sometimes we communicated with each other using our avatar...for example, when she wanted to show me something on the island she wouldn't look at me or talk to me but I would find a teleportation request so I would teleport she was just beside me but it was funny to go and see her avatar and what it wanted

This differentiation between inworld and first world communication may have been due to students making a distinction between first world and inworld personalities. Although the students had been asked to name their avatars in a particular manner (see Section 8.4), six of the seventeen students did not follow this instruction but rather invented avatar names. Four of these students (students S1-S4, Figure 86a) were referred to, by their classmates, using their first world name (see Figure 87). For example, the participant *Prevally* (student S3) was referred to eight times by her first name and not at all by her avatar name. In comparison, the avatars of two participants, *Hallorann* (student S5) and *Tingrabu* (student S6), (see Figure 86b) were addressed by their avatar names rather than the students' first world names. For example, *Tingrabu* was addressed by his avatar name six times and never by his first name.

Our data revealed that avatars with a human-based morphology were referred to in the interaction by their users' first names. However, avatars referred to by their avatar names had a less human-based morphology (Figure 86b). It appears that that the choice of a less-corporeal body by students for their avatar helps distinguish the inworld identity placement of these students from their first world identity.



Figure 86: Avatars with human-like morphology Avatars with changed morphology

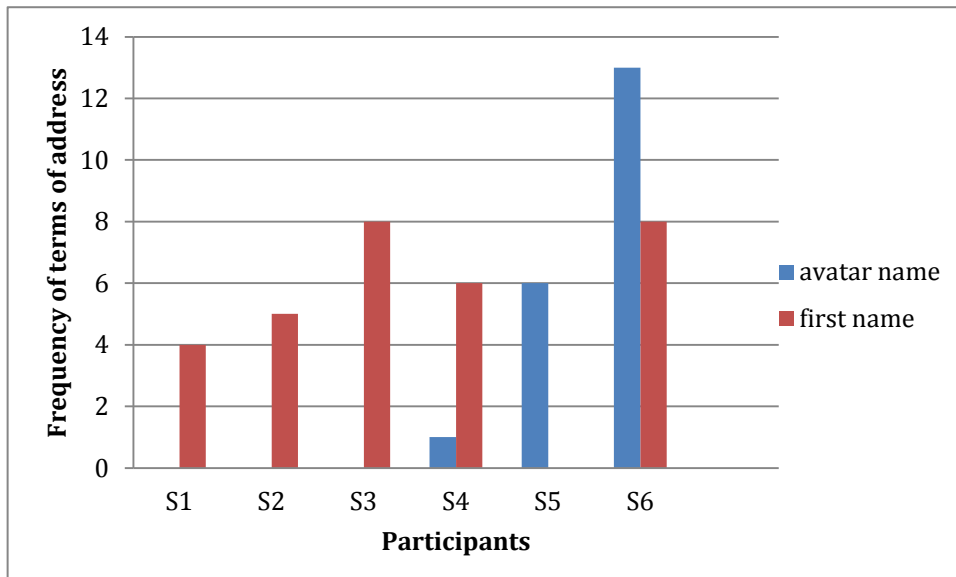


Figure 87: Terms of address for students whose avatar names did not correspond to their first name (see Figure 86)

11.4.3. Avatars' morphological evolution related to L2 verbal participation and interaction

To better understand changes the students made to avatar morphology and, in particular, whether this impacted L2 verbal participation and / or interaction, I examined our student avatars' morphological evolution with respect to the number of L2 verbal acts during the reflective sessions which have been transcribed. Although in the 'Introduction to Second Life' session, no activities had involved changing the avatar's clothes or appearance nor any

specific instructions given in the pre-course email (see Appendices 2 and 3), I noticed that despite Second Life being a new environment for most students (see Figure 65), as they evolved in the world which they were constructing as part of their architectural design projects many students customized their avatar's appearance.



Figure 88: Female student participant *Emmegi88* changes her avatar body shape between day one and three of course

The changes students made were, frequently, to become less based on human morphology either by using editing avatar appearance using the *Second Life* menu to customise an avatar's look (e.g. change skin colour, body shape, see Figure 88) or by adding objects which were scripted to their avatar's body. In *Second Life*, it is possible to use the computer programming language *Linden Scripting Language* to write programs which produce scripts (sets of instructions) to give behaviours to *Second Life* objects which can then be worn by avatars. For example, a script can be written so that the hat worn by an avatar includes moving appearance components (see Figure 89 left) or that an object (e.g. a can/mug) worn by an avatar makes the avatar repeatedly performs a gesture at determined time intervals (e.g. that of drinking, see Figure 89, right).



Figure 89: Avatars with a scripted appearance – a light rotating around an avatar's head – and an avatar wearing an object which scripts the kinesic act of drinking

Twelve of the 17 students customized the appearance of their avatar during the course. Figure 90 shows this: a vertical increase of one in the y axis showing a modification to avatar appearance by a student from one session to another. For example, the student *Arnaudrez* modified his avatar's appearance between each of the first four sessions, but then did not change appearance between session four and five (shown by the horizontal line). *Audreyrez*, did not change the appearance of her avatar between sessions one and two and sessions three and four (horizontal lines) although the student changed her appearance between sessions two and three and sessions three and four.

Figure 90 shows that the changes to avatar appearance were predominantly made after the first introductory session to *Second Life* or midway through the course (see Figure 90). We can also see that five students in this study made no modifications to the appearance of their avatar during the course: the figure shows a horizontal line for each of these students for the totality of the five sessions on the x axis. One student, *Zeinarez*, explained that, at first, she did not have the time to change the appearance of her avatar and then finally that she felt that she did not really want to change her appearance. One possible interpretation of *Zeinarez's* reason might be that she felt the need to adopt a persistent identity in order to be identified and re-identified consistently throughout the course.

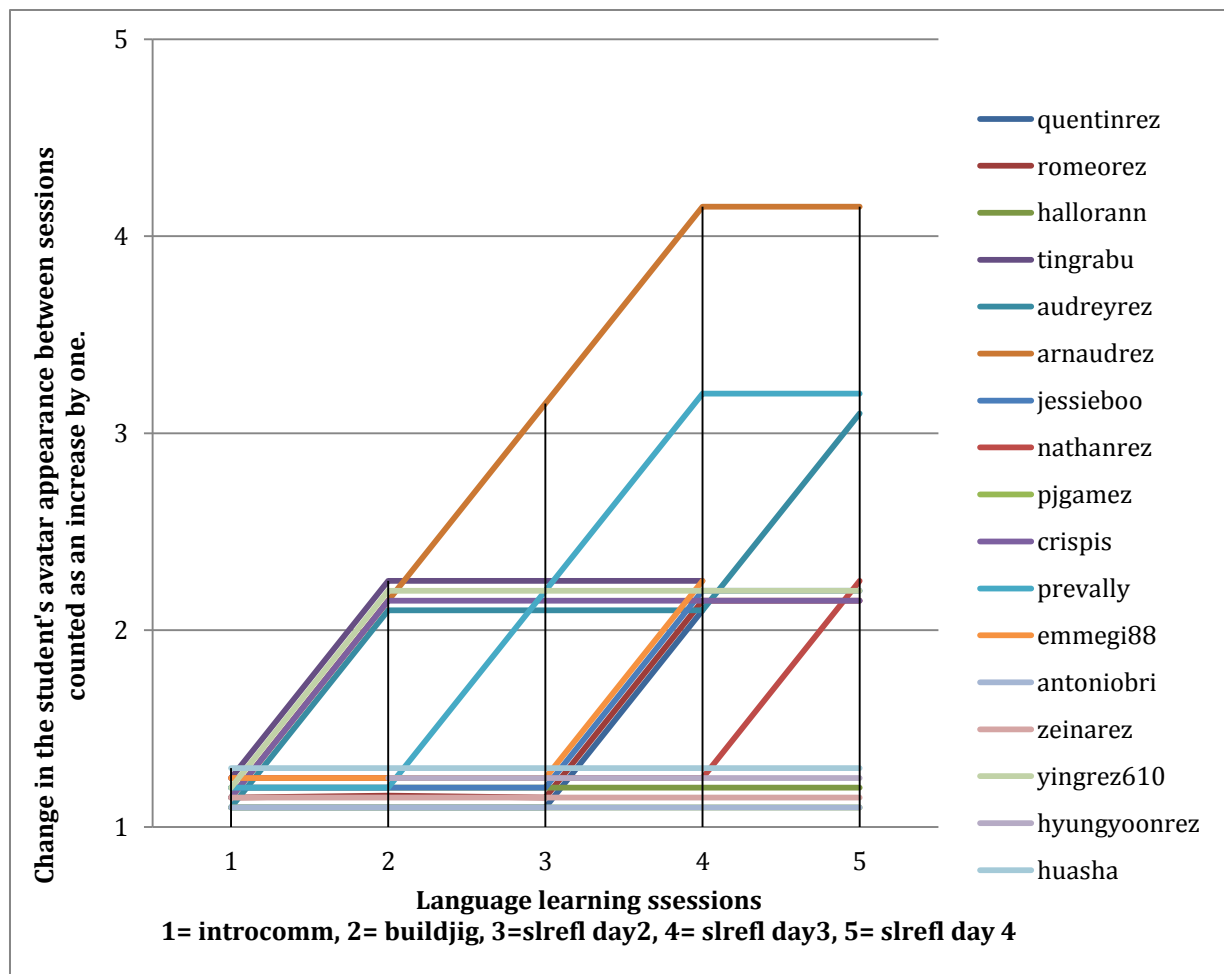


Figure 90: Evolution of students' avatar appearances during the course adapted from Warburton (2008)

For the four of the five students who did *not* change their avatars' appearance: *Huasha*, *Antoinobri*, *Zeinarez* and *Pjgamez* (Figure 90), my analysis reveals that these students were amongst the five students to have made the *least* number of verbal acts during the interaction in the *Second Life* reflective sessions (Figure 91). These participants made an average of 13 verbal acts during a session, compared to an average, for any single participant in all three workgroups analysed, of 30 verbal acts. A lack of personalisation of the avatars suggests that the students have perhaps not passed the "technological and competency threshold" (Warburton, 2008: para.4): they are not yet able to manage the graphical interface of the social networking environment and interact with it. They have, thus, not accessed the "threshold of care" (Warburton, 2008: para.6). This threshold is when users start to identify with their avatars, feeling an emotional pull towards their virtual selves and starting to care about their avatar. At this threshold the user feels the necessary embodiment to invest in the synthetic world and in the interactions within this world.

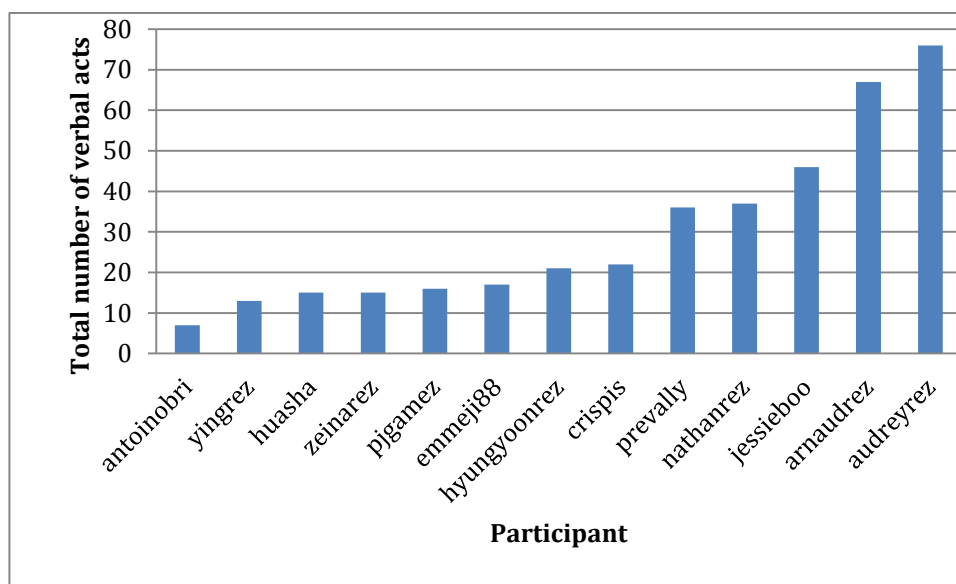


Figure 91: Number of verbal acts for students in groups GA, GL and GS during slrefl sessions day 2

Our interview data (see Section 9.4.5) also suggests that an avatar's morphological evolution may not only influence L2 verbal participation but also with whom students decide to network and interact inworld. One student, after describing her group member *Antoinobri*'s avatar as similar to that of a monster with a small head and large chest, refers to this:

(11F)

Researcher, [27:18-27:29]: est-ce que le fait que son avatar ait un peu l'apparence d'un monstre a changé votre manière de communiquer avec lui ?

Did the fact that the avatar was a little like a monster change how you communicated with that avatar?

Hyungyoonrez, (FFL) [27:30-27:32]: hum on n'a pas de tout communiqué [_chuckles]

erm we didn't communicate at all [_chuckles]

This suggests the necessity to encourage students to personalize their avatar appearance in order to encourage their L2 verbal communication inworld but that there are certain limits that, when reached, influence with whom students decide to interact.

11.4.4. Nonverbal communication with respect to L2 verbal participation

Having seen the role avatar appearance played in L2 participation and interaction in this study, I now turn to whether the students created their avatar identity in part through

nonverbal communication acts (see Table 1) and whether the use of these acts impacted on L2 verbal participation. To study this, I analysed the frequency of nonverbal acts used by different participants in our transcription data. My analysis shows that certain students repeatedly performed the same nonverbal acts. For example, the avatar of *Arnaudrez* frequently used the kinesic act of drinking from a can of beer whilst the participant *Emmegi88* repeatedly changed her sitting posture, leaning in and out when she verbally interacted with the others. Our interview data shows how this nonverbal communication was perceived by the students' peers. *Audreyrez* described that all of her workgroup members used gestures but that *Arnaudrez's* drinking gestures created a classmate who was funny and unique. Another student explained that participants drew attention to their avatar's image by 'ego-tripping' through their use of gestures. Thus, our data shows that the students' inworld identities were created in part through their nonverbal acts in addition to their avatar appearance.

I questioned whether the students who frequently used nonverbal communication acts utilised these to occupy the space during the *Second Life* reflective sessions so that they were seen as participating without necessarily interacting frequently in their L2. To analyse this, I examined the total number of nonverbal acts compared to verbal acts during the *Second Life* reflective session on day 2 for the workgroups which included the participants *Arnaudrez* and *Emmegi88* whose nonverbal acts were considered as part of their identity by the other students.

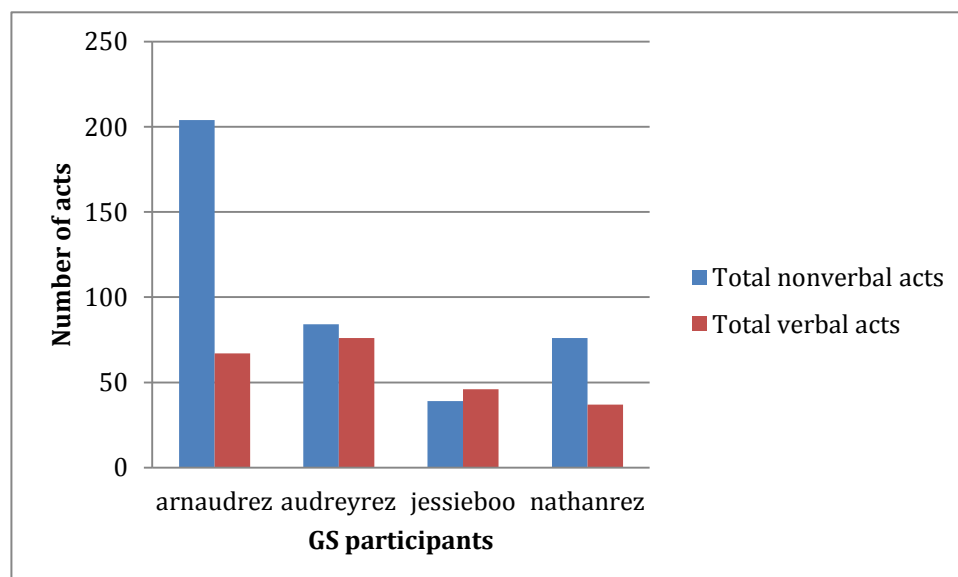


Figure 92: Number of verbal and nonverbal acts by participant for workgroup GS during slrefl day 2

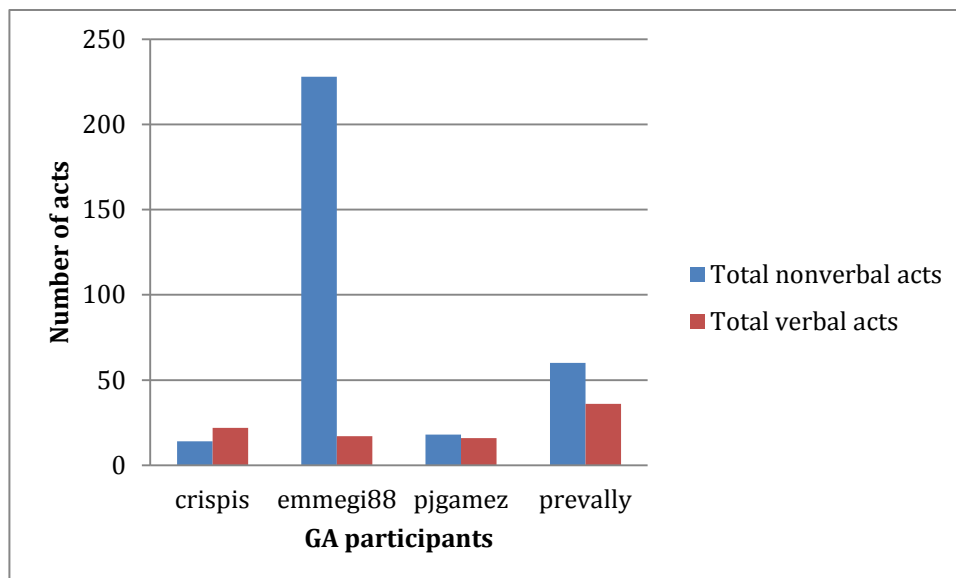


Figure 93: Number of verbal and nonverbal acts by participant for workgroup GA during slrefl day 2

Figure 92 and Figure 93 show that the two participants *Arnaudrez* and *Emmegi88* used considerably more nonverbal acts than the other workgroup participants. Although the quantity of verbal acts for *Emmegi88* was considerably smaller than for *Arnaudrez*, the total number of L2 verbal acts for both students was within the norms of their workgroup. Therefore, it appears that they did not simply use nonverbal communication to occupy the space and be seen as participating within the reflective sessions but rather in parallel with L2 verbal interaction.

To examine more closely whether the nonverbal communication acts of the avatars allowed the students to engage more in the L2 verbal interaction, two hypotheses were formed and tests of statistical significance performed on same data from the *Second Life* reflective sessions on day 2 for workgroups GA and GS (distinguished corpora mce-archi21-slrefl-av-j2, Chanier, Saddour & Wigham, 2012b and mce-archi21-slrefl-sc-j2, Chanier, Saddour & Wigham, 2012f). The data and results are available in an open-access distinguished LETEC corpus (mce-archi21-modality-inteplay, Wigham & Chanier, 2012).

Hypothesis 1 (H1): The more nonverbal acts a participant performs, the more verbal acts s/he performs.

Hypothesis 2 (H2): An increase in the number of nonverbal acts performed by a participant results in an increase in the total length of the participant's verbal acts.

None of the participants in GA and GS had used *Second Life* prior to the course. Therefore, all students had spent the same amount of time inworld when data was collected.

The analysis of variance used to test H1 and H2 was a one-way ANOVA test for which the populations from the samples obtained must be normally distributed and the samples independent. To ensure that a one-way ANOVA analysis of variance could be performed, considering the small sample sizes, a Shapiro-Wilk test of normality was conducted. It showed that the population from which the samples were obtained was normally distributed being greater than 0.05 with the results of 0.90 for verbal acts and 0.86 for nonverbal acts.

Using the one-way ANOVA test to test H1, the two data sets were, thus, the number of independent verbal acts and number of independent nonverbal acts performed for each participant. I define two acts as being independent when the time difference between the start time of *act n+1* and the end of time of *act n* is greater than the standard deviation for the time delays between all acts in the session performed by any one participant (see Figure 14).

Act type	Actor = crispis. Contents of act.	Start time of act in seconds	End time of act in seconds	Difference End time and start time
v	ouais	11,95	12,69	
nv	lean_forward	44,01	46,34	31,32
nv	look_up	66,81	68,74	20,47
v	je crois que que on ne sait pas	184,71	222,3	115,97
v	euh je crois que pour le mom	313,2	357,2	90,9
v	ils nous ont dit que sous que l	372,2	403	15
nv	move(head)	471,54	473,36	68,54
nv	lean_forward	484,04	485,96	10,68
nv	lean_back	488,19	489,84	2,23
nv	lean_forward	505,67	508,17	15,83
nv	lean_back	509,48	511,85	1,31
v	oui	514,8	515,7	2,95
v	[_laughs] moi non plus	524,5	526,19	8,8
v	euh j'ai une mais les autres je	540,8	545,51	14,61
v	euh pardon vous pouvez répé	605,59	613	60,08
v	euh non mon {snapshot} se tr	619,4	625	6,4
v	mais il y a un symbole de hm	634,9	641,3	9,9
v	bon je [_laughs] je ne sais [ch	677,4	726,21	36,1
v	bon hier j'ai essayé un peu av	733,4	784	7,19
nv	look_up	870,53	871,51	86,53
	Standard deviation for all actors = 25,69			
	Independent acts highlighted			independent verbal act
				independent nonverbal act

Figure 94: Example of the identification of independent verbal and nonverbal acts

The result of the first one-way ANOVA analysis shows that the variance between the number of independent nonverbal acts performed by each participant and the number of independent verbal acts performed by each participant was not statistically significant ($F = 0.121, p \geq 0.5$). My hypothesis (H1) was therefore not confirmed.

The two data sets used to test H2 were the count of independent nonverbal acts per participant and the total length of all independent verbal acts for the participant (in seconds) during the session. As my hypothesis concerned individual participants, the tests were performed on the data for both workgroups GA and GS together.

The result of the second one-way ANOVA analysis confirmed my second hypothesis, showing that the variance between the number of independent nonverbal acts performed by each participant and the total length of each participant's verbal acts was statistically significant ($F = 27.616, p = \leq 0.001$).

To summarise, a student who performed a greater number of nonverbal acts did not necessarily perform a greater number of verbal acts. However, there was a proportional increase between the total length of all verbal acts performed by a student and the total number of nonverbal acts performed.

Our data suggests that whilst these students used nonverbal acts to help to establish their inworld identity (and that this was recognised by the other students with whom they were networking and working inworld), they did not use them to occupy the space but used them in parallel with interacting verbally in their L2. Indeed, the students' nonverbal communication helped support L2 verbal interaction because a student who performed a greater number of nonverbal acts performed longer L2 verbal acts.

11.5. Synthesis of observations

This second analysis chapter studied the use of the nonverbal mode in identity construction and the interplay between identity construction and verbal participation and interaction. To complete this chapter, I return to my second set of research questions and provide a synthesis of this study's observations in response to these.

2A: Do students construct inworld identities using the nonverbal mode?

2B: Does interplay exist between the students' use of the nonverbal mode for inworld identity construction and their L2 verbal interaction and participation?

My results show, firstly, the importance students attribute to their avatar for L2 communication and as social capital. Secondly, they illustrate students' differentiation between inworld and first world communication which may be due to a distinction between first world and inworld personalities reflected through changes in avatar morphology. These changes affected how students addressed each other in their interaction and also students' level of L2 verbal participation: students who changed their avatar's appearance participated more frequently in their L2. Finally, this study shows that nonverbal communication acts also contributed to the construction of students' inworld identities and suggested a connection between these acts and L2 verbal participation: students' nonverbal communication helped support their L2 verbal interaction with an increase in use of nonverbal acts being related to longer L2 verbal acts.

My findings suggest if L2 teachers wish to help students network within synthetic worlds, when doing this, they need not seek to choose morphological appearances with corporeal shapes. On the contrary, standing back from their first world identity may help their level of verbal L2 participation. However, students may need to be careful about the morphological shape of their avatar not being too intimidating. Furthermore, introducing students to the range of nonverbal acts that are possible within the environment may also accelerate the emergence of verbal language production, particularly the length of L2 verbal interactions. To conclude, encouraging students to construct an inworld identity by altering avatar appearance and using nonverbal communication acts may help increase students' opportunities for interaction in their L2 within the synthetic world environment by supporting verbal participation. Although increasing L2 verbal participation will increase opportunities for potentially acquisitional sequences (Py, 1990), research must further examine ways in which synthetic worlds can foster language learning through increased verbal participation.

Chapter 12. Textchat modality related to the audio modality

12.1. Introduction

This chapter analyses the interplay between the textchat and audio modalities during the group *Second Life* reflective sessions. One affordance of the textchat modality, in monomodal environments, is that portrays some of the same language benefits for second language acquisition as in face-to-face interaction, including opportunities for self-repair, negotiation of meaning and corrective feedback which leads to modified output. In examining the interplay between the audio and textchat modalities, I investigate whether, in synthetic worlds, the textchat will act only in adjunct to the voicechat, because the textchat is equally in competition from several nonverbal modalities, or whether the textchat can play a role in the CLIL interaction and serve for feedback provision on language form, thus helping learners in their verbal production. The chapter is organised in a similar way to the previous analysis chapter. Firstly, I outline my research questions referring back to Part I of this thesis. Then,

I describe the analysis methodology that I employed in order to address the research questions alongside the data coverage used for the analysis. This leads us to the presentation and discussion of results. I conclude this chapter with a synthesis of my observations with regards to my initial research questions.

12.2. Outlining research questions

In Section 5.7 in which I discussed previous studies into multimodal communication in synthetic worlds related to L2 learning, I described Palomeque's (2011) study which highlighted that the textchat modality was employed when there was a technical problem with the audio modality, in the opening and closing phases of language learning sessions or was used by the students as an aside, often in their L1, to the main interaction in the audio modality. I also described a study by Deutschmann & Panichi (2009) which suggested that an anxiety, on behalf of the language tutors, concerning overloading learners, particularly of lower levels, if both modalities are used in the synthetic world. However, in Section 2.5.2, I reported on studies that show that in audio-graphic conferencing environment which included

iconic and whiteboard tools interplay between the different verbal modalities exist which supports L2 participation. I described Vetter & Chanier's study (2008) which showed that, although for language learning the audio modality will take precedence, the textchat and other modalities (e.g. nonverbal) work in support of the audio verbal participation. Their study and that of Stickler & Hampel (2012) also showed that learners may have a preference for using the textchat and the verbal modalities and portrayed the phenomenon of participation equalisation between the voicechat and textchat.

This chapter investigates the role of textchat modality in the group *Second Life* reflective sessions. My research questions are as follows:

3A: Is there the place for textchat to play a role in the communication in synthetic worlds or does the textchat act only in adjunct to the voicechat, considering it is equally in competition with several nonverbal modalities?

3B: What stance do the tutors adopt *vis-à-vis* the textchat? Do they accord importance to this modality, amongst the others, or not?

3C: What is the role that the textchat plays in terms of discourse functions?

Section 4.2.2 of this study highlighted that one of the affordances of textchat in monomodal environments is that it portrays some of the same language benefits for Second Language Acquisition as face-to-face interaction. These include self-repair (Kitade, 2000) facilitated by the communication's textual nature which helps learners to notice the gaps and by the tools which allow learners to scroll back to monitor their language production. Research into NS-NNS exchanges in textchat has also examined feedback offered to learners. Bower & Kawaguchi (2011) detail the forms this feedback might take, distinguishing between corrective feedback (either explicit or implicit corrective responses to non target-like language) and negotiation strategies which draw learner attention to non target-like language without providing the correct form. Four types of implicit corrective feedback form the latter category: clarification requests, repetition, confirmation and comprehension checks.

The studies into monomodal textchat environments discussed in Section 4.2.2 showed varying results concerning the percentage of NS responses to non target-like language which provide corrective feedback in textchat exchanges and the percentage of non target-like acts which received corrective feedback and which then lead to modified output on the part of the NNS. They also suggested a more frequent focus on lexical non target-like language prompted by negotiation strategies than grammatical non-target like language.

Besides exploring the interactions between the audio and textchat modalities for communication in synthetic worlds, in this chapter I also address the following questions:

3D: If in synthetic worlds, the textchat plays a role in the interaction, can it serve for feedback provision, as in monomodal textchat environments or because students and tutors are required to manage communication across multiple modes, will they not be able to pay attention to feedback due to potentially being cognitively overloaded?

3E: If the textchat is used for feedback, will the type of errors leading to feedback reflect results found in monomodal environments and what strategies are used to provide feedback?

3F: Given the multimodal nature will students, having to deal with multiple communication channels, be able to respond to feedback in the textchat? When, and in what modality, will responses occur?

12.3. Analysis methodology

In this section I outline the methodology that I developed and employed to explore my research questions which relate to the use of verbal modalities in synthetic worlds and whether the textchat modality is instrumental concerning feedback.

12.3.1. Coding the multimodal transcriptions of the *Second Life* reflective sessions for analysis of interplay between the voicechat and textchat modalities

Our multimodal transcriptions of the *Second Life* reflective sessions allowed us to calculate participants' use of the different modalities available in *Second Life*, in terms of floor space and act length. Our multimodal transcriptions also showed that there were various levels which I needed to treat in order to respond to my research question concerning the interplay between the voicechat and textchat modalities and, more specifically, how the teacher 's stance towards and usage of the textchat affects the students' use of this modality and the overall interaction in the verbal mode, one of the phenomenon of interest that emerged out of our data. At a primary level, I needed to determine the overall function of the textchat act. At a secondary level, for the textchat acts for which the function is form, I

needed to treat what type of feedback is offered, who is the author of the feedback and the also the type of non target-like form to which the feedback responds.

In order to respond to the above needs, I coded our data at two different levels. Firstly, at the act level, I coded each textchat act depending on the function of the act (see Table 23 and Figure 95). At this level, it was possible to attribute more than one code to a single textchat act. Five categories and codes for discourse function were used: socialisation (soc), technical (tech), conversation management (cm), language form (form) and task (task). Examples of coding are given in Appendix 18.

Function	Code	Explanation
Technical	tech	The act contents pertain to a technical issue with the environment.
Socialisation	soc	Greeting statements, farewell statements,
Conversation management	cm	Attribution of speaking acts to participants, opening up of the floor space inviting participants to contribute, acknowledging the act of another participant
Task	task	Act pertains to the contents and communicative message of an utterance with respect to the task asked of students
Form	form	Act pertains to linguistic content of an utterance

Table 23: Coding at the act level

Secondly, for the textchat acts which pertained to language form, I coded the specific instances of feedback depending on type of feedback (adapting Bower & Kawaguchi's categorisation, 2011), and on the author of the feedback (teacher, student or peer). I also coded the type of non target-like trigger to which the feedback responded and made a reference to this annotation in our transcriptions. The types of feedback alongside an explanation, annotation codes and examples of each annotation type are given in Appendix 18.

At this secondary level, each annotation was given an identification number and the information was coded using XML. For instance, in example 12A, the annotation an03 shows an instance of corrective feedback in the form of a recast. The author of this feedback is the teacher. The feedback refers back to annotation an02 which was a lexical non target-like form.

(12A)

<anno id="an03" type="cf-rec" author="tut" ntl="lex" ref="an02"> contents of annotation </anno>

Thirdly, to ascertain whether and how students reacted to feedback, four categories were attributed for coding students' responses to feedback:

- 'repetition'- repetition of feedback;
- 'incorporation' – integration of the feedback within an utterance in the target- like form;
- 'non successful incorporation'- integration of the feedback but in a non target-like form that needs repair;
- 'acknowledgement' - recognition of the feedback, for example, by thanking the tutor or by using an affirmative reply.

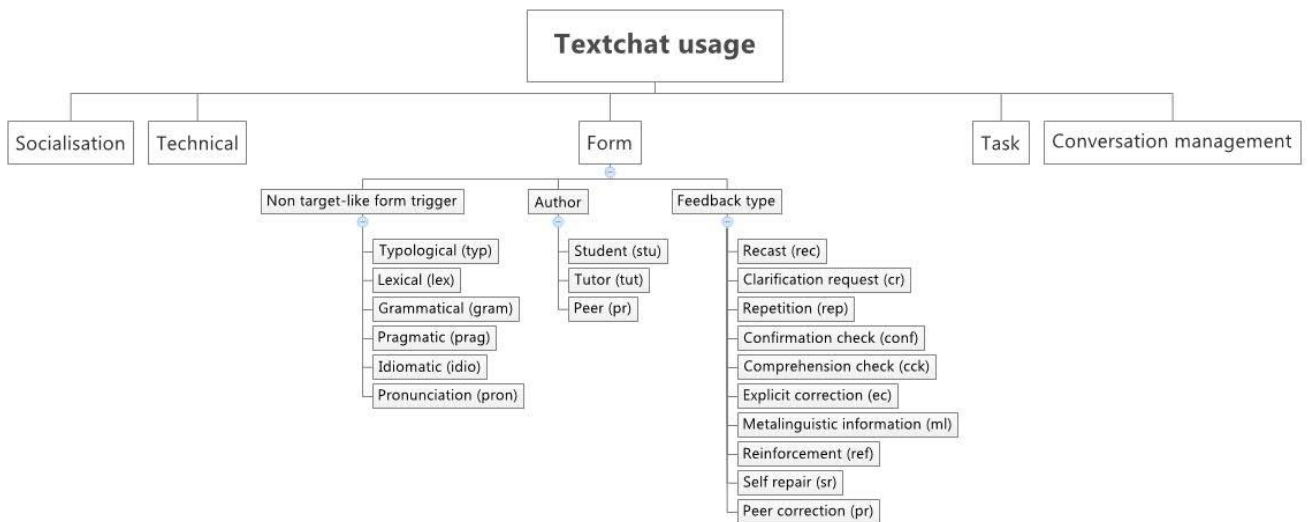


Figure 95 : Levels of annotation and codes used

To illustrate my coding system, let us work through an example (example 12B). Detailed examples of my coding can also be found in Appendix 18. In example 12B, the first textchat act is coded at the act level as pertaining to the task the students had to complete. In comparison, the function of the second textchat act by the teacher pertains to form. Within the contents of this act, in annotation an51, we see again that the function of the textchat act is form and that the type of annotation within the act pertains to corrective feedback of an explicit correction type. The author of the correction is the teacher and the correction pertains to a lexical non target-like form found in annotation an50. If we look back in the transcription,

we can see that the annotation an50 refers to the student *Quentinrez*'s misuse of the word 'mission' in the audio modality.

In the next act, beginning at 12:41, in the audio modality, we see annotation an52 which pertains to form. The type of annotation is a student response to feedback (sr) and the student acknowledges the feedback which is given in an51. The author is, thus, the student. Further on in the same audio act, the student *Quentinrez* then incorporates the feedback but using the non target-like form 'mission' again. This can be seen in annotation an53 which pertains to form. Its type is that of a student response which is the incorporation of a non target-like form (sr-incr). The author is the student, the non target-like form is of a lexical nature and the incorporation, albeit unsuccessful, refers to the feedback annotated in an51. The rest of the example is annotated in a similar fashion. We see three more textchat acts, two pertaining to task and one to form. In the act pertaining to form feedback is given. Its nature is of an explicit correction pertaining to a lexical non target-like form. The feedback is offered by the teacher and refers back to the contents of annotation an51.

(12B)

tpa, *Quentinrez* [12:02-12:33]: yes hm in a way we just could say that we + hm + well ++ [_chuckles] <anno id="an50"> I don't know if if we had really a mission</anno> that was just my point so I cannot ++ go any further because I don't think it's really a precise mission

tpc <task>, *Romeorez* [12:22-12:23]: not essentially a maze

tpc <form>, *Tfrez2* [12:38-12:38]: <anno id="an51" function="form" type="cf-ec" author="tut" ntl="lex" ref="an50">by mission I mean your "problem"</anno>

tpa *Quentinrez* [12:41-12:59]: <anno id="an52" function="form" type="sr-ack" author="stu" ref="an51">yes</anno> <anno id="an53" function="form" type="sr-incnr" author="stu" ntl="lex" ref="an51">our mission</anno> is more be able to communicate and elaborate the expression of that problem and in plastic and formal and buildable things

tpc <form>, *Tfrez2* [12:46-12:46]: <anno id="an54" function="form" type="cf-ec" author="tut" ntl="lex" ref="an51">or your "problematique" in French</anno>

tpc <task>, *tfrez* [12:56-12:56]: <anno id="an55" function="task" ref="an54">I'm still trying to understand exactly what it is...</anno>

tpc <task>, *Romeorez* [12:59-12:59]: <anno id="an56" ref="an55">it's a composition of specific spaces connected with teleportation or physics law</anno>

tpa, *Quentinrez* [13:02-13:14]: <anno id="an57" ref="an55">ah ok + hm +++ I don't know may be some somebody else want to answer that question of what is the problematic </anno>

Appendix 18 gives a full explication of the annotation codes used, including examples. This system of annotation allows us to both quantitatively and qualitatively address the questions of how the teacher s use the textchat modality and how their use impacts on students' usage and the overall interaction in both the textchat and audio modalities. A programme *Comptage* (Lotin, 2012) was used to automatically count the annotations by type

and also to count annotations by cross referencing one annotation type with another. In order, for example, to count how many annotations referred to form (function= “form”) for which the trigger was lexical (ntl=“lex”).

12.4. Data coverage

To address whether the teacher’s stance towards and usage of the textchat affects the students’ use of this modality and the overall interaction in the verbal mode and, in the specific context of sessions of an open task nature pertaining to architecture, whether it is possible for the language teacher s to provide feedback on language form, I analysed data from six *Second Life* reflective sessions. Two sessions for the group *avatars* (GA) and *scenario* (GS) were analysed for days two and three of the course (corpus mce-archi21-slrefl-av-j2 (Chanier, Saddour & Wigham, 2012b, resource mce-archi21-slrefl-av-j3 (in Chanier & Wigham, 2011), corpus mce-archi21-slrefl-sc-j3 (Chanier, Saddour & Wigham, 2012g) and resource mce-archi21-slrefl-sc-j2 Chanier, Saddour & Wigham, 2012f). The *Second Life* reflective sessions on day three of the course were analysed for groups *e-spaces* (GE) (corpus mce-archi21-slrefl-es-j3, Chanier, Saddour & Wigham, 2012a) and *landscapes* (GL) (corpus mce-archi21-slrefl-ls-j3, Chanier, Saddour & Wigham, 2012e).

The selection of data is comprised of 836 audio acts and 487 textchat acts totalling 23338 tokens. A detailed breakdown of the data by session and participant is given in Table 24 for the EFL groups and Table 25 for the FFL groups.

Session	Participant	Total audio acts	Total textchat acts	Total tokens in audio acts	Total tokens in textchat acts
GE-j3	<i>Hallorann</i>	9	8	341	13
	<i>Quentinrez</i>	18	7	894	24
	<i>Romeorez</i>	14	30	482	139
	<i>Tingrabu</i>	14	15	350	48
	<i>Tfrez2</i>	36	77	1492	323
Totals for the session GE-j3		91	137	3559	547
GS-j2	<i>Arnaudrez</i>	54	13	588	41
	<i>Audreyrez</i>	14	62	171	378
	<i>Jessieboo</i>	37	9	546	18
	<i>Nathanrez</i>	29	8	479	18
	<i>Tfrez2</i>	146	125	1698	890
Totals for the session GS-j2		280	217	3482	1345
GS-j3	<i>Arnaudrez</i>	19	2	324	4
	<i>Audreyrez</i>	11	10	338	42
	<i>Jessieboo</i>	11	3	288	10
	<i>Nathanrez</i>	4	9	121	16
	<i>Tfrez2</i>	34	45	1386	207
Totals for the session GS-j3		79	69	2457	279

Table 24: EFL groups' verbal act breakdown by session and participant

Session	Participant	Total audio acts	Total textchat acts	Total tokens in audio acts	Total tokens in textchat acts
GA-j2	<i>Crispis</i>	22	0	817	0
	<i>Emmegi88</i>	15	2	389	7
	<i>Pjgamez</i>	24	0	627	0
	<i>Prevally</i>	33	3	674	3
	<i>Tfrez1</i>	72	4	1076	15
Totals for the session GA-j2		166	9	3583	25
GA-j3	<i>Crispis</i>	7	3	484	5
	<i>Emmegi88</i>	10	9	477	17
	<i>Pjgamez</i>	21	0	725	0
	<i>Prevally</i>	27	5	1145	5
	<i>Tfrez1</i>	59	9	1562	23
Totals for the session GA-j3		124	26	4393	50
GL-j3	<i>Antoniobri</i>	3	4	344	20
	<i>Wuhuasha</i>	12	3	487	3
	<i>Hyungyoonrez</i>	14	7	319	14
	<i>Zeinarez</i>	8	7	565	15
	<i>Yingrez610</i>	12	1	341	1
	<i>Tfrez1</i>	47	7	1091	29
Totals for the session GL-j3		96	29	3147	82

Table 25: FFL groups' verbal act breakdown by session and participant

12.5. Results and discussion

In this section, I outline the results with respect to each research question and provide a discussion of these. This section is divided into two sub-sections. First, I present my findings concerning the use of the textchat modality. Secondly, I turn to whether the textchat was employed for corrective feedback.

12.5.1. Use of the textchat

This section addresses my first set of research questions, concerning the use of the textchat and its role during the *Second Life* reflective sessions.

In synthetic worlds' multimodal context, is the textchat used for L2 communication?

Considering the multimodal nature of synthetic worlds, here I address the question of whether there is space for the textchat to play a role in L2 communication or whether the textchat acts only in adjunct to the voicechat due to the competition between modalities.

My analysis shows a difference exists in the number of audio communication acts (tpa) compared to the number of acts made using the text-based chat modality (tpc) depending on whether the students had French or English as their L2. For the two EFL groups, a total of 450 audio acts are taken, compared to 386 audio acts for the FFL participants. Whilst the two EFL groups, SC and ES, show a tendency to use as many textchat acts as audio acts (session GS-j3) if not more textchat acts than audio acts (sessions GE-j3), the two FFL groups, LS and AV, used considerably more audio acts than textchat acts (Figure 96). There also exists a marked difference in the average number of textchat acts per session: the EFL groups used an average of 141 textchat acts per session compared to 21 for the FFL groups.

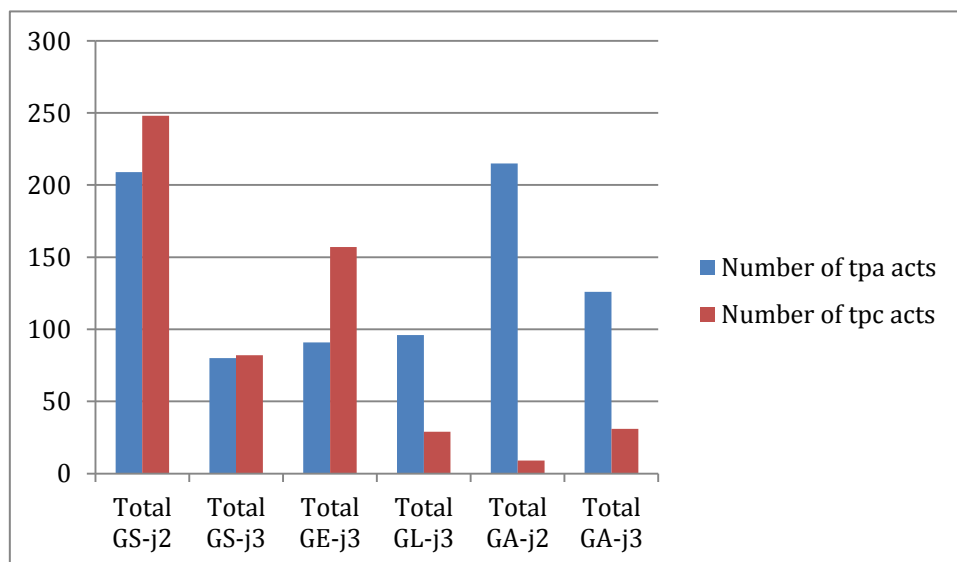


Figure 96: Distribution of tpa-tpc acts during the sessions analysed

The EFL groups used the textchat modality more frequently and there was a greater balance between the audio and textchat modalities. The total number of tokens in the audio

acts did not differ considerably with respect to the L2 of the session (Figure 97). However, the average number of tokens per audio act for a participant in the EFL groups was lower (18.88 tokens / audio act) than that of a participant in the FFL groups (28.81 tokens / audio act). In contrast, in any EFL session, an average of 724 tokens was used in the textchat, compared to an average of 52 tokens for the FFL sessions. An average act in the textchat for a participant in the EFL sessions contained 5.13 tokens, compared to 2.45 tokens in the FFL groups.

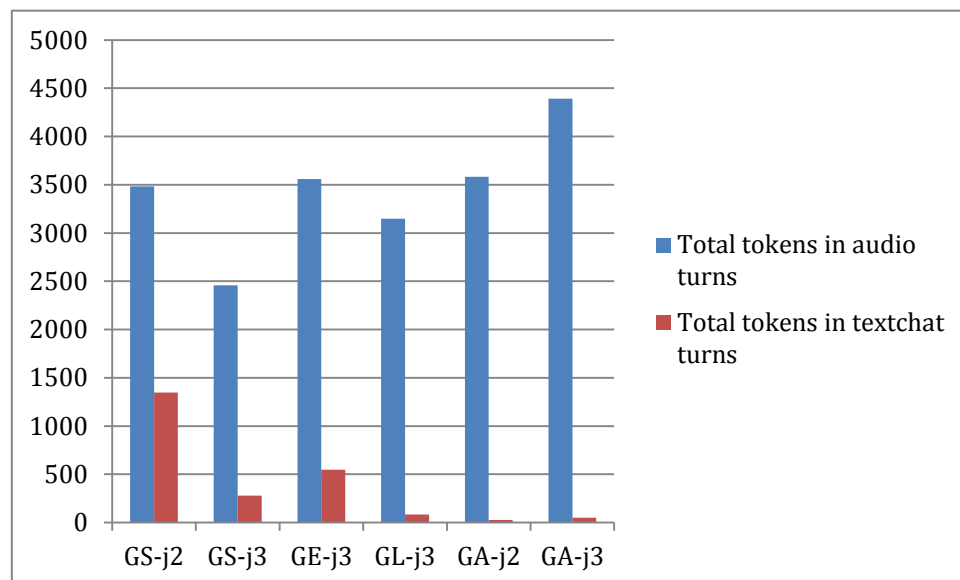


Figure 97: Distribution of tokens during sessions analysed

My analysis shows that in the EFL groups the textchat appears to have a place alongside the voicechat for L2 communication. However, in the FFL sessions the place accorded to this modality is significantly less important. In Section 0 I investigate why this may be.

Concerning the distribution of tokens, my results echo the previous results of Vetter & Chanier (2006) concerning the number of tokens per textchat act: the average number of tokens in the lower level language groups' textchat acts (FLE) was superior to the average for the more advanced groups (EFL). The textchat may allow lower-level learners to feel more comfortable contributing longer acts because they can reflect upon and review their verbal production before it becomes public.

EFL and FFL groups' differing usage of the textchat

Section 0 details the difference in quantity of textchat usage between EFL and FFL sessions. In this section, I examine textchat floor space balance between the students and tutor

for each session to analyse whether these may account for the quantitative differences in textchat uses between the groups.

In the EFL sessions, the textchat modality took on an important role, being used frequently by both the students and the tutor within the interaction (Figure 98). The tutor, however, in all three EFL sessions occupied the most floor space in the textchat modality. In the FFL sessions, the textchat was used infrequently and although in session GA-j2 floor space was equally distributed between tutor and students, in sessions GA-j3 and GL-j3 the textchat floor space was student-dominated.

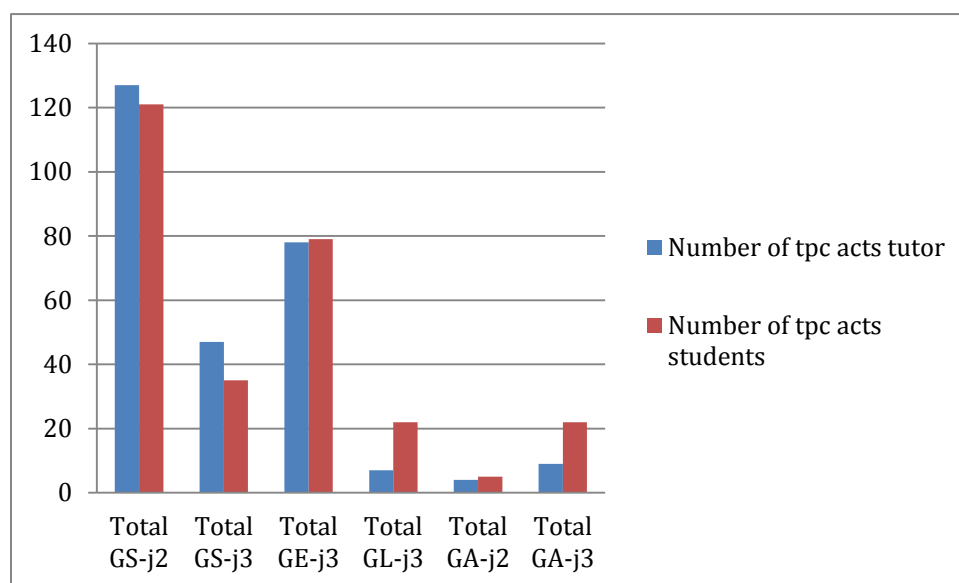


Figure 98: Division of textchat floor space between teacher and students for each session

The EFL tutor, who systematically used the textchat throughout the sessions showed the importance she placed on this modality to the students who, in turn, followed her lead and contributed regularly to the interaction in the textchat. Although the students contribute frequently in the textchat, however, as in Hampel & Stickler's (2012) study, the EFL tutor remains the dominant participant in this modality.

Contributing in both verbal modalities did not overload learners, however. The EFL students' still make a substantial number of audio acts, in particular during the session GS-j2 (Figure 96). This suggests that the students did not find it difficult to manage both modalities simultaneously. Rather, the textchat modality enhanced the EFL students' overall use of the verbal mode.

In contrast, during the FFL sessions, the tutor suggested, through adopting primarily the voicechat and infrequently the textchat, that the textchat was not central to the interaction within the sessions. This may be provoked by a fear of overloading the learners considering the numerous modalities available for interaction (see Chapter 6). The students, thus, followed her behaviour and used the textchat infrequently despite the fact that they occupied more textchat floor space suggesting that they would have been keen to use this modality. As Blake (2005) and Hampel & Stickler's (2012) suggest it appears necessary to raise L2 teachers' awareness concerning textchat usage, including the strategies needed to successfully combine voicechat and textchat when teaching in multimodal environments: the students appear keen to use both modalities but are potentially impeded in doing so by the tutor considering the textchat peripheral to the verbal interaction.

Students' floor space across verbal modalities

To consider more narrowly the modalities used by each participant, I analysed the floor space of each participant in both the audio modality and the textchat modality. Floor space in the audio modality, in this analysis, is calculated without taking into account the acts of silence. In this section, I consider only the EFL groups for whom the use of the textchat modality was frequent. Such small raw numbers of textchat acts in the FFL sessions (see Figure 96 and Table 24) will not allow us to draw any conclusions about individuals' usages of the two different verbal modalities.

Referring back to Table 24 and looking specifically at the sessions for the group scenario (GS-j2 and GS-j3, see Figure 99), I notice that the student *Arnaudrez* contributed the most number of student audio acts to the sessions. His 54 audio acts in GS-j2 and 19 audio acts in GS-j3 represent 40 and 42 per cent of the students' audio floor space respectively. The student's use of the textchat, however, is less frequent, representing only 13 acts and eight per cent the student textchat floor space in GS-j2 and two acts (four per cent of the student textchat floor space in GS-j3).

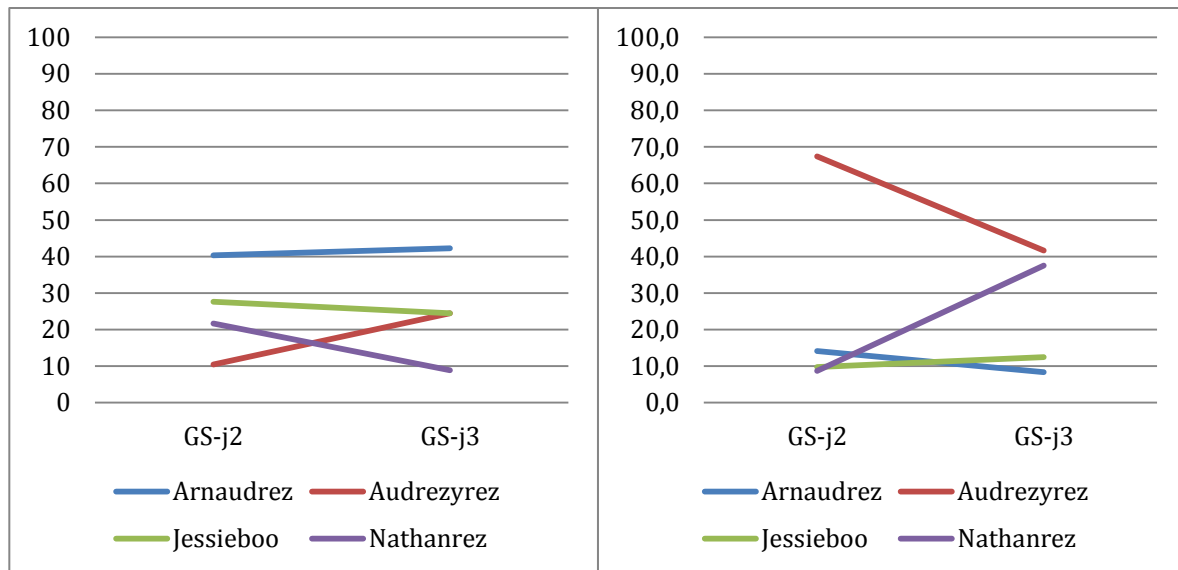


Figure 99: Percentage of audio floor space change (left) & textchat floor space change (right) between session GS-j2 and GS-j3

In comparison, turning to audio contributions of the student *Audreyrez*, I note that in session GS-j2 the student was a relatively inactive participant in the audio mode, contributing only 14 audio acts and representing only ten per cent of all student audio floor space. However, this student dominated the students' contributions to the session in the textchat modality: *Audreyrez's* 62 tpc acts represent 67 per cent of all student tpc acts. Concerning session GS-j3, although *Audreyrez's* participation increased in the audio modality she remains the main contributor in the textchat (see Figure 99).

Concerning the participant *Nathanrez*, whilst in the session GS-j2, the student occupied an important percentage of the audio floor space (29 audio acts representing 22 per cent of the student audio floor space), his occupation of the student textchat floor space was small in comparison (nine acts representing eight per cent of the student textchat floor space). However, this distribution is reversed on day three of the course during the session GS-j3. In this session, *Nathanrez* uses the audio modality less frequently: his four audio acts represent nine per cent of the student audio floor space. However, his floor space in the textchat modality greatly increases from 8 per cent in GS-j2 to 38 per cent in GS-j3.

Figure 99 shows the evolution in floor space for both modalities between session GS-j2 and GS-j3. For the two students *Arnaudrez* and *Audreyrez*, an increase in audio floor space between session GS-j2 and GS-j3 resulted in a decrease in textchat floor space. The contrary is also true. For students *Jessieboo* and *Nathanrez*, a decrease in audio floor space between

session GS-j2 and GS-j3 resulted in an increase in textchat floor space between the two sessions.

Turning now to the EFL session GE-j3, the participants *Hallorann* and *Tingrabu* occupied fairly equivalent floor spaces across the textchat and audio modalities (see Table 26). However, whilst the student *Quentinrez* occupied a large floor space in the audio modality his floor space was small in the textchat modality. The opposite is true of *Romeorez* who occupied a much greater floor space in the textchat modality than in the voicechat.

Student participant in GE-j3	Percentage of student audio floor space	Percentage of student textchat floor space
<i>Hallorann</i>	16%	13%
<i>Quentinrez</i>	33%	12%
<i>Romeorez</i>	25%	50%
<i>Tingrabu</i>	26%	25%

Table 26: Student floor space distribution for session GE-j3

My results concerning the distribution of floor space for the EFL groups across the two verbal modalities portray the phenomenon of equalisation between the voicechat and textchat highlighted in previous work (Vetter & Chanier, 2006). Within specific sessions, certain students compensate, in terms of floor space, for their infrequent audio acts by a greater usage of the textchat whilst those students who participate actively in the audio modality participate less frequently with textchat acts. The students in the group scenario, across two different sessions (GS-j2 and GS-j3), also compensate for an increase in audio floor space, with a decrease in textchat floor space, and compensate for a decrease in audio floor space, with an increase in textchat floor space.

The role of the textchat

The EFL groups' data shows that the textchat has a place within multimodal communication in synthetic worlds. I now turn to examine its role and whether it is used simply for managing technical problems, in the opening and closing of sessions or for off-task asides as suggested in previous literature, or whether it plays a more central role in the L2 communication as shown in the studies of Vetter & Chanier (2008) and Hampel & Stickler (2012).

My analysis of the role of the textchat acts for both the EFL and FFL sessions shows that they were not simply of a technical order (Figure 100). Acts referring to technical issues

in the synthetic world represented, between 3 and 28% of all textchat acts for the six sessions analysed.

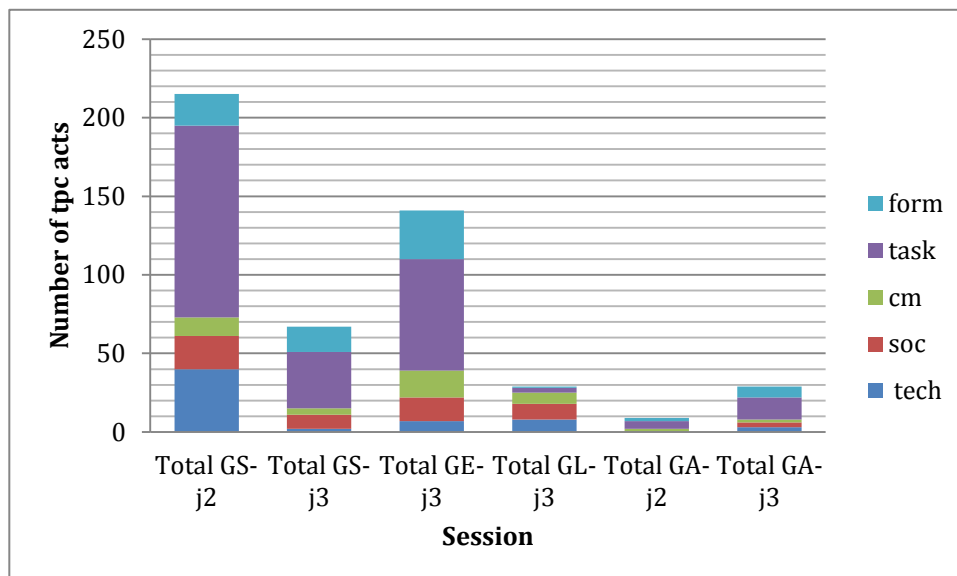


Figure 100: Textchat acts' functions

In five of the six sessions between 48% and 71% of textchat acts were used with reference to the task at hand. This said, the total number of acts used with reference to the task was a lot more important in terms of absolute figures for the EFL groups, ranging from 36 acts in session GS-j3 to 122 acts in session GS-j2, in comparison to a maximum of 14 acts concerning the task (session GA-j2) during the FFL sessions.

In the EFL groups, a greater number of textchat acts concerned form than in the FFL sessions. In session GS-j2, 20 textchat acts concerned form compared to 16 in GS-j3 and 31 in GE-j3. For the FFL sessions these numbers are a lot smaller. In session GL-j3 only one textchat act concerned form. In session GA-j2 textchat acts concerning form representing two acts and in GA-j3 seven acts. Focusing on the tutor's use of the textchat, the majority of the EFL tutor's textchat acts (between 54% and 59% of all textchat acts per sessions) concern the task. An average of 22% of her textchat acts (an average of 16 acts per session) refer to language form. In comparison, the FFL tutor infrequently uses the textchat modality with respect to the session's task or language form: an average of two textchat acts pertain to the task or pertain to the form in any given session.

We must bear in mind, that the sessions studied concerned an open discussion / task in which the tutors' role was to animate the discussion and help the group advance in their response to the problem brief, despite the domain of architecture not being an area of

expertise for the language tutors. Therefore, they did not necessarily master the contents of the task. I propose that the EFL tutor may have adopted a strategy of using the textchat modality for acts concerning the task because it allowed her to reduce the cognitive load. Indeed, I would put forward that rather than contributing concerning the task, which she did not master, in the audio modality which takes precedence in language learning sessions, her use of the textchat modality where the task was concerned allowed her to contribute to the session and to managing the advancement of the group without taking too big a risk of losing face.

It appears that the textchat modality also allowed the EFL tutor to address a central problem within language teaching of whether to give greater value to communicative meaning, which is paramount, or to comprehensible form, without which linguistic competence cannot be fully obtained. The multimodality allowed the EFL tutor to pay attention both to problems of meaning of students' utterances without this being to the detriment of form and vice-versa. The tutors' floor space is shared between acts pertaining to language form and those pertaining to the communicative task.

12.5.2. Feedback

I turn, now, to look more specifically at the role the textchat played in feedback provision. I question whether the characteristics of the feedback offered in the EFL sessions concerning language form in the textchat modality resemble those of previous studies into monomodal environments and whether feedback leads to modified output and in which modality responses to feedback are given.

In this section of my analysis, I consider only the EFL groups, for whom the use of the textchat modality was frequent. As expressed in Section 9.6.1, using small raw numbers of interaction data in an analysis, such as the insignificant number of textchat acts concerning form in the FFL sessions, runs the risk of drawing upon anecdotal examples of interactions and will not allow us to draw any reliable conclusions.

Feedback on what type of errors is given? Is feedback predominantly lexical?

Studies into monomodal textchat environments show that corrective feedback leads to high levels of modified output and predominantly concerns lexical non target-like language

errors. Here I examine whether these characteristics hold true of the multimodal synthetic world environment.

In two of the three EFL sessions analysed, the majority of error triggers pertained to lexical non target-like (NTL) forms (Table 27). In sessions GE-j3 and GS-j3, there was greater variety of NTL forms which received feedback, including corrective feedback being given on idiomatic NTL forms and typological NTL forms.

EFL Session	Technical	Socialisation	Conversation management	Task	Form
GE-j3	3	7	9	41	17
GS-j2	26	5	7	76	16
GS-j3	2	9	4	36	16

Table 27: EFL teacher's use of the textchat modality

These results align with previous studies of feedback in monomodal environments. Similar to Tudini's (2007) grammatical feedback receives attention but correction on lexical NTL forms is dominant as reported by Blake (2000), Pellettieri (2003) and Tudini (2003a). However, whilst Tudini (2007) reports that the NSs intervened more frequently concerning grammar rather than lexis NTL forms, the interventions of the NS tutors in this study show the contrary. This may due to the nature of the task-type: lexical NTL forms may lead to greater communicative breakdown in an open-discussion than grammatical NTL forms and thus are privileged by the tutor.

What type of feedback is offered?

In this section, I analyse the type of feedback offered in the textchat according to the categorisation of forms feedback might take outlined by Bower & Kawaguchi (2011) and adopted in my annotation methodology.

Three occurrences of student self-correction and three occurrences of peer correction were found. The remaining 43 occurrences of feedback were offered by the tutor. 17% of the tutor's textchat acts contained corrective feedback on the students' audio productions. Recasts were the predominant feedback type provided by the tutor (32 instances, Figure 101) alongside reinforcement (10 instances) which frequently occurred following self-correction in the voicechat. Other types of feedback were used infrequently (either two or three instances of other feedback types). No occurrences of repetition of erroneous output or instances of comprehension checks were found.

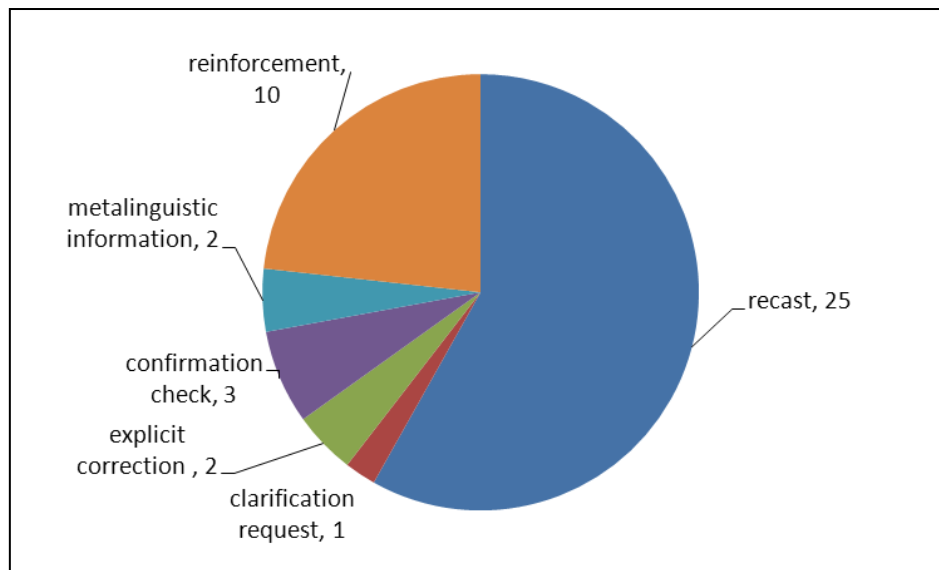


Figure 101 : Occurrences of feedback types offered by tutor

With respect to the rate of feedback offered, this study's results for tutor feedback are slightly lower than in previous studies discussed in Section 4.2.2. This may be due to the task which was not uniquely language focussed. The tutor, in the open-discussion, had to help the group advance with respect to their macro task of building a model in response to a problem brief. Greater importance may therefore have been accorded to communication concerning the group task rather than correct linguistic form. This may also explain predominant use of recasts: it appears the tutor does not want to interrupt the discussion and chooses to provide the correct language form directly rather than deflect the discussion of the macro task into a purely linguistic discussion.

Considering that in the language learning sessions, because of the nature of the learning the audio modality takes precedence, if the message of the audio production is not comprehensible it would appear natural for the language tutor to intervene in this modality to resolve this. Particularly, because the audio in the synthetic world is fully duplex: the tutor does not have to wait her turn before intervening and, therefore, can address comprehension breakdowns directly. This may explain the lack of comprehension checks in the textchat modality.

Is there uptake of the feedback, when does this occur and in which modality?

Previous studies of monomodal textchat environments show a varying rate at which the non target-like acts receiving corrective feedback led to modified output, percentages ranging

from 25-60% (Table 1). Given the highly multimodal nature of synthetic worlds, which may cause anxiety and overload learners, in this section I question whether learners are able to respond to the feedback offered and if so, how they do so.

Of the 43 occurrences of corrective feedback offered to the students by the EFL tutor in the textchat, 25 instances were responded to (Figure 102). Hence, 58% of all corrective feedback was responded to by students either by the students repeating the correct form (rpt), including the correction in their interaction (albeit correctly (inc) or incorrectly (incnr), or by students acknowledging the tutor's correction (ack).

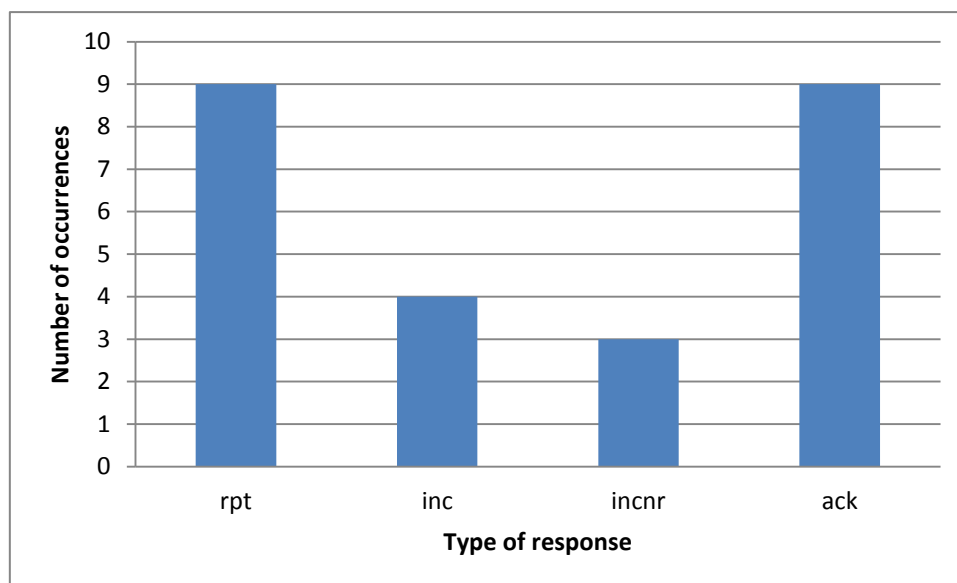


Figure 102: Students' responses to the EFL tutor's feedback

Of the 25 occurrences of corrective feedback made in textchat acts that were responded to, 20 were responded to in audio acts and five in textchat acts. Example 12C illustrates corrections in the textchat modality being responded to in the audio modality. The student *Tingrabu* continues his audio act whilst the tutor *Tfrez2* corrects their grammatical errors in the textchat. The student then incorporates the correction in annotation 19 into his audio act and also acknowledges the correction by apologising for his mistake.

(12C)

aud, Tingrabu [07:20-08:48]: ok hm for me this presentation was hm + become
 <anno id="an18">too fast</anno> because it's always the same in our architecture
 school euh we have not time and hm + <anno id="an21" function="form" ntl="gram"
 type="cf-rpt ack" ref="an19">too quickly sorry</anno> and ...

tc, <form> Tfrez2, [07:32-07:33]: <anno id="an19" function="form" ntl="gram" type="cf--
 con" author="tut" ref="an18">it went too quickly?</anno>

The majority of responses to feedback (16 out of 29) occur in the verbal act which followed the act in which the corrective feedback is given. There were five instances of corrective feedback being incorporated in the same audio act as that being corrected (Figure 103), as seen in Example 12C.

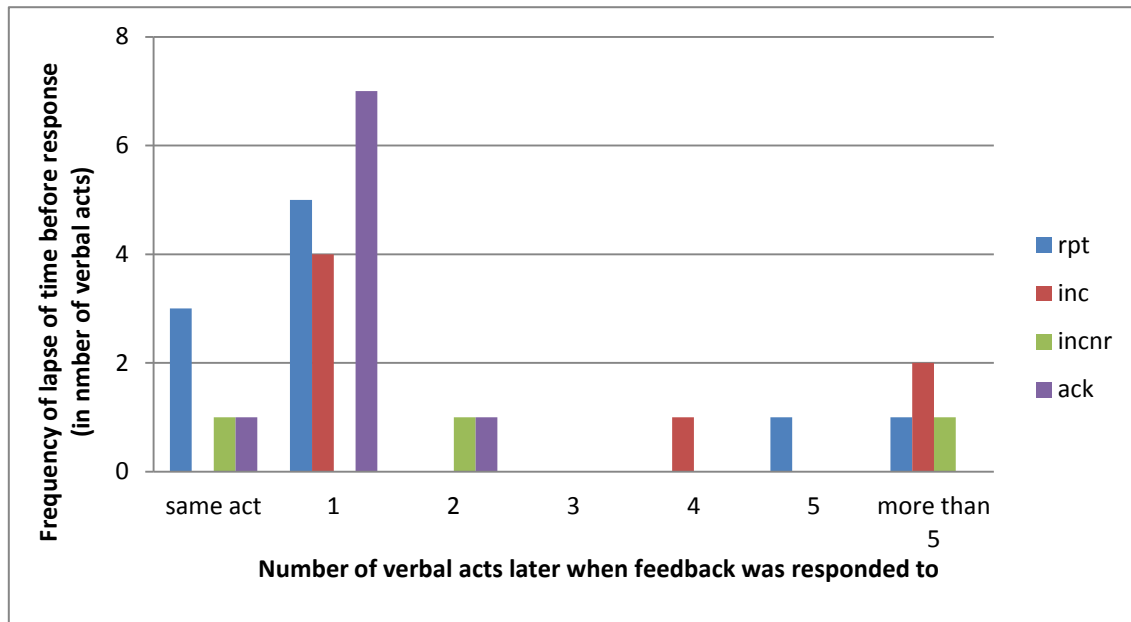


Figure 103 : Time lapse (in number of verbal acts) before corrective feedback was responded to by students

Some corrective feedback was responded to later within the interaction. Fourteen per cent of corrective feedback was responded to over five verbal acts later in the interaction. Some of these responses are made by students other than those who produced the non target-like trigger prompting the corrective feedback.

Following corrective feedback offered by the tutor, our data shows instances of conversation doubling. In one example (Example 12D), the student *Tingrabu* makes a grammatical error in an audio act. The tutor offers the student a split act confirmation check in the textchat. This correction is replied to by both the student to which we can assume it was primarily addressed, *Tingrabu*, in the audio modality, and by *Romeorez* in the text chat modality. *Tingrabu* in the continuation of his audio act acknowledges the correction pertaining to language form by repeating the correction and apologizing: the student is following the text chat as he uses the audio modality. *Romeorez*, also replies to the corrective feedback in the textchat: he offers his personal opinion on the contents of the feedback which pertains to the task: "i think it was to early". The student then self corrects his typographical

error and the tutor similarly corrects this using the textchat. In this example, the input in the textchat led to interaction in the voicechat and the textchat modalities. However, the textchat also responds to both textchat and voicechat modalities. Later in example 12D, in the textchat act at 08:16, the student *Quentinrez* responds to the contents of his peer *Tingrabu*'s audio act in a textchat act "you didn't have enough time". The tutor then offers corrective feedback in the textchat on both the error made in the student *Tingrabu*'s audio act and in *Quentinrez*'s text chat act (an31).

(12D)

aud, Tingrabu [07:20-08:48]: ok hm for me this presentation was hm + become **<anno id="an18">**too fast**</anno>** because it's always the same in our architecture school euh we have not time and hm + **<anno id="an21" function="form" ntl="gram" type="cf-rpt cf-ack" ref="an19">**too quickly sorry**</anno>** and hm + we can't do good images because euh + euh it's xtime I don't know ++ and euh of course we whole project ++ is about motion and hm we make just some pictures hm statics pictures and hm it's + and it's it's a big matter because hm we always brought about teleportation our + motion is and hm +++ and **<anno id="an27" function="form" ntl="lex" type="rpt ack" ref="an29">**everyday lack of time ok thank you**</anno>** xxx and hm this is + this is hm really difficult for us because hm **<anno id="an28">**we have not enough time**</anno>** to do good presentation euh in + one night and I hope so tues wednesday could be better + it should be + may be I don't know **<anno id="an32" function="form" type="ack" ref="an31">**[_chuckles]**</anno>**

tc, <form> Tfrez2, [07:32-07:33]: **<anno id="an19" function="form" ntl="gram" type="cf-con" author="tut" ref="an18">**it went too quickly?**</anno>**

tc, <form> Tfrez2, [07:38-07:38]: **<anno id="an20" function="task" type="cf-con" author="tut" ref="an18">**or it was too early in the week?**</anno>**

tc, <task>Romeorez [07:54-07:55]: **<anno id="an22" ref="an20">**i think it was to early**</anno>**

tc, <form> Romeorez [07:59-07:59]: **<anno id="an23" function="form" ntl="typ" type="cf-sr" author="st" ref="an22">**too**</anno>**

tc, <form> Tfrez2 [07:59-07:59]:**<anno id="an24" function="form" ntl="gram" type="cf-rec" author="tut" ref="an22">**too early**</anno>** **<anno id="an25" function="form" type="cf-ref" author="tut" ref="an23">** ok**</anno>**

tc, <form> Tfrez2 [08:08-08:10]: **<anno id="an26" function="form" ntl="gram" type="cf-ml" author="tut" ref="an21">**too quickly means that you didn't have enough time to speak**</anno>**

tc, <task form>Quentinrez [08:16-08:16]: **<anno id="an29" type="cf-pr" author="pr" ref="an28">**yes, it's an everyday lack of time**</anno>**

tc, <task>Romeorez [08:43-08:43]:**<anno id="an30" ref="an28">**that more that we have to show something that we don't really know **</anno>**

tc, <form> Tfrez2 [08:08-08:10]: **<anno id="an31" function="form" ntl="gram" type="cf-rec" author="tut" ref="an28 an29">**you didn't have enough time**</anno>**

tc, <task> Romeorez [08:43-08:44]:**<anno id="an27" ref="an28">**fore the shape**</anno>**

Example 12D shows the extent to which the audio and textchat modalities respond to each other. I have illustrated this visually in Figure 104. We see that acts in the textchat respond to the voicechat (blue arrows) but equally acts in the voicechat respond to the textchat (black arrows) and, as described above, that textchat acts can both respond to interaction in both voicechat and textchat modalities (act id202) and prompt interaction in voicechat and textchat modalities (act id212).

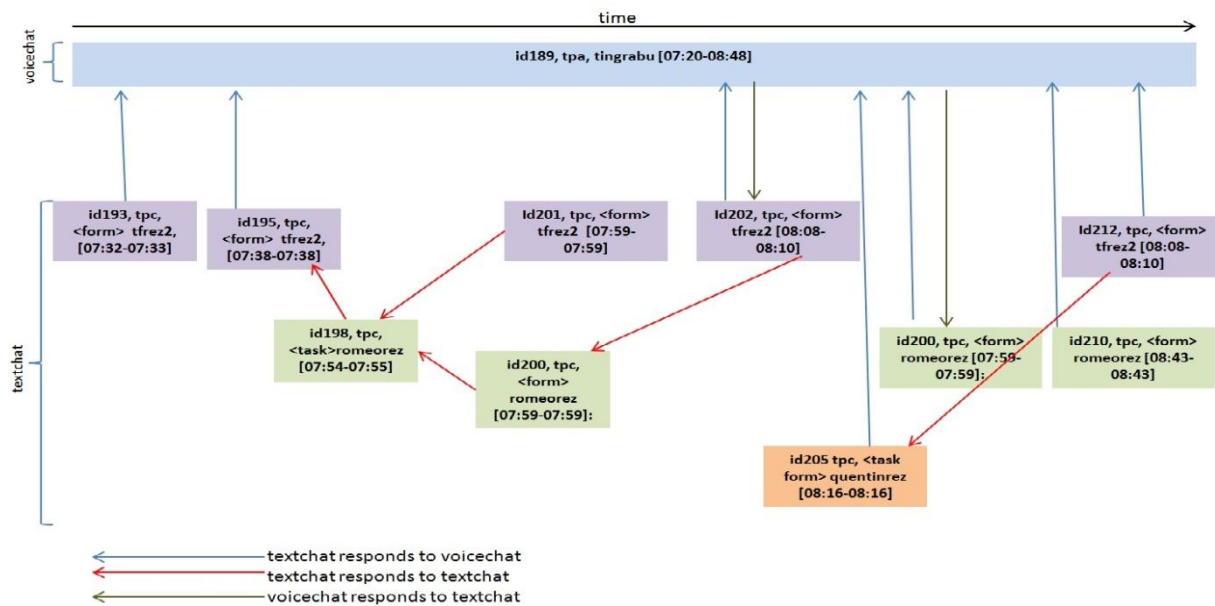


Figure 104 : Example of conversation doubling

My study shows that there is uptake of feedback, 58% of feedback being responded to but that unlike in other studies where this leads to high rates of modified output, incorporation of the feedback within an utterance in the target-like form represented only 16% of responses: student acknowledgement or repetition of the feedback was more common. This may be explained by students giving greater importance to the architectural macro task taking than to correct linguistic form. It does not suggest that the students were cognitively overloaded: the high rate of feedback being responded to in general (by repetition, correction (or not) incorporation and acknowledgement) shows that the students are aware of the multimodality of the environment. Indeed, they monitor the textchat whilst speaking and incorporate textchat comments into productions in the audio modality. The teacher is similarly monitors both modalities as she offers feedback on both the audio acts and textchat acts.

Kitade (2000) observed that self-repair was facilitated by textchat tools which allow learners to scroll back to monitor their language production. This study further suggests in a multimodal environment, because the textchat modality remains available for all students to

view, this helps the students who produced non target-like forms and their peers to incorporate feedback several acts later within the interaction. The textchat remains as a reminder of the correct target-like form.

My analysis reinforces the suggestion (Vetter & Chanier, 2006) that the idea of 'adjacent pairs' needs to be reconsidered and reinterpreted in a multimodal context. The majority of student responded to feedback occurred in the verbal act which was adjacent to the textchat act in which the corrective feedback was given. Furthermore, the tutor's contributions in the textchat responded to contributions in both verbal modalities and equally incited immediate reactions in different modalities.

In comparison to example 12E in which corrective feedback in the textchat led to conversation doubling, there are also instances where the tutors give feedback in the audio modality and break the communication. I note some instances in which the audio correction is detrimental to the authentic communication and afterwards, the student's need to communicate his message has past or is forgotten (see Example 12E).

(12E)

tpa, Romeorez [13:20-13:46]: Yeah we we try to to make euh like I said a composition of specific spaces that we connects with different hm difference ways and different scripts and the main aim or what we call hypothèse I don't know

tpc, <task> Tfrez2 [13:23-13:25]: I understand in general but not your specific problem!

tpc, <form> Tfrez2 [13:39-13:40]: with different scripts, ok

tpc, <form> Tfrez2 [13:44-13:44]: hypothesis

tpa, Tfrez2 [13:48-13:52]: yeah in English we say hypothesis or our hypothesis is

tpa, Romeorez [13:52-14:01]: thank you + hm so I I I lose what I want to say so I'll be back in five minutes [_chuckles]

In this example, the tutor firstly offers a recast of a lexical error using the textchat before offering an explicit correction in the audio modality. The student, *Romeorez*, acknowledges this correction by thanking the tutor but then explicitly states that he no longer remembers what he wanted to say. The explicit feedback in the audio modality can be seen to break the communication and end the student's oral production. This example corresponds to Tsutsui's (2004) description of the problems linked to what she terms 'intrusive feedback'. She warns, in particular, that interrupting to correct can often discourage the learners.

12.6. Synthesis of observations

My third analysis chapter studied the interplay within the verbal mode between the audio and textchat modalities during six *Second Life* reflective sessions. Setting out from

examples from our corpus, from which I defined an analysis coding methodology in accordance with that adopted in a previous study (Bower & Kawaguchi, 2011), I studied how verbal acts were distributed between the two verbal modalities and examined in detail the students' floor space over these. I then turned to the role of the textchat and, in particular, examined how one teacher used the modality for corrective feedback. I reported on how students responded to this feedback and the modality choices made for these responses. To complete this chapter, I return to my research questions and provide a synthesis of my observations in response to these and suggest some pedagogical implications that result from my analysis.

3A: Is there the place for textchat to play a role in the communication in synthetic worlds or does the textchat act only in adjunct to the voicechat, considering it is equally in competition with several nonverbal modalities?

My initial analysis of how verbal acts were distributed in the sessions between the two verbal modalities showed a marked difference in usage of the textchat between the EFL and the FFL sessions. Although, evidently, the audio modality will take precedence over the other modalities where language learning is concerned, in the EFL sessions the textchat modality was systematically used alongside the audio, whilst in the FFL sessions the usage of this modality was infrequent. For the EFL sessions, the textchat modality represented between 44 per cent and 60 per cent of the total floor space in the verbal mode. In the FFL sessions, however, the textchat modality represented, on average, for the three sessions analysed, 15 per cent of the total floor space in the verbal mode. Examining more closely, the distribution of the textchat acts between the students and teacher for each session, our data shows that the EFL teacher used on average 24 more acts in any given session than the students combined, whilst the textchat acts of the students in every FFL session slightly outnumbered the acts of the teacher. The absolute values for these sessions were small (61 textchat acts in total over the three sessions), however, in comparison to those for the EFL sessions (423 textchat acts in total for the three EFL sessions).

Looking more closely at how the EFL students distributed their floor space across the verbal modalities, this study's results echoed previous results (Vetter & Chanier, 2006) by showing the phenomenon of participation equalisation across the two modalities. Certain students compensated in terms of floor space and, thus, presence in the sessions, for their infrequent audio acts by a greater use of the textchat and vice-versa. Furthering this 2006 study, I also showed that this phenomenon of participation equalisation existed not only

between modalities used by participants in one given session but also across sessions. The two students who increased their share of the total students' audio floor space from one session to another decreased their share of the students' textchat floor space whilst the two students who increased their textchat floor space from one session to another decreased their audio floor space

3B: What stance do the tutors adopt *vis-à-vis* the textchat? Do they accord importance to this modality, amongst the others, or not?

Whilst other studies have suggested, in synthetic world environments in which the verbal mode is comprised of both textchat and audio modalities, that the textchat modality acts in adjunct to the audio modality (Palomeque, 2011) and that learners may find it difficult to manage both modalities in their target language simultaneously (Deutschmann & Panichi, 2009), my analysis suggests that the use of the textchat modality will depend on the stance of the teacher *vis-à-vis* the textchat and its usage. In the FFL sessions, the teacher suggested, through adopting primarily the voicechat and infrequently the textchat, that the textchat was not central to the interaction within the sessions. The students, thus, followed her behaviour and used the textchat infrequently. However, the EFL teacher, who systematically used the textchat throughout the sessions showed the importance she placed on this modality to the students who, in turn, followed her lead and contributed regularly to the interaction in this modality. These contributions, however, did not take away from the groups' use of the audio modality. In the EFL sessions, the students contributed on average 188 verbal acts (both modalities considered) per session. In comparison the FFL students contributed an average of 84 verbal acts per any given session. This suggests that rather than take away from the audio acts of the students, the groups' usage of the textchat modality supported these acts. Unlike previous research which has suggested that learners find it difficult to manage both modalities simultaneously, my study suggests use of the textchat modality only enhances a group's overall use of the audio modality.

3C & 3D: What is the role that the textchat plays in terms of discourse functions and if in synthetic worlds, the textchat plays a role in the interaction, can it serve for feedback provision?

It has been suggested, when combined with the audio modality, the textchat modality's usage is primarily of a technical order and is used during the openings and closings of conversations (Palomeque 2011). In contrast, this study shows that, depending on how the teacher chooses to adopt the textchat modality, despite the complex context where the

teacher's role was to advance an open-ended task in a domain in which she was not familiar with, that the textchat can be used both to advance the task and to address occurrences of non target-like forms in the L2. I suggest that one reason that the EFL teacher may have adopted the textchat modality for acts pertaining to the task is as a face-saving strategy and to reduce any cognitive overload concerning her non-expertise of the subject matter. Despite this demanding task because of the bi-modality of the environment the teacher was able to address problems of non target-like forms in students' acts without this being to the detriment of the advancement of the task.

3E: If the textchat is used for feedback, will the type of errors leading to feedback reflect results found in monomodal environments and what strategies are used to provide feedback?

The majority of the feedback that the teacher provided in the textchat modality pertained to lexical non target-like forms but using the textchat she also provided feedback on grammatical errors and idiomatic non target-like forms. The textchat modality allowed the teacher to provide 'unobtrusive feedback' (Tsutsui, 2004) about what was being said in the audio modality as it was being said. This was most frequently provided in the form of recasts of the students' utterances. However, when the teacher switched to providing feedback in the audio modality this frequently led to a communication breakdown with students forgetting what they wanted to say. This further suggests the importance for teachers to familiarise themselves with using the textchat to support what students are saying in the audio modality.

3F: Given the multimodal nature will students, having to deal with multiple communication channels, be able to respond to feedback in the textchat? When, and in what modality, will responses occur?

Fifty eight per cent of the EFL teacher's feedback provided in the textchat was responded to by students. The majority of these responses were made in the audio modality. Student responses most frequently were occurrences of repetition of the feedback or acknowledgement of the feedback. The majority of responses were incorporated into the same audio act as that being corrected or in the verbal act following the act in which the corrective feedback was given. This shows the students' abilities to manage both the modalities in their target language simultaneously. They appear able to shift their attention from the audio interaction to the textchat interaction, keeping an eye on the textchat whilst they speak in the voicechat. Our data also shows how multimodality is at play in such the environment: feedback and responses to feedback often occurring in adjacent pairs over both verbal

modalities. Despite this, however, our data also shows occurrences of feedback being incorporated in the acts of students other than those to whom it was addressed and of this being several verbal acts later in the sessions. This may be because the feedback remains for some time in the textchat modality or can be scrolled back to. Thus, it, can act as a reminder of the correct form, helping to facilitate peers' noticing and uptake for both the student to whom the feedback was addressed and his/her peers.

Whilst some teachers in previous studies on L2 learning in synthetic worlds made the decision to "restrict feedback to the end of each session in order to avoid interfering with the communicative dynamics of the actual class" (Deutschmann & Panichi, 2009:41), my analysis suggests that feedback in the textchat mode during the session interaction did not disturb the communicative dynamics of the sessions but rather enhanced them. It appears all the more important for teachers to try to adopt this practice rather than perceive the textchat modality as an adjunct to the voicechat, when we consider that the psycholinguistic mechanism, by which correction is thought to work, is dependent upon the juxtaposition of the learner utterance and the correction (Doughty and Long, 2003). For effective feedback, the distance between the triggering effect of students' errors and feedback must be short, enabling learners to compare the correction with their utterance (Annett, 1969).

This study shows that when a teacher pays importance to the textchat modality the students follow her lead and use it to support their oral communication in the audio modality. In our data, when the teacher adopted the textchat modality to provide feedback on non target-like forms, there was a high rate of response to teacher's corrective feedback in the students' productions (albeit through repetition, incorporation or acknowledgements) primarily in the voicechat but also in the textchat. I, thus, would like to conclude this chapter by suggesting that teachers' awareness of the affordances of different verbal modalities in environments such as *Second Life* needs to be heightened partially through training in how to exploit them for their students' L2 language learning.

Chapter 13. Conclusion

13.1. Aims of this research project

This thesis set out to investigate the interplay between nonverbal and verbal modes within the synthetic world *Second Life*. Interplay was examined within the context of an architectural and language integrated learning course *Building Fragile Spaces*. The study aimed to analyse whether interplay between the modes supported the language learners' verbal participation and production. These objectives were motivated by two reasons. Firstly, synthetic worlds are a computer-mediated communication environment which remains relatively unstudied. Whilst studies into face-to-face environments increasingly show the importance of nonverbal communication for second language learners, in combination with the verbal mode (McCafferty & Stam, 2008; Gullberg, in press), few studies explore this in synthetic worlds. Secondly, because architecture students may recognise the interest of synthetic worlds for their content-learning domain, I wished to investigate whether multimodality adds a cognitive overload for these language learners, to the detriment of verbal participation and production, or if interplay between the nonverbal and verbal modes could support their verbal participation and production. This was particularly relevant, considering our student population. Prior to the course studied here, their language courses had not been integrated into the process of architectural design learning. Therefore, for these students, it was not necessarily clear what was at stake concerning language learning. This often led to student indifference. Hence my interest into whether a synthetic world could help support learners' verbal participation.

This research project also aimed to contribute to the methodological considerations needed in order that research into multimodal interaction in synthetic worlds can move beyond speculative and anecdotal examples of inworld interaction. We aimed to offer some original contributions to the establishment of a methodology to achieve measurable observables and increase the validity of findings concerning interaction in synthetic worlds.

13.2. Results of this study

In this section, I present the main findings of the study presented in this thesis and relate them to previous studies. I outline the original contributions of this thesis. I then report on the

results of the study. These were presented with reference to my specific research questions outlined in Section 1.1 in the 'synthesis of observations' section of each analysis chapter (see Sections 10.5, 11.5 and 12.6). However, here, I have chosen to present the findings of this study with respect to the study's title: 'The interplay between nonverbal and verbal interaction in synthetic worlds that supports verbal participation and production in a foreign language'. Firstly, I present the study's results concerning interplay between the nonverbal and verbal modes that supports verbal participation. Secondly, I present the findings concerning the interplay between modes that supports verbal production in a foreign language.

13.2.1. Original contributions of this thesis

This thesis suggests that meaning making in synthetic worlds is achieved in both the verbal and nonverbal modes and in the interplay between the two. It offers some original perspectives into: how the potential for language learning in synthetic worlds lies in offering learners nonverbal as well as verbal modalities for making meaning; and the importance to take this into consideration in pedagogical scenario planning and in introductory activities for both teachers and learners in synthetic worlds.

This thesis also makes some original contributions to establishing a methodology for researching interaction in synthetic worlds. I suggest, firstly, the typology of verbal and, in particular, nonverbal modalities that the synthetic world *Second Life* offers its users and which, in other studies into synthetic worlds (Toyoda and Harrison, 2002; Peterson, 2005, 2006, 2011), have not been specifically categorized. This typology may help teachers, who are planning courses in the synthetic world *Second Life*, to gain an overview of the different communication possibilities that are available, and in doing so may help in task planning. The typology is drawn upon in the second methodological contribution of this thesis: the original methodology proposed to complete multimodal transcriptions of interactions in the verbal and nonverbal modes in synthetic worlds. Previous studies (Toyoda and Harrison, 2002; Peterson, 2005, 2006) have relied on field notes concerning observations of the nonverbal mode in synthetic worlds. I believe our transcription framework contributes to the methodological considerations needed for research into interaction in synthetic worlds and may help other researchers to achieve measurable observables.

A third original contribution left by this thesis is the structured LETEC corpus (Chanier & Wigham, 2011). I hope this will allow other contextual analyses to be performed on our data. Indeed, some of the barriers to research in synthetic worlds include the need for

researchers to break through the technical learning curve, in order to access the environment and the necessary human resources to make multimodal transcriptions. The LETEC corpus provides explicit links between interaction data of all course participants, the learning context (both the technical context and the pedagogical context) and also the research protocol established to collect data. It follows that this LETEC methodology allows reanalysis of the learning situation by researchers who did not participate in this study. This may promote other research into synthetic worlds whilst taking away the barriers which I feel prevent and / or limit research into synthetic world environments.

13.2.2. Interplay between and within modes that supports verbal participation

This thesis offers four findings concerning the interplay between the nonverbal and verbal modes supporting verbal participation in the foreign language in this study. I considered verbal participation as the number of acts made by a participant in the audio or the textchat modality and the duration of these acts.

Proxemic organisation

The first finding of this study is that the proxemic organisation of participants in the synthetic world affected verbal participation (see Chapter 10 and more specifically Section 10.4.7). In line with the studies examining the relationships between proxemics and verbal participation in face-to-face environments by Allen (1977) and Kraut, Fussell & Siegler (2003, see Section 3.3.1), my analysis showed that the proxemic distance between the avatars impacted on the students' verbal involvement in the activity. The closer together participants were proxemically, the more likely they were to interact in the verbal mode and the less likely the interaction was to be off-task, thus, requiring the intervention of a language teacher.

This finding leads us to some practical suggestions for teachers wishing to create language courses in *Second Life*. Firstly, teachers should consider configuring small sub-plots in the synthetic world for group work. This will mean that the sound from one plot does not transfer to another subplot and also it will encourage the learners to stay proxemically close to each other. Learners who move out of the sub plot, by increasing their proxemic distance will no longer be able to hear the interaction of their group in the plot. This may be one way of encouraging learners to stay proxemically close and, as a consequence, increase their participation in the verbal mode.

My results also showed that proxemic norms, which I believe the students had in the first world, e.g. facing a person they are talking to, are not transferred into the synthetic world. This suggests there is a need, in pedagogical scenarios, to explicitly introduce students to the importance of proxemics in the synthetic world environment in order to accelerate the emergence of communication norms when students work together. In doing so, I believe, language participation will be facilitated.

Avatar appearance

My analysis showed that learners, who changed the appearance of their avatar, participated more frequently in the verbal mode in terms of the number of verbal acts (see Chapter 11). Whilst language teachers may be tempted to tell learners that avatar appearance is not important: "you're here to speak!", this study's results suggest the need, in pedagogical scenarios, to introduce learners to how they can customize their avatars' appearances. For example, pedagogical scenarios could introduce students to the menus in the synthetic world interface to change appearance and morphology, or could introduce activities which allow students to go shopping for avatar clothes, e.g. through an inworld quest.

Nonverbal acts and the duration of verbal acts

This study proposes that there is a correlation between the number of nonverbal acts a learner performs and the duration of the learner's verbal acts but not the actual number of verbal acts (see Section 11.4.4). Again this finding underlines the importance of introducing learners, during introductory sessions to the environment, to the nonverbal possibilities that exist in a synthetic world. It also supports the need for pedagogical scenarios in synthetic worlds not to adopt a "you do what you did before approach" (Svensson, 2004 cited in Deutschmann, Panichi & Molka-Danielson, 2009). If teachers wish to help support verbal participation, they need to consider the affordances of the environment in task design. My results suggest the interest of including the possibilities for communication in the nonverbal mode and how these can be incorporated into tasks, to support verbal participation.

Equalisation in the verbal mode

This study showed that the bi-modality of the synthetic world in the verbal mode allowed participants in the EFL groups to compensate, in terms of floor space, for their less frequent audio acts by a greater usage of the textchat, whilst those students who participate actively in the audio modality participate less frequently with textchat acts (see Section

12.5.1). This phenomenon of equalisation, which has been reported in other CMC environments (Vetter & Chanier, 2006) was also shown in this study to occur not only within the same *Second Life* session but also between different sessions. Participants compensated between one session and another for an increase in audio floor space, with a decrease in textchat floor space, and compensated for a decrease in audio floor space, with an increase in textchat floor space. This finding suggests that one of the affordances of the synthetic world is that it accommodates learner differences / preferences concerning which modality they express themselves in.

13.2.3. Interplay between and within modes that supports verbal production in a foreign language

This thesis offers findings concerning the interplay between modes that supports verbal production in the foreign language.

Nonverbal mode in support of the verbal mode during communication difficulties

The nonverbal mode supports the verbal mode when, in the latter, there are communication difficulties. The nonverbal modality of avatar movement was used as a strategy to overcome verbal miscommunication when expressing direction and orientation. These communication difficulties arose because the camera view provided in the synthetic world allows learners to detach their viewpoint from the avatar they are controlling. In turn, this makes it difficult, during collaborative activities, for peers to understand whether they share visual space with the learner or not. Also, as a consequence, to understand how they should give instructions concerning direction or orientation of objects during a collaborative building activity. The avatar's orientation and gaze do not necessarily indicate the view of the learner commanding the avatar. This study highlights how avatar movement can help overcome these miscommunications: learners can use the placing of their avatar to help them to refer to objects in the environment and to help procedural instructions to be understood in the audio modality. In face-to-face activities, Fussell *et al.*, (2003) suggest that spatial and distance gestures aid procedural information. This study shows that in synthetic worlds, meaning making concerning direction and orientation, although drawing on the nonverbal and verbal modes as in the study by Fussell *et al.*, (2003) also uses a different nonverbal modality: that of movement rather than kinesic gestures.

The nonverbal modality of movement also helped learners in the synthetic world to secure deictic references to objects in the environment given in their verbal productions. Again, I suggest this usage was prompted by learners being unaware of whether they shared visual access to the collaborative activity space or not.

These results suggest that, should language teachers wish to exploit the synthetic world environment for collaborative learning through building activities, it may be important to develop the proficiency of learners to express orientation and direction in the design of the pedagogical scenario. They could, for example, provide scaffolding activities. It also appears important to introduce students to the possibility that they can use avatar movement to support them in referencing objects and giving procedural instructions concerning how to move objects.

Use of textchat modality for feedback on language form

This study advises the benefits of using the textchat modality for feedback on language form to support learners' productions in the audio modality. The textchat allowed, for one of the teachers in this study, a high rate of feedback on language form (22% of the teachers' total textchat acts), predominantly in the form of recasts and concerning lexical non target-like forms. 58% of the teachers' acts concerning feedback on language form were responded to by students with 16% of feedback leading to modified output. The majority of CLIL research has been within face-to-face classroom contexts. Studies which have looked into process evidence suggest that CLIL teachers focus more on correcting content knowledge than language production (Dalton-Puffer, 2007, 2008). This study proposes that a potential way to overcome this imbalance would be to use CMC environments which are bi-modal in the verbal mode and include textchat and voicechat modalities. My analysis showed that the EFL language teacher could use the textchat, both to advance the task in terms of content learning, but also to offer unobtrusive feedback on learners' verbal productions in both the audio and textchat modalities. This did not cognitively overload the students, despite the textchat being in competition with not only the audio modality but also the nonverbal modalities. The high rate of response to feedback shows that students are aware of, and can manage, the multimodality of the environment. Furthermore, feedback in the textchat modality was most often incorporated into acts in the audio modality, showing the students' abilities to monitor both modalities in the environment and to switch between these. Comparing the EFL teacher's use

of the textchat with that of the FFL teacher, this study suggests that teacher stance towards the textchat modality will affect how it is used in interaction. This study, therefore, underlines the need to provide teachers, who wish to teach in synthetic worlds, with the strategies needed to use bi-verbal modalities, in order to support verbal production. Similar recommendations are also highlighted by Blake (2005) and by Hampel & Stickler (2012) with reference to other multimodal environments. Whilst these studies consider the need, in general, to train teachers in how to exploit bi-verbal modal environments, this study suggests that a specific strategy, to help teachers support verbal production, is that of providing feedback in the textchat. I will return to this recommendation in Section 13.3, in the research perspectives section to discuss one possible implementation of this recommendation.

13.3. Future research perspectives

In this section, I outline the need for future research into the domain of interaction in synthetic worlds and the research perspectives that result from this study.

One of the limitations of this thesis is that the results are limited to one research context. Interaction in synthetic worlds has only fairly recently started to attract research attention. Thus, it appears vital that the research questions of this thesis are re-investigated within different contexts in order to determine my findings' validity. Indeed, there are not enough studies into interaction in synthetic worlds in general. Furthermore, studies into synthetic worlds which consider that interaction *includes* language rather than *is* language are rare. This thesis offers some suggestions regarding the interplay between nonverbal and verbal modes. Further studies are needed to provide a fuller picture of the multimodal benefits of synthetic worlds for language-learning contexts. For such studies to contribute to confirming or not my findings, I suggest it is vital that they adhere to a similar methodology as the one proposed by this study. This will enable them to make contributions that go beyond speculative suggestions or anecdotal evidence and to ensure that their results are comparable with those presented in this thesis and other future studies.

One finding of this study is that the nonverbal mode and its modalities of appearance help the learners to distinguish between first world and inworld identities. I was able to demonstrate, that within our context, this affected learners' verbal participation, suggesting that the adoption of an inworld identity helped reduce student apprehension in participating orally in the target language. However, Teoh (2007) suggests that if learners construct an inworld identity, this will not only disinhibit them, but also allow them to take risks while

feeling safe to practise the target language. Although, in this study, I did not investigate any possible links between inworld identity construction, for which learners draw on the nonverbal mode, and risk-taking in the verbal production, I suggest this is a future research direction needed to understand how avatars contribute to the perceived beneficial aspects of interaction in synthetic worlds (Peterson, 2011). A structural approach, one of the domains of computer-mediated discourse analysis, could be adopted to analyse the type of linguistic constructions learners used in the environment. Analysis could consider whether there are differences in the difficulty of constructions between learners who changed their avatars' appearance and those who did not, and the extent to which learners' constructions were target-like or not. This may provide some further insights into whether inworld identity, partially constructed through the nonverbal mode, can help to support learners' production by encouraging risk-taking in the target language.

The study presented in Chapter 11 is one of the first to look at the interplay between avatar identity constructed through the nonverbal mode and verbal participation. Since my study, *Second Life* now offers the possibility to choose avatars which are not at all based on human morphology, but rather on objects within the first world, including cars and airplanes. It would be interesting to replicate a study in *Second Life* with the same research questions concerning i) how students construct inworld identities using the nonverbal mode and ii) whether interplay exists between students' use of the nonverbal mode for inworld identity construction and their L2 verbal interaction and participation. This would allow the examination of whether my suggestion that non-morphological avatar shapes may help students to stand back from their first world identity, encouraging verbal L2 participation, will also apply to entirely non-morphological avatars.

My research highlighted the benefits of the textchat modality for offering feedback on language production in the audio modality, and the need for teachers to acquire the strategies to offer such feedback. One of the more practical perspectives I believe to be worthy of development from this thesis is to use the data from our LETEC corpus (Chanier & Wigham, 2011), including screen recordings and session transcriptions, to create a corpus of training objects aimed at language teachers interested in CMC and distance learning environments. These could be designed to help increase teachers' awareness of the different strategies that are available for providing feedback in environments which combine voicechat and textchat, as well as the different forms of correction that are possible. Training language teachers in these possibilities may help them to manage the bi-modality in the verbal mode in synthetic

worlds. For example, we could imagine a corpus of training objects being useful to pre-service language teachers. With the developing interest in synthetic worlds for NS-NNS telecollaboration projects (Deutschmann, Molka-Danielson & Panichi, 2011; Antoniadou, 2011) training objects concerning multimodal feedback may contribute to better preparing language teachers for online language learning.

In this study I examined the discourse functions for which acts in the textchat modality were used during the *Second Life* reflective sessions. I feel that this analysis could be developed by analysing the acts that occurred in the audio modality during the same sessions, in order to try to determine whether they were used for discourse objectives different from those used in the textchat, as shown in the study by Vetter & Chanier (2006). This would allow for additional examination of how the two verbal modalities complement each other, and the interplay between them.

A further line of enquiry concerning language feedback is whether there is any interplay between not only the textchat and voicechat modalities but also the verbal mode and nonverbal mode. In Section 3.4.1, I discussed learners' use of the nonverbal modality of gaze, in face-to-face environments, as a 'call for help' in lexical searches, and Kida & Faraco's (2003) study which suggested that the nonverbal modality can determine the exact moment at which a teacher intervenes in the verbal mode to offer help. I also summarized studies which show that a teacher's nonverbal behaviour helps in reducing the psychological distances between teachers and learners. I question whether, in a synthetic world environment, the nonverbal mode is used by learners to attract a teachers' attention to a learner's difficulty in expressing him/herself and also whether, when offering feedback, teachers may use the nonverbal mode to reduce the psychological distance between teacher and learner, so that the learner receives the feedback in a positive manner. A pilot study (Rodrigues & Wigham, 2012), concerning four *Second Life* reflective sessions, showed some instances of interplay between the nonverbal and verbal modes by teachers when resolving problematic non target-like lexical items. An example was the use of the kinesic gesture of nodding when providing lexical feedback. I feel it would be of interest to widen this analysis to include other, non-lexical, non target-like forms and to include a larger number of our transcribed sessions. It would also be interesting to include the nonverbal acts of learners who produce the non target-like forms in the analysis. I believe this may offer insights into how the nonverbal mode may trigger the need for feedback and help learners accept feedback.

To conclude, this study offers some initial findings which suggest, synthetic worlds may offer the possibility to support verbal participation and production in a foreign language, because of the opportunities offered in their multimodal nature for interplay between nonverbal and verbal modes. However, further studies, which adhere to a similar methodology as the one advanced in this thesis, are needed to better understand this interaction, and to confirm, or refute, the observations made in this study.

References

- Aarseth, E. (2008). A Hollow World: *World of Warcraft* as Spatial Practice, In Corneliussen, H. & Rettberg, J. (Eds.) (2008). *Digital Culture, Play and Identity: A World of Warcraft Reader*. Cambridge: MIT Press. pp.111-122.
- Active Worlds Inc. (1997). *Active Worlds*. [software] Las Vegas: Active Worlds Inc. [http://www.activeworlds.com/]
- Adobe (2006). *Adobe Connect*. [software] San Jose: Adobe. [http://www.adobe.com/products/adobeconnect.html]
- Aldrich, D. (2009). Learning Online with Games, Simulations and Virtual Worlds: Strategies for Online Instruction. San Diego: Pfeiffer.
- Allen, L.Q. (1995). The effect of emblematic gestures on the development and access of mental representations of French expressions, *Modern Language Journal*, 79(4). pp.541-529.
- Allen, T.J. (1977). *Managing the Flow of Technology*. Cambridge : MA: MIT Press.
- Alvarez-Martinez, S. (2007). L'analyse du discours médié par ordinateur (ADMOA): Quel intérêt pour l'étude des interactions synchrones à distance dans un environnement pédagogique en ligne ? In Lamy, M.-N., Mangenot, F. & Nissen, E. (Eds.). (2007). *Actes du colloque " Echanger pour apprendre en ligne (EPAL)"*. [http://w3.u-grenoble3.fr/epal/pdf/alvarez.pdf]
- American Heritage Dictionary of English Language (2011). [online dictionary] [http://www.ahdictionary.com/].
- Amiel, A., Camps, J-F., Lutz, G., Plégat-Soutjis & A. Tricot (2002). Concevoir un dispositif de Formation Ouverte et à Distance, Vers un modèle de cahier des charges. [http://andre.tricot.pagesperso-orange.fr/Amiel-et-al_GuideMethodoElearning.pdf].
- Anderson, L.W. & Krathwohl, D.R. (2001) (Eds.). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.
- Anis, J. (1998). *Texte et Ordinateur: l'écriture réinventée ?* Paris, Brussels: De Boeck Université.
- Anis, J. (2003). Communication électronique scripturale et forms langagières, *Réseaux Humaines / Réseaux Technologiques*, 4. [http://rhrt.edel.univ-poitiers.fr/document.php?id=547]
- Annett, J. (1969). *Feedback and human behavior*. Penguin Education.
- Antoniadou, A. (2011). Using Activity Theory to understand the contradictions in an online transatlantic collaboration between student-teachers of English as a Foreign Language, *ReCALL*, 23(3), pp.233-251. DOI: 10.1017/S0958344011000164
- Antonijevic, S. (2008). From Text to Gesture Online; A microethnographic analysis of nonverbal communication in the Second Life virtual environment, *Information, Communication and Society* , 11(2). pp. 221-238.
- Archer, D. (1997). Unspoken Diversity: Cultural Differences in Gestures, *Qualitative Sociology*, 20(1), pp. 79-105.
- Argyle, M., Ingham, R., Alkema, F. & McCallan, M. (no date) The different functions of gaze. [http://web.media.mit.edu/~cynthiab/Readings/argyle-73.pdf].
- Arias, I. (2010). Proxemics in the ESL Classroom. [website] [http://www.au.af.mil/au/awc/awcgate/state/proxemics.htm]

- Barlow, M. (2006). Computer-based analyses of learner language, in Ellis, R. & Barkhuizen, G. (Eds.) (2006). *Analysing Learning Language*. Oxford: Oxford University Press. pp.335-358. [<http://michaelbarlow.com/chapter14.pdf>].
- Barrier, G. (2008). *La communication non verbale*. Issy les Moulineaux: ESF.
- Bartle, R. (2004). *Designing Virtual Worlds*. Indianapolis: New Riders Publishing.
- Bartle, R. (2008). Making places, In Von Borries, F., Walz, S.P. & Bottger, M. (Eds.) (2008). *Space Time Play: computer games, architecture and urbanism: the next level*. Basel: Birkhauser. pp.158-163.
- Beattie, G. & Barnard, P. (1979). The temporal structure of natural telephone conversations, *Linguistics*, 17. pp.213-230.
- Beattie, G. & Coughlan, J. (1998). Do iconic gestures have a functional role in lexical access? An experimental study on the effects of repeating a verbal message on gesture production, *Semiotica*, 119(3/4). pp.221-249.
- Beattie, G. & Coughlan, J. (1999). An experimental investigation of the role of iconic gestures in lexical access using the tip-of-the-tongue phenomenon, *British Journal of Psychology*, 90. pp.35-56.
- Beepa (2010). *Fraps version 3.1.2*. [software] Albert Park: Beepa Pty Ltd. [<http://www.fraps.com/>]
- Bell, M. (2008). Toward a Definition of "Virtual Worlds", *Journal of Virtual Worlds Research*, 1(1). [<http://journals.tdl.org/jvwr/article/view/283/237>].
- Bell, R.W., Smith-Robbins, S. & G. Withnam (2010). This is Not a Game – Social Virtual Worlds, Fun and Learning, In Peachey, A., Gillen, J., Livingston, D., & Smith-Robbins, S. (Eds.) (2010). *Research Learning in Virtual Worlds*. London: Springer. pp.177-191.
- Bennett, J. & Beith, M. (2007). Why millions are living virtual lives online. *Newsweek International Edition*. [blog] [<http://www.newsweek.com/id/32824/output/print>].
- Bertin, J-C. (2009). Qu'est-ce que la langue de spécialité, quelles en est la problématique spécifique ? Conference presentation at the 'Séminaire d'étude sur l'anglais de spécialité', Université de Grenoble, 23 January 2009. [presentation] [<http://bertinjc.free.fr/ASP%20Grenoble%202009.ppt>].
- Bezemer, J. & C. Jewitt (2010). Multimodal Analysis: Key issues, In Litosseliti, L. (Ed) (2010). *Research Methods in Linguistics*. London: Continuum. pp.180-197.
- Birdwhistell, R. (1952). *Introduction to Kinesics*. Louisville: Louisville University Press.
- Blake, R. (2000). Computer mediated communication: A window on L2 Spanish interlanguage, *Language Learning & Technology (LLT)*, 4(1). pp.120-136. [<http://llt.msu.edu/vol4num1/blake/default.html>]
- Blake, R. (2005). Bimodal CMC: The glue of learning at a distance, *CALICO Journal*, 22(3). pp.497-511. [<https://www.calico.org/a-146-Bimodal%20CMC%20The%20Glue%20of%20Language%20Learning%20at%20a%20Distance.html>]
- Blanchet, P. (2011). Les principales méthodes et leurs techniques de construction des observables, In Blanchet, P. & Chardenet, P. (Eds.) (2011). *Guide pour la recherche en didactique des langues et des cultures*. Paris : Editions des archives contemporaines. pp.73-192.
- Blizzard Entertainment (2004). *World of Warcraft*. [software] Versailles: Blizzard Entertainment SAS. [<http://eu.battle.net/wow/en/>]
- Bloom, B.S. (Ed.) (1956). *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain*. New York: McKay.

- Boellstorff, T. (2008). *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human*. Princeton: Princeton University Press.
- Bonfils, P. (2007). Dispositifs socio-techniques et mondes persistants : Quelles médiations pour quelle communication dans un contexte situé ? Unpublished PhD thesis, Université du sud Toulon-Var. [http://philippe-bonfils.com/resources/Bonfils_these_doc_v-print.pdf].
- Bonnet, A. (2012). Towards an Evidence Base for CLIL: How to Integrate Qualitative and Quantitative as well as Process, Product and Participant Perspectives, *CLIL Research, International CLIL Research Journal*, 1(4), article 7. [<http://www.icrj.eu/14/article7.html>].
- Book, B. (2004). Moving Beyond the Game: Social Virtual Worlds. Communication at *State of Play 2 Conference 2004*, 13-15 November, 2004, New York: United States of America. [http://www.virtualworldsreview.com/papers/BBook_SoP2.pdf]
- Bourdieu, P. (1999). Principles for reflecting on the curriculum in France, In Moon, B. & Murphy, P. (Eds.) (1999). *Curriculum in Context*. London: Paul Chapman Publishing, pp.245-252.
- Bower, J. & Kawaguchi, S. (2011). Negotiation of meaning and corrective feedback in Japanese/English eTandem, *Language Learning & Technology (LLT)*, 15(1). pp.41-71. [<http://llt.msu.edu/issues/february2011/bowerkawaguchi.pdf>]
- Breidbach, S. & Viebroch, B. (2012). Editorial, *International CLIL Research Journal*, 1(4). [<http://www.icrj.eu/14/editorial.html>].
- Brown, B. & Bell, M. (2004). CSCW at play: 'There' as a collaborative virtual environment, In Herbsleb, J.D. & Olson, G.M. (Eds.) (2004). *CSCW '04 Proceedings of the 2004 ACM conference on Computer supported cooperative work*. pp.350-359. [<http://www.informatik.uni-trier.de/~ley/db/conf/cscw/cscw2004.html>]
- Butterworth, B. & Beattie, G. (1978). Gesture and silence as indicators of planning in speech, In Campbell, R.N. & Smith, P.T. (Eds.) (1978) *Recent Advances in the Psychology of Language: Formal and Experimental Approaches*. New York: Plenum. pp.347-360.
- Butterworth, B. & Hadar, U. (1989). Gesture, speech and computational stages: A reply to McNeill, *Psychological Review*, 96(1). pp.168-174.
- Butzkamm, W. (1998). Code-switching in a bilingual history lesson: The mother tongue as conversational lubricant, *International Journal of Bilingual Education and Bilingualism* 1(2). pp. 81-99.
- Bygate, M., Skehan, P., & Swain, M. (2001). Introduction. In Bygate, M., Skehan, P. & Swain, M. (Eds.) (2001). *Researching pedagogic tasks, second language learning, teaching and testing*. Harlow: Longman. pp.1-20.
- Cabiria, J. (2008). Virtual world and real world permeability: Transference of positive benefits for marginalized gay and lesbian populations, *Virtual Worlds Research* 1(1). [<https://journals.tdl.org/jvwr/article/viewFile/284/238>]
- Calbris, G. & Pourcher, L. (1989). *Geste et Communication*. Paris: Hatier.
- Castronova, E. (2005). *Synthetic Worlds: the Business and Culture of Online Games*. Chicago: University of Chicago Press.
- Chachkine, E. (2011). Quels scénarios pédagogiques pour un dispositif d'apprentissage à distance socioconstructiviste et de conception énonciativiste en FLE ? Unpublished PhD Thesis, Université de Provence - Aix-Marseille. [<http://tel.archives-ouvertes.fr/tel-00604871/en/>].
- Chamberlin, C. (2000). Pre-service EFL teachers' perceptions of trust in supervisors, *TESOL Quarterly*, 34. pp.353-363.
- Chanier, T. & Cartier, J. (2006). Communauté d'apprentissage et communauté de pratique en ligne : le processus réflexif dans la formation des formateurs, *Revue internationale des technologies en pédagogie universitaire*, 3(3). pp.64-82.

- Chanier, T. & Ciekanski, M. (2010). Utilité du partage des corpus pour l'analyse des interactions en ligne en situation d'apprentissage : un exemple d'approche méthodologique autour d'une base de corpus d'apprentissage, *Apprentissage des Langues et Systèmes d'Information et de Communication (ALSIC)*, 13. DOI : 10.4000/alsic.1666
- Chanier, T., Ciekanski, M. & Vetter, A. (2005). Tâche Tmult1 : Multimodal, modèles, transcription. *Annexe technique : Mode d'emploi pour transcription multimodale adapté pour le projet Infral*. Mulce.org : Clermont Université. [report] [http://mulce-doc.univ-bpclermont.fr/IMG/pdf/Mulce_adapt_infral_090821.pdf]
- Chanier, T. & Vetter, A. (2006). Multimodalité et expression en langue étrangère dans une plate-forme audio-synchrone, *Apprentissage des Langues et Systèmes d'Information et de Communication (ALSIC)*, 9, pp. 61-101. DOI: 10.4000/alsic.270
- Chanier, T. & Wigham, C.R. (2011). (Eds.) *Learning and Teaching Corpus (LETEC) of ARCHI21*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-letec-all ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012a). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-es-j3*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-es-j3 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012b). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-av-j2*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-av-j2 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012c). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-av-j4*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-av-j4 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012d). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-es-j4*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-es-j4 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012e). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-ls-j3*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-ls-j3 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012f). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-sc-j2*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-sc-j2 ; <http://repository.mulce.org>].
- Chanier, T. Saddour, I. & Wigham, C.R. (2012g). (Eds.) *Distinguished Corpus: Transcription of Verbal and Nonverbal Interactions of the Second Life Reflection archi21-slrefl-sc-j3*. Mulce.org : Clermont Université. [oai : mulce.org:mce-archi21-slrefl-sc-j3 ; <http://repository.mulce.org>].
- Chapelle, C.A. (2004). Technology and second language learning: expanding methods and agendas, *System*, 32(4). pp.593-601.
- Charlier B., Deschryver N., Peraya D. (2005) Apprendre en présence et à distance - A la recherche des effets des dispositifs hybrides. *Réseau Education Formation (REF)*, 15-16/09/05, Montpellier. [http://pedagogie.ac-montpellier.fr/Disciplines/maths/REF_2005/REF-Charlier.pdf].
- Chen, Y. (2012). Are We Ready for Second Life (SL) in Taiwan? The Uses of Social Media Technologies in Teaching Shakespeare, In Colpaert, J.Aerts, A. Wu, V. & Chao, J. *The Medium Matters*. Proceedings of the 2012 CALL conference 24-27 May 2012, Providence University, Taiwan.
- Cherny, L. (1999). *Conversation and Community. Chat in a Virtual World*. Stanford: CSLI Publications.
- Chun, D. (1994). Using computer networking to facilitate the acquisition of interactive competence, *System*, 22(1). pp.17-31.

- Cicurel, F. (2011). Les interactions en situation d'enseignement-apprentissage : observer, transcrire, analyser, In Blanchet, P. & Chardenet, P. (2011). *Guide pour la recherche en didactique des langues et des cultures*. Paris: Editions des archives contemporaines.
- Ciekanski, M. (2008). Rapport d'activité Tâche Tmult1 : Multimodal, modèles, transcription Annexe technique : Multimodal, conventions de transcription et outils de transcription. Mulce.org : Clermont Université. [report] [http://mulce-doc.univ-bpclermont.fr/IMG/pdf/mce_codetranscription_v4.pdf]
- Ciekanski, M., & Chanier, T. (2008). Developing online multimodal verbal communication to enhance the writing process in an audio-graphic conferencing environment, *ReCALL*, 20(2). pp.162-182. DOI: 10.1017/S0958344008000426
- Clarín (2012). *Virtual language observatory* [corpus repository] [<http://catalog.clarin.eu/ds/vlo/?jsessionid=FD61A780CFE3470019BF45CDEECDABF6?fq=collection:Multimodal+Learning+and+teaching+Corpora+Exchange>]
- Clark, H. H. & Krych, M. A. (2004). Speaking while monitoring addressees for understanding, *Journal of Memory and Language*, 50(1). pp.62-81.
- Classen, W. (1992). Gesturing referential expressions in a multimodal environment, In Dale, R., Hovy, E., Rosnder, D. & Stock, O. (Eds.) (1992). *Aspects of Automated Natural Language Generation*. New York: Springer.
- Coonan, D. (2003). Planning for CLIL, A general outline and thoughts on two micro features, In Catalano, L. (Ed.) (2003). *L'uso veicolare della lingua straniera in apprendimenti non linguistici*. Italie: Ufficio scolastico Regionale per il Piemonte. pp.23-47.
- Cosnier, J. & Brossard, A. (1984). *La communication non verbale*. Neuchâtel: Delachaux et Niestlé.
- Cosnier, J. & Develotte, C. (2011). Le face à face en ligne, approche éthologique, In Develotte, C. Kern, R. & Lamy, M-N. (Eds.) (2011). *Décrire la conversation en ligne*. Lyon: ENS Editions. pp.27-50.
- Cosnier, J. (1982). Communications et langages gestuels, In Cosnier, J. Berrendonner, A. Coulon, J. & Orrecchioni, C. (Eds.) (1982). *Les voies du langage : communications verbales gestuelles et animals*. Paris: Bordas.
- Cosnier, J., & Vaysse, J. (1997). Sémiotique des gestes communicatifs, *Nouveaux Actes Sémiotiques (Geste, cognition et communication)*, 52. pp. 7-28.
- Costa, F. & Coleman, J.A. (2010). Integrating Content and Language in Higher Education Italy: Ongoing Research, *International CLIL Research Journal*, 1(3), article 2. [<http://www.icrj.eu/13/article2.html>].
- Coyle, D. (2000). *New Perspectives on Teaching and Learning Modern Languages*. Clevedon: Multilingual Matters
- Coyle, D. (2002). Relevance of CLIL to the European Commission's Language Learning Objectives, In Marsh, D. (Ed.) (2002). *CLIL/EMILE the European Dimension*. Finland: UniCOM.
- Coyle, D. (2005). The Teaching Observatory: exploring zones of interactivity, In Holmberg, G., Shelley, M. & White, C. (Eds.) (2005). *Languages and Distance Education: Evolution and Change*. Clevedon: MultiLingual Matters. pp.309-326.
- Coyle, D. (2010). Language Pedagogies Revisited: alternative approaches for integrating language learning, language using and intercultural understanding, In Miller, J., Kostogriz, A & Gearon, M. (Eds.) (2010). *Culturally and Linguistically Diverse Classrooms: New Dilemmas for Teachers*. Ontario: Multilingual Matters. pp.172-195.
- Coyle, D. (no date). CLIL in Europe and the UK [presentation] [www.britishcouncil.org/mfl-docoyleall-2.ppt].

- Coyle, D., Hood, P., & Marsh, D. (2010). *Content and Language Integrated Learning*. Cambridge: Cambridge University Press.
- Cummins, J. (1984). *Bilingualism and special education: Issues in assessment and pedagogy*. Clevedon: Multilingual Matters.
- Cummins, J. (2000). *Language, Power and Pedagogy: Bilingual Children in the Crossfire*. Clevedon: Multilingual Matters.
- Cummins, J., & Swain, M. (1986). *Bilingualism in Education: Aspects of Theory, Research and Practice*. New York: Longman.
- Cziko, G., & Park, S. (2003). Internet audio communication for second language learning: A comparative review of six programs, *Language Learning & Technology (LLT)*, 7(1). pp.15–27. [<http://llt.msu.edu/vol7num1/review1/default.html>]
- D'Unrug, M.C. (1974). *Analyse de contenu de l'énoncé à l'énonciation*. Paris: Editions Universitaires.
- Daele, A., Brassard, C., Esnault, L., Donoghue, M., Uytterbrouk, E., Zeiliger, R. (2002). Conception, mise en oeuvre, analyse et évaluation des scénarios pédagogiques recourant à l'usage des TIC, Rapport du projet Recre@sup-WP2 FUNDP. [report] [<http://tecfa.unige.ch/proj/recreasup/rapport/WP2.pdf>].
- Dalgarno, B. & Lee, M.J.W. (2009). What are the learning affordances of 3-D virtual environments? *British Journal of Educational Technology*, 41(1). pp.10-32.
- Dalton- Puffer, C., & Smit, U. (2007). Introduction, In Dalton- Puffer, Christiane; Smit, Ute (Eds.) (2007). *Empirical perspectives on CLIL classroom discourse*. Frankfurt/Main: Peter Lang Verlag. pp.7- 23.
- Dalton-Puffer, C. (2007). *Discourse in Content-and-Language-Integrated Learning (CLIL) Classrooms*. New York: Benjamins.
- Dalton-Puffer, C. (2008). Outcomes and processes in Content and Language Integrated Learning (CLIL): current research from Europe. In Werner, D. & Volkman, L. (Eds.) (2008). *Future Perspectives for English Language Teaching*. Heidelberg: Carl Winter. pp.139-157.
- Dalton-Puffer, C. (2011). Content-and-Language Integrated Learning: From Practice to Principles?, *Annual review of Applied Linguistics*, 31, pp.182-204.
- Davies, G. (2009). Preface, In Molka-Danielson, J. & Deutschmann, M. (Eds.) (2009). *Learning and Teaching in the Virtual World of Second Life*. Trondheim: Tapir Academic Press. pp.3-6.
- Debyser, F. (1996). *L'immeuble*. Paris: Hachette.
- De Freitas, S. (2006). Learning in immersive worlds: a review of game-based learning. [report] [<http://www.jisc.ac.uk/whatwedo/programmes/elearninginnovation/outcomes>].
- De Lièvre, B., Depover, C., Dillenbourg, P. (2006). The relationship between tutoring mode and learners' use of help tools in distance education, *Instructional Science*, 34. pp.97-129.
- De Reuter, J. P. (2000). The production of gesture and speech, In McNeill, D. (Ed.) *Language and Gesture*. Cambridge: Cambridge University Press. pp.284-311.
- De Singly, F. (2008). *Le Questionnaire*. Paris: Armand Colin.
- De Souza, L.M.T.M. (2003) Literacy and dreamspace : multimodal texts in a Brazilian indigenous community, In Goodman, S., Lillis, T., Maybin, J. & Mercer, N. (Eds.) (2003). *Language, Literacy and Education: A Reader*. Stoke on Trent: Trentham Books. pp.221-230.
- Deutschmann, M. & Panichi, L. (2009). Instructional Design, Teacher Practice and Learner Autonomy, In Molka-Danielson, J. & Deutschmann, M. (Eds.) (2009). *Learning and Teaching in the Virtual World of Second Life*. Trondheim: Tapir Academic Press. pp.27-44.

- Deutschmann, M., Molka-Danielson, J. & Panichi, L. (2011). Analyzing the Design of Telecollaboration in Second Life Using Activity Theory, In Cheney, A. & Sanders, R.L. (Eds.) (2011). *Teaching and Learning in 3D Immersive Worlds: Pedagogical Models and Constructivist Approaches*. Hershey: IGI Global. pp.112-128.
- Deutschmann, M., Panichi, L. & Molka-Danielsen, J. (2009). Designing oral participation in Second Life – a comparative study of two language proficiency courses, *ReCALL*, 21(2). pp.206-226. DOI:10.1017/S0958344009000196
- Dickey, M. (2005). Three-dimensional virtual worlds and distance learning: two case studies of Active Worlds as a medium for distance education, *British Journal of Educational Technology*, 36(3), pp.439-451.
- Do, E. & Gross, M.D. (1998). The Design Studio Approach: Learning Design in Architecture Education, In Kolodner, J. & Guzdial, M. (Eds.) *Design Education Workshop*. Atlanta: Georgia Institute of Technology. [<http://depts.washington.edu/dmgftp/publications/pdfs/edutech97-eyd.pdf>].
- Donath, J. Karahalios, K. & Viagas, F. (1999). Visualizing Conversation, *Journal of Computer Mediated communication*, 4(4). [<http://jcmc.indiana.edu/vol4/issue4/donath.html>].
- Dooly, M. & Hauck, M. (in press). Researching multimodal communicative competence in video and audio telecollaborative encounters, In Dooly, M. & O'Dowd, R. (Eds.) (in press). *Researching Online Interaction and Exchange in Foreign Language Education. Telecollaboartion in Education*, 3. Bern: Peter Lang Publishing Group. [<http://oro.open.ac.uk/cgi/export/32943/SummaryPage/oro-eprint-32943.html>].
- Doughty, C. & Long, M. (2003). Optimal psycholinguistic environments for distance foreign language learning, *Language Learning & Technology (LLT)*, 7 (3). Pp.50-80.
- Dresner, E. & Herring, S. (2010). Functions of the Nonverbal in CMC: Emoticons and Illocutionary Force, *Communication Theory* (20). pp.249-268.
- Ekman, P. & Friesan, W.V. (1969). The repertoire of nonverbal behaviour: Categories, origins, usage and coding, *Semiotica*, 1. pp.49-98.
- Ellis, R. (1994). *The Study of Second Language Acquisition*. Oxford: Oxford University Press
- Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.
- Eurydice (2006). Content and Language Integrated Learning (CLIL) at School in Europe. Eurydice European Unit report. [report] [http://ec.europa.eu/languages/documents/studies/clil-at-school-in-europe_en.pdf].
- Falloon, G. (2010). Using avatars and virtual environments in learning: What do they have to offer? *British Journal of Educational Technology*, 41(1). pp.108-122.
- Faraco, M. & Kida, T. (2008). Gesture and the Negotiation of Meaning in a Second Language Classroom, In McCafferty, S.G. & Stam, G. (Eds.) (2008) *Gesture: Second Language Acquisition and Classroom Research*. New York: Routledge.
- Feyereisen, P. (1987). Gestures and speech, interactions and separations: A reply to McNeill 1985, *Psychological Review*, 94(4). pp.493-498.
- Fitze, M. (2006). Discourse and participation in ESL face-to-face and written electronic conferences, *Language Learning & Technology (LLT)*, 10(1). pp.67-86. [<http://llt.msu.edu/vol10num1/pdf/fitze.pdf>]
- Flewitt, R., Hampel, R., Hauck, M. & Lancaster, L. (2009). What are multimodal data and transcriptions? In Jewitt, C. (Ed.) (2009). *The Routledge Handbook of Multimodal Analysis*. pp.40-54.

- Flowerdew, L. (2001). The exploitation of small learner corpora in EAP materials design, In M. Ghadessy, A. Henry & R. L. Roseberry (Eds.) (2001). *Small corpus studies and ELT: Theory and practice*. Amsterdam: John Benjamins Publishing Company. pp.363-379.
- Foucher, A-L. (2010). Didactiques des Langues-Cultures et Tice : scénarios, tâches, interactions. Unpublished HDR, Université Blaise Pascal.
- Fraser, M. (2000). Working with Objects in Collaborative Virtual Environments. Unpublished PhD Thesis, University of Bristol. [<http://www.cs.bris.ac.uk/~fraser/phd/>].
- Freedman, N. (1972). The analysis of movement behaviour during the clinical interview, In Siegman, A. & Pope, B. (Eds.) (1972). *Studies in dyadic communication*. New York: Permagon. pp.153-175.
- Freedman, N. & Hoffman, S. (1967). Kinetic behavior in altered clinical states: Approach to objective analysis of motor behavior during clinical interviews, *Perceptual and Motor Skills*, 24. pp.527-39.
- Fussell, S. R., Kraut, R. E., & Siegel, J. (2000). Coordination of communication: Effects of shared visual context on collaborative work, *Proceedings of CSCW 2000*. New York: ACM Press. pp. 21-30. [<http://www.informatik.uni-trier.de/~ley/db/conf/cscw/cscw2000.html>].
- Fussell, S., Setlock L., Yang, J., Ou, J. & Mauer, E. (2004). Gestures over video streams to support remote collaboration on physical tasks, *Human Computer Interaction Institution*, Paper 83.
- Fynn, J. (2007). Aide à l'apprentissage du discours oral dans un contexte de communication asynchrone, *Apprentissage des Langues et Systèmes d'Information et de Communication (ALSIC)* 10(1). DOI : 10.4000/alsic.586
- Gajo, L. (2001). Immersion, bilinguisme et interaction en classe. Paris: Didier.
- Garau, M., Slater, M., Bee, S. & Sasse, M.A. (2001). The impact of eye gaze on communication using humanoid avatars, In Jacko, J. & Sears, A. (Eds.) (2001). *CHI01 Proceedings of the SIGCHI conference on Human factors in computing systems*. New York: ACM.
- Garner, S., Schadewitz, N., Holden, G., Zamenopoulos, T. & Alexiou, K. (2011). Supporting Fragility in Distance Design Education, In T. Zupančič-Strojan, M. Juvančič, S. Verovše & A. Jutraž (Eds.) (2011). *Respecting Fragile Spaces: proceedings of the 29th Conference on Education in Computer Aided Architectural Design in Europe*. Ljubljana: Faculty of Architecture. pp. 663–672.
- Gartner Inc. (2007). 80 Percent of Active Internet Users Will Have A "Second Life" in the Virtual World by the End of 2011. [press release] [<http://www.gartner.com/it/page.jsp?id=503861>]
- Gaver, W., Sellen, A., Heath, C., & Luff, P. (1993). One is not enough: Multiple views in a media space, In Ashlund, S., Mullet, K., Henderson, A., Hollnagel, E. & White, T. (Eds.) (1993). *Interchi '93*. NY: ACM Press. pp. 335-341.
- Gibson, J. J. (1977). The theory of affordances, In Shaw, R. & Bransford, J. (Eds.) *Perceiving, Acting, and Knowing Toward an Ecological Psychology*. New York, Toronto, London, Sydney: Hillsdale.
- Golish, T. D., & Olson, L. N. (2000). Students' use of power in the classroom: An investigation of student power, teacher power, and teacher immediacy, *Communication Quarterly*, 48. pp.293-310
- Goodman, S., Lillis, T., Maybin, J. & Mercer, N. (Eds.) (2003). *Language, Literact and Education: A Reader*. Stoke on Trent: Trentham Books.
- Grabe, W., & Stoller, F.L. (1997). Content-Based Instruction: Research Foundations, In Snow, M.A. & Brinton, D.M. (Eds.) (1997). *The Content-Based Classroom: Perspectives on Integrating Language and Content*. New York: Addison Wesley Longman Publishing Company. pp.5-21.

- Graddol, D. (2006). *English next*. London: British Council. [e-book]
[<http://www.britishcouncil.org/learning-research-english-next.pdf>].
- Granger, S. (2002). A Bird's-eye View of Computer Learner Corpus Research, In Granger S., Hung J., Petch-Tyson S. (Eds.) (2002). *Computer Learner Corpora, Second Language Acquisition and Foreign Language Teaching*, Amsterdam & Philadelphia: Benjamins. pp. 3-33.
[<http://hdl.handle.net/2078.1/75823>].
- Granger, S. (2004). Computer learner corpus research: current status and future prospects, In Connor, U. & Upton, T. (Eds.) (2004). *Applied Corpus Linguistics: A Multidimensional Perspective*, Amsterdam and Atlanta: Rodopi. pp. 123-145. [<http://hdl.handle.net/2078.1/75819>].
- Grosbois, M. (2012). *Didactique des langues et technologies de l'EAO aux réseaux sociaux*. Paris: Presses de l'université Paris-Sorbonne.
- Gu, N., Gül, L-F., Williams, A. & Nakapan, W. (2009). Second Life - A Context For Design Learning, In C. Wankel & J. Kingsley (Eds.) (2009). *Higher Education in Second Life*. Bingley, UK: Emerald. pp.159–180
- Guichon, N. & McLornan, S. (2008). The effects of multimodality on L2 learners: Implications for CALL resource design, *System*, 36(1). pp 85-93.
- Guichon, N., Bétrancourt, M. & Prié, Y. (2012). Managing written and oral negative feedback in a synchronous online teaching situation, *Computer assisted language learning*, 25(2). pp.181–197. [10.1080/09588221.2011.636054]
- Gullberg, M. (1998). *Gesture as a communication strategy in second language discourse. A study of learners of French and Swedish*. Lund: Lund University Press.
- Gullberg, M. (in press). *Gestures in Second Language Acquisition (Cognitive Science and Second Language Acquisition)*. Routledge.
- Hadar, U. & Butterworth, B. (1997). Iconic gestures, imagery and word retrieval in speech, *Semiotica*, 115(1/2). pp.147-172.
- Hall, E. (1959). *The Silent Language*. New York: Doubleday.
- Hall, E. (1963). A system for the notation of proxemics behavior, *American Anthropologist*, 65. pp. 1003-1026.
- Halliday, M. A. K. (1978). *Language as social semiotic*, London: Edward Arnold.
- Halliday, M.A.K. (1994). *An Introduction to Functional Grammar*. London: Edward Arnold.
- Hampel, R. & Stickler, U. (2012). The use of videoconferencing to support multimodal interaction in an online language classroom, *ReCALL*, 24(2). pp.116-137. DOI: 10.1017/S095834401200002X
- Hampel, R. (2006). Rethinking task design for the digital age: A framework for language teaching and learning in a synchronous online environment, *ReCALL*, 18(1). pp.105–121. DOI: 10.1017/S0958344006000711
- Harper, D. (2012). *Online Etymological Dictionary*. [website]. [<http://www.etymonline.com/>].
- Hasselgard, H. & Johansson, S. (2012). Learner corpora and contrastive interlanguage analysis, In Meunier, F., De Cock, S., Gilquin, G. & Paquot, M. (Eds.) (2012). *A Taste for Corpora. In honour of Sylviane Granger*. Amsterdam: John Benjamins. pp.33-62.
- Hauck, M. & Youngs, B. L. (2008). Telecollaboration in multimodal environments: the impact on task design and learner interaction, *Computer Assisted Language Learning (CALL)*, 21(2). pp.87-124. 10.1080/09588220801943510
- Haviland, J. (2000). Pointing, gesture spaces and mental maps, In McNeill, D. (Ed.) (2000) *Language and Gesture*. Cambridge: Cambridge University Press.

- Henderson, M., Huang, H., Grant, S. and Henderson, L. (2009). Language Acquisition in *Second Life*: improving self-efficacy beliefs, *Proceedings ascilite*.
[<http://www.ascilite.org.au/conferences/auckland09/procs/henderson.pdf>].
- Herring, S. C. (2004). Computer-mediated discourse analysis: An approach to researching online behaviour, In S. A. Barab, R. Kling, & J. H. Gray (Eds.). (2004). *Designing for Virtual Communities in the Service of Learning*. New York: Cambridge University Press. pp.338-376.
[<http://ella.slis.indiana.edu/~herring/cmda.pdf>].
- Herring, S. C. (2007). A faceted classification scheme for computer-mediated discourse, *Language@Internet*, 4. [<http://www.languageatinternet.org/articles/2007/761>]
- Herring, S. C., Börner, K. & Swan, M.B. (2003). When rich media are opaque: Spatial reference in a 3-D virtual world. [<http://ivl.slis.indiana.edu/km/pub/2003-herring-whenrich.pdf>]
- Hindmarsh J., Fraser, M., Heath, C., Benford, S. & Greenhalgh, C. (2000). Object-focused Interaction in collaborative virtual environments, *TOCHI*, 7(4). pp.477-509.
- Hislope, K. (2008). Language Learning in a Virtual World, *The International Journal of Learning*, 15(11). pp.51-58.
- Hoffman, R. (1996). Computer networks: Webs of communication for language teaching, In M. Pennington (Ed.) (1996). *The power of CALL*. Houston: Athelstan. pp.55-78.
- Hogg, M., Terry, D. & White, K. (1995). A Tale of Two Theories: A Critical Comparison of Identity Theory with Social Identity Theory, *Social Psychology Quarterly*, 58(4). pp.255-269.
- Huberman, A. M. & Miles, M. (1991). *Analyse des données qualitatives, recueil de nouvelles méthodes*. Paris & Brussels: De Boeck Université.
- Hunter, M. & Parchoma, G. (2012). Content and Language Integrated Learning: Shifting Boundaries and Terrain Mapping, In Hodgson, V., Jones, C., de Laat, M., McConnell, D., Ryberg, T., & Sloep, P. (Eds.) (2012). *Proceedings of the eighth International Conference on Networked Learning, 2-4 April, 2012*. Maastricht: Maastricht School of Management.
[http://www.networkedlearningconference.org.uk/abstracts/parchoma_smposium.html].
- Hutchby, I. (2001). Technologies, Texts and Affordances, *Sociology*, 35(2). pp.441-456.
- Hutchinson, D. (2007). Teaching practices for effective cooperative learning in an online learning environment (OLE), *Journal of information systems education*, 18(3). pp.357-367.
- IMS-CP (2011). Instructional Management System Content Package, Version 1.2. Public Draft 2 Specification. [<http://www.imsglobal.org/content/packaging/>]
- IMS-LD (2003). Learning Design Specification of the IMS consortium, version 1.0, January.
[http://www.imsglobal.org/learningdesign/ldv1p0/imslld_infov1p0.html].
- Iwasaki, J. & Oliver, R. (2003). Chatline interaction and negative feedback, *Australian Review of Applied Linguistics*, 17. pp.60-73.
- Jeffrey, P. & G. Mark (1998). Constructing Social Spaces in Virtual Environments: A study of Navigation and Interaction, In Hook, K., Munro, A. & D. Benyon (Eds.) (1998). *Workshop on Personalised and Social Navigation in Information Space*. Stockholm: Swedish Institution of Computer Science (SICS). pp. 24-38.
- Jepson, K. (2005). Conversations – and Negotiated interaction – in text and voicechat rooms, *Language Learning & Technology (LLT)*, 9(3). pp.79-98.
[<http://llt.msu.edu/vol9num3/pdf/jepson.pdf>]
- Jewitt, C. (Ed.) (2009). *The Routledge handbook of Multimodal Analysis*. Oxon: Routledge.
- Jewitt, C., Kress, G., Ogborn, J. & Tsatsarelis, C. (2004). Exploring Learning through Visual, Actual and Linguistic Communication: the multimodal environment of a science classroom, *Educational Review*, 53(1). pp.5-18.

- Joint Quality Initiative informal group (2004). *Shared 'Dublin' descriptors for Short Cycle, First Cycle, Second Cycle and Third Cycle Awards*. Working document on Joint Quality Initiative meeting in Dublin, 18 October 2004.
[<http://www.jointquality.org/content/descriptors/CompletesetDublinDescriptors.doc>].
- Jonassen, D.H. (1994). Thinking Technology: toward a constructivist design model, *Educational Technology*, April. pp.34-37.
- Jungheim, N. O. (1991). A study of the classroom acquisition of gesture in Japan, *Journal of Ryutsu Keizai University*, 27(1). pp.61-68.
- Jungheim, N. O. (2006). Learner and native speaker perspectives on a culturally-specific Japanese refusal gesture, *IRAL*, 44. pp.125-144.
- Kellerman, E. & van Hoof, A.-M. (2003). Manual accents, *International Review of Applied Linguistics*, 41(3). pp.251-269.
- Kellerman, S. (1992). 'I see what you mean': The Role of Kinesic Behaviour in Listening and Implications for Foreign and Second Language Learning, *Applied Linguistics*, 13(3). pp.239-258.
- Kelm, O. (1992). The use of synchronous computer networks in second language instruction: A preliminary report, *Foreign Language Annals*, 25. pp.441-454.
- Kendon, A. & Ferber, A. (1973). A description of some human greetings, In R.P. Michael & Crook, J.H. (Eds.) (1973). *Comparative Behaviour and Ecology of Primates*. London: Academic Press. pp.591-668.
- Kendon, A. (1970). Movement coordination in social interaction, *Acta Psychologica*, 32. pp.1-25.
- Kendon, A. (1977). *Studies in the Behavior of Face-to-Face Interaction*. Netherlands: Peter De Ridder Press.
- Kendon, A. (1982). The study of gesture: some observations on its history, *Recherches Semiotique/Semiotic Inquiry*, 2(1). pp.25-62.
- Kendon, A. (1995). Gestures as illocutionary and discourse structure markers in southern Italian conversation, *Journal of Pragmatics*, 23. pp.247-279.
- Kendon, A. (2000). Language and Gesture: Unity or Duality, In D. McNeill, (Ed.) (2000). *Language and Gesture: Window into Thought and Action*. Cambridge: Cambridge University Press. pp. 47-63.
- Kendon, A. (2005). *Gesture: Visible Action as Utterance*. Cambridge: Cambridge University Press.
- Kenning, M-M. (2010). Differences that make the difference: a study of functionalities in synchronous CMC, *ReCALL*, 22(1). pp.3-19. DOI: 10.1017/S0958344009990164
- Kerbrat-Orecchioni, C. (2005). *Le discours en interaction*. Paris: Armand Colin.
- Kern, N. (2010) It's burning? What now?, *Teaching in Second Life*, [blog]
[<http://slexperiments.edublogs.org/category/lesson-planning/>]
- Kern, R. (1995). Restructuring classroom interaction with networked computers: Effects on quantity and characteristics of language production, *The Modern Language Journal*, 79. pp.457-476.
- Kida T. & Faraco M. (2003). Gestures in second language discourse: metacommunicative function and perlocution, In M. Rector, I. Poggi & N. Trigo (Eds) (2003). *Gestures: Meaning and Use*. Porto: Edições Universidade Fernando Pessoa. pp.305-318.
- Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication, *American Psychologist*, 39(10). pp.1123-1134.

- Kirk, D. Rodden, T & Stanton Fraser, D. (2007). Turn it this way: grounding collaborative action with remote gestures, In *Proceedings of CHI Conference on Human Factors in Computing Systems*, San Jose: ACM. pp.1039-1048. [http://www.interaction-design.org/references/conferences/proceedings_of_acm_chi_2007_conference_on_human_factors_in_computing_systems.html].
- Kita, S. (2000). How representational gestures help speaking, In McNeill, D. (Ed.) (2000). *Language and Gesture*. Cambridge: Cambridge University Press. pp.162-185.
- Kitade, K. (2000). L2 learners' discourse and SLA theories in CLC: Collaborative interaction in Internet chat, *Computer Assisted Language Learning (CALL)*, 13(2). pp.143-166. DOI: 10.1076/0958-8221(200004)13:2;1-D;FT143
- Kligerman, B. (2010). *Intensive Framework. metaREZmalaquais*. ARCHI21 Working Document.
- Knapp, M. L., & Hall, J. A. (2002). *Nonverbal Communication in Human Interaction*. Crawfordsville: Thomson Learning.
- Kolb, A. & Kolb, D.A. (2005). Learning Styles and Learning Spaces; Enhancing Experiential Learning in Higher Education, *Academy of Management Journal*, 4(2). pp.193-212.
- Kötter, M. (2003). Negotiation of meaning and codeswitching in online tandems, *Language Learning & Technology (LLT)*, 7(2). pp.145-172. [<http://lt.msu.edu/vol7num2/kotter/default.html>]
- Krashen, S. (1981). *Second Language Acquisition and Second Language Learning*. Oxford: Pergamon Press.
- Krashen, S. D. (1985). *The input hypothesis: issues and implications*. New York: Longman.
- Krashen, S.; Terrell, T. (1983). *The natural approach: language acquisition in the classroom*. Oxford: Pergamon Press.
- Krauss, R., Chen, Y. & Chawla, P. (2004). Nonverbal behaviour and nonverbal communication: What do conversational hand gestures tell us? In Zanna, M. (Ed.) (2004). *Advances in experimental social psychology*. San Diego, CA: Academic Press. pp.389-450. [<http://www.columbia.edu/~rmk7/PDF/Adv.pdf>]
- Krauss, R., Chen, Y. & Gottesman, R. (2000). Lexical gestures and lexical access: a process model, In McNeill, D. (Ed.) (2000). *Language and Gesture*. Cambridge Cambridge University Press. pp. 261-283.
- Kraut, R. E., Fussell, S. R., & Siegel, J. (2003). Visual information as a Conversational Resource in Collaborative Physical Tasks, *Human Computer Interaction*, 18(1). pp. 13-49.
- Kress, G. & Jewitt, C. (2001). *Multimodal Teaching and Learning*. London: Continuum.
- Kress, G. & Jewitt, C. (2003). (Eds.) *Multimodal Literacy*. New York: Peter Lang.
- Kress, G. & van Leeuwen, T. (2001). *Multimodal Discourse*. London: Arnold.
- Kress, G. & van Leeuwen, T. (2002). Colour as a semiotic mode: Notes for a grammar of colour, *Visual Communication*, 1(3). pp. 343-368.
- Kress, G. (2010). *Multimodality*. Oxon: Routledge.
- Krikorian, D.H., Lee, J.S., Makana Chock, T. & Harms, C. (2000). Isn't That Spatial?: Distance and Communication in a 2-D Virtual Environment, *Journal of Computer Mediated Communication*, 5(4). [<http://jcmc.indiana.edu/vol5/issue4/krikorian.html>].
- Kwiksurveys.com (no date). *Kwiksurveys*. [survey management tool] [<http://kwiksurveys.com/>]
- Labov, W. (1972). *Sociolinguistic patterns*. Oxford: Blackwell.
- Lamunu Ppiyo Lueth, P. The architectural design studio as a learning environment: A qualitative exploration of architecture design student learning experiences in design studios from first-through fourth-year. Unpublished PhD dissertation. Iowa State University.

- Lamy, M. N. (2004). Oral conversations online: Redefining oral competence in synchronous environment, *ReCALL*, 16(2). pp.520–538. DOI: 10.1017/S095834400400182X
- Lamy, M-N. & Hampel, R. (2007). *Online Communication in Language Learning and Teaching*. Basingstoke: Palgrave Macmillan.
- Lamy, M-N. (2012a). Diversity in modalities, In Stockwell, G. (Ed.) (2012). *Computer-Assisted Language Learning: Diversity in Research and Practice*. Cambridge: Cambridge University Press. pp.110-127.
- Lamy M-N (2012b). Click if You Want to Speak: Reframing CA for Research into Multimodal Conversations in Online Learning, *International Journal of Virtual and Personal Learning Environments*, 3 (1). pp.1-18.
- Lazaraton, A. (2004). Gesture and speech in the vocabulary explanations of one ESL teacher. A microanalytic inquiry, *Language Learning*, 54 (1). pp.79-117.
- Ledewitz, S. (1985). Models of Design in Studio Teaching, *Journal of Architectural Education*, 38(2). pp.2-8.
- Lee, M. (2009). Come gli ambienti virtuali 3D possono essere utilizzati nell'apprendimento collaborativo? Un'analisi di casi appartenenti alla letteratura del settore, *Journal of E-learning and Knowledge Society*, 5(1). pp.21-30.
- Leech, G. (1997). Teaching and Language Corpora: A Convergence, In Wichmann, A., Fligelstone, S., McEnery, T. & Knowles, G. (Eds.) (1997). *Teaching and Language Corpora*. London: Longman. pp.1-23.
- Lefebvre, L. (2008). Les indicateurs non verbaux dans les interactions médiatisés. PhD thesis. [oai:tel.archives-ouvertes.fr:tel-00350409].
- Lehuen, J. & Kitlinska, S. (2006). Simulation Globale en Réseau pour le FLE ? La Plate-forme Informatique MEPA-2D, *Sticef*, 13. [http://sticef.univ-lemans.fr/num/vol2006/lehuen-06/sticef_2006_lehuen_06.htm].
- Lessikar, P. (2000). *Business Communication Theory and application*. New Delhi: All India Traveller Books seller.
- Levelt, W. (1989). *Speaking: From intention to articulation*. Cambridge: MIT Press
- Lim, K. (2009). The Six Learnings of Second Life: a Framework for Designing Curricular Interventions In-world, *Journal of Virtual Worlds Research*. [<https://journals.tdl.org/jvwr/article/view/424/466>]
- Long, M. (1996). The role of linguistic environment in second language acquisition, In Richie, W.C. & Bhatia, T.K. (Eds) (2003). *Handbook of research on language acquisition*, 2. New York: Academic Press. pp.413-468.
- Long, M. H., & Robinson, P. (1998). Focus on form: Theory, research and practice, In C. Doughty & J. Williams (Eds.) (1998). *Focus on Form in Classroom Language Acquisition*. Cambridge: CUP. pp.15-41.
- Long, M.H. (1981). Input, interaction and second language acquisition, In H. Winitz (Ed.), (1981). *Native Language and Foreign Language Acquisition. Annals of the New York Academy of Sciences*, 379. pp.259–278.
- Lotin, P. (2012). *Comptage*. Clermont-Ferrand: Laboratoire de Recherche sur le Langage.
- LRL (2011). *VoiceForum platform*. [web server] Clermont-Ferrand: Clermont Université [<http://lrl-voiceforum.univ-bpclermont.fr/>]
- Lucietto, S. (2009). Plurilinguismo e innovazione di sistema. Sfide e ricerche in ambito nazionale e internazionale, Trento, IPRASE del Trentino. [http://www.iprase.tn.it/prodotti/materiali_di_lavoro/alis2008/download/Alis_2008.pdf]

- Mahl, G.F. (1968). Gesture and Body Movements in Interviews, *Research in Psychotherapy, II*, pp.295-347.
- Maina, M. (2010). A design method for reusable pedagogical scenarios. Unpublished PhD Thesis, Open University of Catalonia.
[http://openaccess.uoc.edu/webapps/o2/bitstream/10609/6401/3/Dissertation_for_electronic_publication_Marcelo_Maina_2010.pdf.txt]
- Mangenot, F. (2009). Du Minitel aux SMS, la communication électronique et ses usages pédagogiques, *Linx*, 60. pp.97-110.
- Mangenot, F. & E. Louveau (2006). *Internet et la classe de langue*. Paris: Clé International.
- Marcoccia, M. (1998). La normalisation des comportements communicatifs sur Internet : étude sociopragmatique de la netiquette, In Guéguen, N. & Toblin, L. (Eds.) (1998). *Communication, société et Internet*. Paris: L'Harmatta. pp .15-22.
- Marcoccia, M. (2004). La communication écrite médiatisée par ordinateur : faire du face à face avec de l'écrit, *Journée d'étude sur le traitement automatique des nouvelles formes de communication écrite*, 5 June 2004, Paris. [<http://sites.univ-provence.fr/veronis/je-nfce/Marcoccia.pdf>]
- Marcoccia, M. (2007). L'analyse du rôle des smileys en production et en réception : un retour sur la question de l'oralité des écrits numériques, *GLOTTOPOLE*, 10. pp.39-55.
- Max Planck Institute for Psycholinguistics (2001). *ELAN* [software]. The Netherlands : Max Planck Institute for Psycholinguistics. [<http://www.lat-mpi.eu/tools/elan/>]
- McCafferty, S. & Ahmed, M. (2000). The appropriation of gestures of the abstract by L2 learners, In J. Lantolf, (Ed) (2000) *Sociocultural theory and Second language learning*. Oxford: Oxford University Press. pp.199-219.
- McCafferty, S. (2004). Space for cognition: Gesture and second language learning, *International Journal of Applied Linguistics*, 14(1). pp.148-165.
- McCafferty, S.G. & Stam, G. (2008). *Gesture: Second Language Acquisition and Classroom Research*. New York: Routledge.
- Mce_sid (2011). Full schema for the Structured Information Data (instantiation component) of a Mulce corpus. [http://lrl-diffusion.univ-bpclermont.fr/mulce/metadata/mce-schemas/mce_sid.xsd].
- McNeill, D. & Duncan, S. (2000). Growth points in thinking for speaking, In McNeill, D. (Ed.) (2000), *Language and Gesture*. Cambridge: Cambridge University Press. pp.141-161.
- McNeill, D. (1992). *Hand and Mind: What gestures reveal about thought*. Chicago: The University of Chicago Press.
- McNeill, D. (2000). (Ed.) *Language and Gesture*. Cambridge: Cambridge University Press.
- McNeill, D. (no date). The Growth Point
[website][http://mcneilllab.uchicago.edu/writing/growth_points.html].
- Meyer, B. & Sørensen, B.H. (2009). Designing Serious Games for Computer Assisted Language Learning – a Framework for Development and Analysis, *Intelligent Systems, Control and Automation: Science and Engineering*, 37(2). DOI: 10.1007/978-1-4020-9496-5_5
- Microsoft (2011). *Skype*. [software] [<http://skype.com>] Luxembourg: Microsoft Skype Division.
- Mohan, B. & Helmer, S. (1988). Context and second language development: Preschoolers' comprehension of gestures, *Applied Linguistics*, 9. pp.275-292.
- Morrel-Samules, P. & Krauss, R. (1992). Word familiarity predicts temporal asynchrony of hand gestures and speech, *Journal of Experimental Psychology: Learning, Memory and Cognition*, 18. pp.615-623.

- Mulce (2011a). *Mulce documentation site*. Mulce.org: Clermont Université. [<http://mulce-doc.univ-bpclermont.fr/?lang=en>]
- Mulce (2011a). *Licences d'utilisation des corpus MULCE*. Mulce.org: Clermont Université. [<http://mulce-doc.univ-bpclermont.fr/spip.php?article44&lang=fr>]
- Mulce (2011b). Rôles, droits et responsabilités. Mulce.org: Clermont Université. [<http://mulce-doc.univ-bpclermont.fr/spip.php?article39&lang=fr>]
- Mulce-repository (2011). *Repository where LETEC corpora can be downloaded*. Mulce.org : Clermont Université. [<http://repository.mulce.org>].
- Nagy, P. (2010). Second Life, Second Choice ? The effects of virtual identity on consumer behaviour. A conceptual framework, *Proceedings of FIKUSZ '10 Symposium for Young Researchers*. Óbuda University Keleti Karoly Faculty of Business and Management: Budapest. pp.167-180
- Narcy-Combes, M-F. (2011). Pour une méthodologie de description des profils d'apprenants : context et croisement des données. In Lin-Zucker, M., Suzuki, E., Takahashi, N. & Martinez, P. (Eds.) (2011). *Compétences d'enseignant à l'épreuve des profils d'apprenant*. Paris: Editions des archives contemporaines. pp.101-114.
- Negueruela, E., Lantolf, J., Rehn Jordan S., & Gelabert, J. (2004). The "private function" of gesture in second language speaking activity: A study of motion verbs and gesturing in English and Spanish, *International Journal of Applied Linguistics*, 14(1). pp.113-147.
- Nelson, B. & Erlandson, B. (2012). *Design for learning in virtual worlds*. New York: Taylor and Francis.
- Nikiforov, A. (2011). *MP3 Skype Recorder* version 1.9.0. London: Nikiforov. [software] [<http://voipcallrecording.com/>]
- Nikula, T. (2007). The IRF pattern and space for interaction: Observations on EFL and CLIL classrooms. In C. Dalton-Puffer & Smit, U. (Eds.) *Empirical Perspectives on CLIL Classroom Discourse*. Frankfurt: Peter Lang. pp.179-204.
- Nissen, E. (2006). Scénarios de communication en ligne dans des formations hybrides, *Recherches et applications, Les échanges en ligne dans l'apprentissage et la formation*, numéro spécial 2006. pp. 44-58.
- Nitsche, M. (2008). *Video game spaces: image, play, and structure in 3D game worlds*. Cambridge: MIT Press.
- Noet-Morand, P. (2003). Le "chat" favorise-t-il le développement des stratégies conversationnelles utiles à l'apprentissage d'une langue étrangère?, *Distances et savoirs*, 1(3). pp.375-398.
- Norman, D.A. (1988). *The Design of Everyday Things*. New York: Doubleday.
- Norris, S. (2009). Modal density and modal configurations: multimodal actions, In Jewitt, C. (Ed.) (2009). *The Routledge handbook of Multimodal Analysis*. Oxon: Routledge. pp.78-90.
- Norris, S. & Jones, R. (Eds.) (2005). *Discourse in action: Introducing Mediated Discourse Analysis*. London: Routledge.
- Nummenmaa, T. (1964). *The Language of the Face*, University of Jyväskylä Studies in Education, Psychology and Social Research. Jyväskylä: Jyväskylä Kasvatusopillinen Korkeakoulu.
- O'Connelly, J. & Groom, D. (2010). *Virtual worlds. Learning in a changing world*. Victoria: ACER Press.
- O'Halloran, K. L. and Smith, B. A, (2011). Multimodal Studies, In K. L. O'Halloran & B. A. Smith (Eds.) (2011). *Multimodal Studies: Exploring Issues and Domains*. New York & London: Routledge. [http://multimodal-analysis-lab.org/_docs/pubs10-Multimodal_Studies.pdf]
- Olac-archi21 (2011). *Description of ARCHI21 corpus within the OLAC directory* [<http://www.language-archives.org/item/oai:mulce.org:mce-archi21-letec-all>]

- Olac-metadata (2008). *Description of OLAC metadata standards* [<http://www.language-archives.org/OLAC/metadata.html>]
- Örnberg, T. (2003). Linguistic Presence on the Internet: Communication, worldview and presence in online virtual environments. Master's thesis in English linguistics. Umea universitet. [<http://www.multitalking.se/publications.html>]
- Palomeque, C. (2011). Interaction and language learning in 3D virtual worlds. Communication at *European Computer Assisted Language Learning Conference 2011*, 31 August - 3 September, 2011, Nottingham: United Kingdom.
- Panichi, L. & Deutschmann, M. (in press). Language Learning in Virtual Worlds – Research Issues and Methods, In Dooly, M. & O'Dowd, R. (in press). *Researching online interaction and exchange in foreign language education*. Bern: Peter Lang.
- Paquette, G. (1997). Virtual Learning Centres for XXIst Century Organisations, In F. Verdejo and G. Davies (Eds.) (1997). *The Virtual Campus*. London: Chapman & Hall. pp.18-34.
- Paquette, G. (2006). Apprentissage sur Internet : des plates-formes aux portails d'objets à base de connaissance, *Actes des 1ères Rencontres Jeunes Chercheurs en EIAH, RJC-EIAH'2006*. [http://events.it-sudparis.eu/rjc_eiah2006/proceeding/].
- Paquette, G. & Bleicher, E. (1997). *MotPlus*. Version 2.3. Quebec: LICEF, Université du Québec. [software] [<http://www.cogigraph.com/Produits/MOTetMOTplus/tabid/995/language/en-EN/Default.aspx>]
- Peachey, A., Gillen, J., Livingston, D., & Smith-Robbins, S. (Eds.) (2010). *Research Learning in Virtual Worlds*. London: Springer.
- Pellettieri, J. (2000). Negotiation in cyberspace: The role of chatting in the development of grammatical competence, In Warschauer, M. & Kern, R. (Eds.) (2000)., *Network-based Language Teaching: Concepts and Practice*. Cambridge: Cambridge University Press. pp.59-86.
- Peraya, D. & Deschryver, N. (2001). *Réalisation d'un dispositif de formation entièrement ou partiellement à distance*. [report]. [http://tecfa.unige.ch/tecfa/teaching/staf17/0102/ress/doc/p2_pedag/dim_pedag.pdf].
- Pernin, J.-P., Lejeune, A. (2004). Modèles pour la réutilisation de scénarios d'apprentissage, *Actes du colloque TICE Méditerranée*, Nice. [<http://isd.m.univ-tln.fr/PDF/isd.m18/48-pernin-lejeune.pdf>].
- Peterson, M. (2005). Learning interaction in an avatar-based virtual environment: A preliminary study, *PacCALL Journal*, 1(1). pp.29-40.
- Peterson, M. (2006). Learner interaction management in an avatar and chat-based virtual world, *Computer Assisted Language Learning (CALL)*, 19(1). pp.79-103. DOI:10.1080/09588220600804087
- Peterson, M. (2010). Learner participation patterns and strategy use in Second Life: an exploratory case study, *ReCALL* 22(3). pp.273-292. DOI: 10.1017/S0958344010000169
- Peterson, M. (2011). Towards a Research Agenda for the Use of Three-Dimensional Virtual Worlds in Language Learning, *CALICO*, 29(1). pp. 67-80. [<https://calico.org/memberBrowse.php?action=article&id=893>]
- Peterson, M. (2012). EFL learner collaborative interaction in Second Life, *ReCALL*, 24(1). pp.20-39. DOI: 10.1017/S0958344011000279
- Piwek, P. (2007). Modality choice for generation of referring acts. Pointing versus describing, In Van der Sluis, I., Theune, M., Reiter, E. & Kraemer, E. (Eds.), (2007). *Proceedings of the Workshop on Multimodal Output Generation (MOG 2007)*. Enschede: Universiteit Twente. pp.129-139.

- Platt, E. & Brooks, B. (2008). Embodiment in Self-Regulation in L2 Task Performance, In McCafferty, S.G. & Stam, G. (Eds.) (2008). *Gesture: Second Language Acquisition and Classroom Research*. New York: Routledge. pp.66-87.
- Puren, C. Bertocchini, P. & Costanzo, E. (1998). *Se former en didactique des langues*. Paris : Ellipses.
- Py, B. (1990). Les stratégies d'acquisition en situation d'interaction, *Le français dans le monde*, February–March. pp.81–88
- QSR International Pty Ltd. (2010). *NVivo qualitative data analysis software*. Version 9. [software] [http://www.qsrinternational.com/products_nvivo.aspx]
- Quinslink, C. (2008). Nonverbal communication, Gesture and Second language classrooms: A review, In McCafferty, S.G. & Stam, G. (Eds.) (2008). *Gesture: Second Language Acquisition and Classroom Research*. New York: Routledge. pp.25-44.
- Quintero Garcia, D. & Vicente-Rasoamalala, L. (2007). Teaching Spanish nonverbal communication through soap opera. In K. Bradford-Watts (Ed.) *JALT2006 Conference Proceedings*. [http://cuhk.academia.edu/LeticiaVicenteRasoamalala/Papers/138064/Teaching_Spanish_nonverbal_communication_through_soap_opera].
- Quintin, J.-J., Depover, C., Degache, C., (2005). Le rôle du scénario pédagogique dans l'analyse d'une formation à distance. Analyse d'un scénario pédagogique à partir d'éléments de caractérisation définis. *Actes du colloque EIAH*, Montpellier. [<http://telearn.archives-ouvertes.fr/hal-00005727/en/>]
- Quintin, J-J. (2005). Effet des modalités de tutorat et de scénarisation dans un dispositif de formation à distance, M2 Dissertation Sciences de l'Education, Université de Mons-Hainaut. [http://hal.inria.fr/docs/00/09/67/02/PDF/Quintin_2005_Effet_des_modalites_de_tutorat_et_de_scenarisation_dans_un_dispositif_de_formation_a_distance.pdf].
- Rauscher, F., Krauss, R., & Chen, Y. (1996). Gesture, speech, and lexical access: the role of lexical movements in speech production, *Psychological Science*, 7. pp.226-230.
- Rayson, P. & Baron, A. (2012). Automatic error tagging of spelling mistakes in learner corpora, in Meunier, F., De Cock, S., Gilquin, G. & Paquot, M. (Eds.) (2012). *A Taste for Corpora. In honour of Sylviane Granger*. Amsterdam: John Benjamins. pp.109-126.
- Reffay, C., Betbeder, M-L. & Chanier, T. (in press). Multimodal learning and teaching corpora exchange: lessons learned in five years by the Mulce project, *International Journal of Technology Enhanced Learning (IJTEL)*. Special issue on dataTEL "Datasets and Data Supported Learning in Technology-Enhanced Learning".
- Reffay, C., Chanier, T., Noras, M. & Betbeder, M.-L. (2008). Contribution à la structuration de corpus d'apprentissage pour un meilleur partage en recherche, *Sciences et Technologies de l'Information et de la Communication pour l'Education et la Formation (Sticef)*,15. [http://sticef.univ-lemans.fr/num/vol2008/01-reffay/sticef_2008_reffay_01.htm]
- Robbins-Bell, S. (2008). Higher education as virtual conversation, *EDUCAUSE Review*, 43(5). [<http://www.educause.edu/ero/article/higher-education-virtual-conversation>].
- Rodrigues, C. & Wigham, C.R. (2012). Second Life et apprentissage d'une langue étrangère dans une approche Emile : quels apports d'un environnement synthétique pour l'apprentissage du vocabulaire ? Conference presentation at *ACEDLE*, 7-9 June 2012, Nantes: France. [presentation][<http://edutice.archives-ouvertes.fr/edutice-00703113>]
- Rodrigues, C., Wigham, C.R., Foucher A-L., & Chanier, T. (in press). Architectural design and language learning in Second Life, In Gregory, S., Lee M.J.W., Dalgarno, B. & Tynan, B. (Eds.) *Virtual Worlds in Online and Distance Education*. Edmonton: Athabasca University Press.
- Rosedale, P. (2011). *Second Life* version 2.7.2 (233432) [software]. San Fransisco : Linden Lab. [<http://www.secondlife.com>]

- Sadler, R. (2012). *Virtual Worlds for Language Learning*. Bern: Peter Lang.
- Sanchez, J. (2009). A social history of virtual worlds, *Library Technology Reports*, 45(2). pp.9-12.
- Sauvé, L., Renaud, L., Kaufman, D., Samson, D., Bluteau-Doré, V., Dumais, C., Bujold, P., Kaszap, M., & Isabelle, C. (2005). *Revue systématique des écrits (1998-2004) sur les fondements conceptuels du jeu, de la simulation et du jeu de simulation*. Québec: Sage & Savie.
- Schmidt, R. (1990). The role of consciousness in second language learning, *Applied Linguistics* 11(2). pp.129–58.
- Schmitt, N. & Redwood, S. (2012). Learner knowledge of phrasal verbs: A corpus-informed study, in Meunier, F., De Cock, S., Gilquin, G. & Paquot, M. (Eds.) (2012). *A Taste for Corpora. In honour of Sylviane Granger*. Amsterdam: John Benjamins. pp.173-208.
- Schroeder, R. (2008). Defining virtual worlds and virtual environments, *Virtual Worlds Research*, 1(1). pp.1-3.
- Schweinhorst, K. (2002). The state of VR: A meta-analysis of virtual reality tools in second language acquisition, *Computer-Assisted Language Learning Journal*, 15(3). pp.221-239.
- Schweinhorst, K. (2003). Learner autonomy and tandem learning: putting principles into practice in synchronous and asynchronous telecommunications environments, *CALL*, 16(5). pp.427-443.
- Scollon, R. & Levine, P. (2004). Multimodal Discourse Analysis as the Confluence of Discourse and Technology, In Levine, P. & Scollon, R. (Eds.) (2004). *Discourse and Technology: Multimodal Discourse Analysis*. Washington: Georgetown University Press. pp.1-6.
- Scollon, R. & Scollon, S. (2004). *Nexus Analysis: Discourse and the Emerging Internet*. London: Routledge.
- Scollon, R. (2001). *Mediated Discourse: The Nexus of Practice*. London: Routledge.
- Second Life (no date-a). *Second Life* Arachon [*Second Life* location]
[<http://maps.secondlife.com/secondlife/Arcachon/219/229/26>]
- Second Life (no date-b). *Second Life* Paris circa 1900 [*Second Life* location]
[<http://secondlife.com/destination/paris-1900>]
- Second Life (no date-c). *Second Life* New York City [*Second Life* location]
[<http://secondlife.com/destination/new-york-city>]
- Skutnabb-Kangas, T. & Toukomaa, P. (1976). Teaching migrant children's mother tongue and learning the language of the host country in the context of the sociocultural situation of the migrant family. Helsinki: The Finnish National Commission for UNESCO.
- Slobin, D. (1991). Learning to think for speaking: Native language, cognition and rhetorical style, *Pragmatics*, 1(17). pp.7-25.
- Smith-Robbins, S. (2011). *Incommensurate Wor(l)ds: A Faceted Classification of Virtual Worlds*. Unpublished PhD dissertation. Ball State University.
- Snow, M. A., Met, M. & Genesee, F. (1989). A conceptual framework for the integration of language and content in second/ foreign language instruction, *Tesol Quarterly*, 23 (2). pp.201-217.
- Snow, M.A. & Brinton, D.M. (Eds.) (1997). *The Content-Based Classroom*. White Plains: Addeley, Wesley, Longman.
- Snyder, I. (2001). A New Communication Order: Research Literacy Practices in the Network Society, *Language and Education*, 15(2&3). pp.117-131.
- Snyder, I. (2003). *Page to Screen*. London: Routledge.
- Sommer, R. (1969). Small group ecology, *Psychological Bulletin*, 6. pp.145-151.

- Sotillo, S. (2005). Corrective feedback via Instant Messenger learning activities in NS-NNS and NNS-NNS Dyads, *CALICO Journal*, 22(3). pp.467-496.
[<https://calico.org/memberBrowse.php?action=article&id=145>]
- Stam, G. (2006). Thinking for speaking about motion: L1 and L2 speech and gesture, *IRAL*, 44. pp.145-171.
- Steuer, J. (1992). Defining Virtual Reality: Dimensions determining telepresence. *Journal of Communication*, 44 (2).pp. 73-93
- Swain, M. (1985). Communicative competence: some roles of comprehensible input and comprehensible output in its development, In Gass, S. M. & Madden, C. G. (Eds.) (1985). *Input in second language acquisition*. Cambridge: Newbury House Publishers. pp.235- 253.
- Swain, M. & Lapkin, S. (1995). Problems in output and the cognitive processes they generate: A step towards second language learning, *Applied Linguistics*, 16. pp. 371-391.
- Swann, J. (1998). Talk control: an illustration from the classroom of problems in analysing male dominance in conversation, In Coates, J. & Cameron, D. (Eds.) (1998). *Women in Their Speech Communities. New Perspectives on Language and Sex*, London: Longman. pp. 122-140.
- Taillefer, G. (2004). Enseigner une matière disciplinaire en langue étrangère dans le contexte français des sciences sociales : défi, observations et implications, *la revue du GERAS ASP*, 45-46. pp.111-126.
- Taylor, T. L. (2006). *Play between worlds*. Cambridge: MIT Press.
- Tellier, M. (2009). L'impact du geste pédagogique sur l'enseignement / apprentissage des langues étrangères. Unpublished PhD thesis.[<http://tel.archives-ouvertes.fr/tel-00371041/fr/>]
- Teoh, J. (2007). Second Life, a simulation: barriers, benefits, and implications for teaching. *Proceedings of the 7th Technology, Colleges & Community (TCC) Worldwide online conference*. Hawaii, USA: University of Hawaii.
[<http://etec.hawaii.edu/proceedings/2007/teoh.pdf>] pp.116-125.
- The Association for Educational Communications and Technology (2001). *The Handbook of Research for Educational Communications and Technology*.Bloomington: The Association for Educational Communications and Technology (AECT) [ebook]
[<http://www.aect.org/edtech/ed1/40/40-03.html>]
- The Open University (2001). *Research Methods in Education Handbook*. Milton Keynes: The Open University.
- Thornbury, S. (1997). Reformulation and reconstruction: tasks that promote 'noticing', *ELT Journal*, 51(4). pp.326-335.
- Thornbury, S. (2003). Grammar as Process, *Foreign Language Teaching & Research in Basic Education*, 3. pp. 48-49.
- Thorne, S. & Fischer, I. (2012). Online gaming as sociable media, *Apprentissage des Langues et Systèmes d'Information et de Communication (ALSIC)*, 15(1). DOI : 10.4000/alsic.2450
- Toyoda, E. & Harrison, H. (2002). Categorization of text chat communication between learners and native speakers of Japanese, *Language Learning and Technology*, 6(1). pp.82-99.
- Tribble, C. (2012). Revisiting apprentice texts; Using lexical bundles to investigate expert and apprentice performances in academic writing, in Meunier, F., De Cock, S., Gilquin, G. & Paquot, M. (Eds.) (2012). *A Taste for Corpora. In honour of Sylviane Granger*. Amsterdam: John Benjamins. pp.85-108.
- Tsutsui, M. (2004). Multimedia as a means to enhance feedback, *Computer Assisted Language Learning (CALL)*, 17 (3/4). pp.377-402. DOI:10.1080/0958822042000319638

- Tudini, V. (2003a). Conversational elements of online chatting: speaking practice for distance language learners? *Apprentissage des Langues et Systèmes d'Information et de Communication (ALSIC)*, 6(2). pp.82-99. DOI : 10.4000/alsic.2238
- Tudini, V. (2003b). Using native speakers in chat, *Language Learning and Technology*, 7(3). pp.141–159.
- Tudini, V. (2007). Negotiation and intercultural learning in Italian native speaker chat rooms, *Modern Language Journal*, 91(4). pp.577-601.
- Tudini, V. (2012). *Online Second Language Acquisition: Conversational Analysis of Online Chat*. London: Continuum.
- Ulicsak, M. (2010). *Games in Education: Serious Games*. [report]
[http://media.futurelab.org.uk/resources/documents/lit_reviews/Serious-Games_Review.pdf].
- Unsworth, L. (2001). *Teaching Multiliteracies Across the Curriculum: Changing contexts of text and image in classroom practice*. Buckingham: Open University Press.
- Van Aertselaer, J. & Bince, C. (2012). The use of small corpora for tracing the development of academic literacies, In Meunier, F., De Cock, S., Gilquin, G. & Paquot, M. (Eds.) (2012). *A Taste for Corpora. In honour of Sylviane Granger*. Amsterdam: John Benjamins. pp.63-84.
- Van Leeuwen (2004). Ten reasons why linguists should pay attention to visual communication. In Levine, P. & Scollon, R. (Eds.) (2004). *Discourse and Technology: Multimodal Discourse Analysis*. Washington: Georgetown University Press. pp.7-19.
- Varonis, E., & Gass, S. (1985). Non-native / non-native conversations: A model for negotiation of meaning, *Applied Linguistics*, 6. pp.71–90.
- Ventrella, J. (2011). *Virtual Body Language. The History and Future of Avatars: How Nonverbal Expression is Evolving on the Internet*. Lavergne: Eyebrian Books.
- Verhulsdonck, G., & Morie, J. F. (2009). Virtual Chironomia: Developing Nonverbal Communication Standards in Virtual Worlds, *Journal of Virtual Worlds Research*, 2(3).
[<http://journals.tdl.org/jvwr/article/viewArticle/657>].
- Vetter, A. & Chanier, T. (2006). Supporting oral production for professional purposes in synchronous communication with heterogenous learners. *ReCALL*, 18 (1). pp.5–23. DOI: 10.1017/S0958344006000218
- Wadley, G. & M. Gibbs (2010). Speaking in character: Voice communication in virtual worlds, In William Sims Bainbridge (Ed.), (2010) *Online worlds: Convergence of the real and the virtual*. Springer : London. pp.187-200.
- Wadley, G.R. (2011). *Voice in virtual worlds*. Unpublished PhD thesis. The University of Melbourne.
- Warburton, S. (2008). Loving your avatar: Identity, immersion and empathy, *Liquid Learning*. [blog]
[<http://warburton.typepad.com/liquidlearning/2008/01/loving-your-ava.html>]
- Warschauer, M. (1996). Comparing face-to-face and electronic discussion in the second language classroom, *CALICO Journal*, 13. pp.7-25.
[<https://calico.org/memberBrowse.php?action=article&id=604>]
- Watson, O.M. & Graves, T.D. (1966). Quantitative research in proxemic behaviour. *American Anthropology*, 68. pp.971-985.
- Wehner, A. K., Gump, A. W., & Downey, S. (2011). The effects of Second Life on the motivation of undergraduate students learning a foreign language, *Computer Assisted Language Learning (CALL)*, 24(3). pp.277-289. DOI: 10.1080/09588221.2010.551757
- Wertsch, J. V. (1985). *Vygotsky and the social formation of mind*. Cambridge, MA: Harvard University Press.

- Whitton, N. & Hollins, P. (2008). Collaborative virtual gaming worlds in Higher Education, *ALT-J* 16(3). pp. 221-229.
- Wigham, C.R. & Chanier, T. (2012). (Eds.) *Distinguished Corpus: Influence of nonverbal communication on verbal production in the Second Life Reflective Sessions*. Mulce.org: Clermont Université. [oai : mulce.org:mce-archi21-modality-interplay; <http://repository.mulce.org>].
- Wolff, D. (2003). Integrating language and content in the language classroom: Are transfer of knowledge and of language ensured? *La revue du GERAS, ASP*, 41-42. pp.35-46.
- WordNet (2003-2008). *WordNet 3.0*. Princeton: Princeton University.
- Yaiche, F. *Les simulations globales: mode d'emploi*. Paris: Hachette Livre.
- Yamada, M. (2009). The role of social presence in learner-centered communicative language learning using synchronous computer-mediated communication: Experimental study, *Computers & Education*, 52. pp.820-833. [[http://tellnik.wikispaces.com/file/view/Yamada_52\(4\).PDF](http://tellnik.wikispaces.com/file/view/Yamada_52(4).PDF)] DOI: 10.1016/j.compedu.2008.12.007
- Yanguas, I. (2009). Oral computer-mediated interaction between L2 learners : it's about time!, *Language Learning & Technology (LLT)*, 14(3). pp.72-93. [<http://llt.msu.edu/issues/october2010/yanguas.pdf>]
- Yee, N. & Bailenson, J.N., (2007). The Proteus effect: Self transformation in virtual reality, *Human Communication Research*, 33. pp.271-290.
- Yee, N., Bailenson, J.N. Urbanek, M., Chang, F. & Merget, D. (2007). The unbearable likeness of being digital: the persistence of nonverbal social norms in online virtual environments, *Cyber Psychology and Behaviour*, 10(1). pp.115-121.
- Yoshioka, K. (2005). Linguistic and gestural introduction and tracking of referents in L1 and L2 discourse. Unpublished PhD thesis. Rijksuniversiteit Groningen. [<http://dissertations.ub.rug.nl/faculties/arts/2005/k.yoshioka/>]
- Yun, H. (2009). Echanges à distance entre apprenants de FLE : Etude des interactions synchrones en contexte academique. Unpublished PhD thesis. Université Paris 3 – Sorbonne Nouvelle.
- Zhao, S., Grasmuck, S. & Martin, J. (2008) Identity construction on Facebook: Digital empowerment in anchored relationships, *Computers in Human Behaviour*, 24. pp.1816-1836.

DETAILED TABLE OF CONTENTS

Chapter 1.	Introduction	10
1.1.	Research objectives and context of study.....	10
1.2.	Thesis structure	15
PART I – MULTIMODALITY - NONVERBAL AND VERBAL MODES.....		20
Chapter 2.	Multimodality.....	21
2.1.	Introduction	21
2.2.	A multimodal view of communication.....	21
2.3.	Approaches to the study of multimodality	24
2.3.1.	Multimodal interactional analysis	24
2.3.2.	Socio-semiotic approach	26
2.4.	Approach adopted and terminology choices	28
2.5.	Application of the socio-semiotic approach to pedagogical contexts	30
2.5.1.	Studies of face-to-face environments.....	31
2.5.2.	Studies of CMC environments	32
	Audio-graphic conferencing environments	33
	Video-conferencing environments	36
2.6.	Conclusion.....	39
Chapter 3.	Nonverbal mode	40
3.1.	Introduction	40
3.2.	Nonverbal behaviour or communication?	40
3.3.	Communication environment	41
3.3.1.	Proxemics	41
3.3.2.	Relationship between proxemics and verbal communication	43
3.3.3.	Proxemics and Second Language Acquisition	43
3.3.4.	Proxemics in two dimensional Computer Mediated Communication	45
3.4.	Communicator’s behaviour	48
3.4.1.	Face and eyes	48
	Relationship between face and eyes and verbal communication	49
	Face and eyes in Second Language Acquisition	49
	Face and eyes in Computer Mediated Communication	51
3.4.2.	Hands and arms (gesture).....	54
	Definitions and classifications of gesture.....	54
	Relationship between gesture and verbal communication	58
	Gesture in Second Language Acquisition	62
	Gesture in Computer Mediated Communication	65
3.5.	Choice of terminology and conclusion.....	72
Chapter 4.	Verbal mode	74
4.1.	Introduction	74
4.2.	Modalities in the verbal mode.....	74
4.2.1.	Synchronous audio modality and characteristics	74
	Different possible configurations of the audio modality.....	75
4.2.2.	Synchronous textchat modality and characteristics	75
	Typical visual presentation of synchronous textchat environments.....	76
	Discourse structure in synchronous textchat.....	77
	Typographic features of synchronous textchat.....	78
	Classification as an oral or written genre	79
4.3.	Verbal participation.....	81
4.3.1.	Defining verbal participation	81
4.3.2.	L2 Verbal participation and the textchat modality.....	82

4.4.	Support for L2 verbal production.....	88
4.4.1.	Opportunities for noticing	88
	Self correction in the textchat modality	88
	Self-correction in the audio modality.....	93
4.4.2.	Opportunities for negotiation of meaning and corrective feedback.....	95
	Negotiation of meaning in textchat environments	96
	Negotiation of meaning in the audio modality compared to the textchat modality.....	101
4.5.	Conclusion.....	105
PART II – SYNTHETIC WORLDS		106
Chapter 5. Synthetic worlds and L2 learning.....		107
5.1.	Introduction	107
5.2.	Emergence of synthetic worlds	107
5.3.	Terminology choice: synthetic world.....	109
5.4.	Characteristics of synthetic worlds.....	110
5.5.	Distinction between social and gaming synthetic worlds	111
5.6.	Perceived affordances of synthetic worlds for L2 learning.....	113
5.7.	Studies into multimodality and L2 learning in synthetic worlds	119
5.8.	Conclusion.....	122
Chapter 6. Nonverbal and verbal modes in synthetic worlds		123
6.1.	Introduction	123
6.2.	The multimodal context in <i>Second Life</i>	123
6.3.	Verbal mode	124
6.3.1.	Audio modality.....	124
6.3.2.	Written modality	127
6.4.	Nonverbal mode	130
6.4.1.	Proxemics	131
6.4.2.	Kinesics	132
6.4.3.	Appearance.....	139
6.5.	Conclusion.....	140
PART III – PEDAGOGICAL APPROACH TO THIS STUDY AND RESEARCH		
METHODS.....		141
Chapter 7. Content and Language Integrated Learning.....		142
7.1.	Introduction	142
7.2.	CLIL overview	142
7.2.1.	The development of CLIL.....	142
7.2.2.	Defining CLIL.....	143
7.3.	Theoretical foundations for CLIL with respect to Second Language Acquisition	146
7.3.1.	The five hypotheses model for SLA - Krashen.....	146
	The acquisition – learning hypothesis and monitor hypothesis	147
	The natural order hypothesis	148
	The input hypothesis	148
	The affective filter hypothesis.....	149
	Krashen's hypotheses with respect to CLIL	150
7.3.2.	The output hypothesis of Swain	151
	Historical context and explanation of the output hypothesis	152
	Functions of output.....	152
	The output hypothesis of Swain with respect to CLIL.....	153
7.3.3.	The bilingualism hypothesis of Cummins.....	155
	Interdependence hypothesis	155

Cummins' threshold hypothesis.....	156
Basic Interpersonal Communication Skills and Cognitive Academic Language Proficiency distinction.....	156
The bilingualism hypothesis of Cummins with respect to CLIL	157
7.4. CLIL Pedagogy	159
7.4.1. Curricular models for CLIL	159
7.4.2. CLIL pedagogical scenarios – macro level	162
7.4.3. CLIL pedagogical scenarios – meso level.....	163
7.4.4. CLIL pedagogical scenarios – micro level.....	166
7.5. CLIL Research	168
7.6. Conclusion.....	172
Chapter 8. Pedagogical Scenario and Study Participants	173
8.1. Introduction	173
8.2. Setting the stage: CLIL and the ARCHI21 project	173
8.3. Pedagogical Scenario	174
8.3.1. Communication scenario.....	175
8.3.2. Pedagogical scenario	176
8.3.3. Approach adopted for <i>Building Fragile Spaces</i>	180
8.3.4. Modelling of the <i>Building Fragile Spaces</i> pedagogical scenario	181
8.4. Pedagogical scenario of <i>Building Fragile Spaces</i>	182
8.4.1. Architectural design learning scenario	183
Production macro tasks	184
Organisation of architectural activities.....	186
Pre-requisites for architectural scenario	187
Resources and tools	188
8.4.2. Language learning scenario.....	188
Potential interlocutors for course participants.....	189
Face-to-face communicative environment	191
Distance communicative environments.....	192
Second Life	192
VoiceForum.....	193
Email	194
Help environment	195
Language activities.....	195
Introduction to Second Life.....	195
Buildjig activity	197
Reflective activities	199
8.4.3. Schedule	202
8.5. Course participants	204
8.5.1. Teachers	205
8.5.2. Students	205
Language profiles	205
Distance communication profiles.....	206
Social networking profiles including synthetic worlds	207
Student workgroups.....	208
Scenario (GS)	209
(e)spaces (GE).....	209
Avatars (GA)	210
Land+scapes (GL)	210
8.6. Conclusion.....	211

Chapter 9.	Research Methodology.....	212
9.1.	Introduction	212
9.2.	Overview of research methodology	212
9.2.1.	Before the experiment	213
9.2.2.	During the experiment.....	213
9.2.3.	Post experiment	214
9.2.4.	Post research.....	214
9.3.	Adopting a LETEC approach to the study	217
9.3.1.	Corpus linguistics and L2 learning-teaching.....	217
9.3.2.	Approaches to learner corpora	218
9.3.3.	Pedagogical applications of learner corpora	219
9.3.4.	Drawbacks of learner corpora concerning this study	220
9.3.5.	LEarning and TEaching Corpora (LETEC)	221
9.4.	Research Protocol.....	226
9.4.1.	Pre-questionnaires	226
9.4.2.	<i>Second Life</i> session data	227
9.4.3.	<i>VoiceForum</i> activity data	228
9.4.4.	Post questionnaires	229
9.4.5.	Semi-directive interviews.....	229
9.4.6.	Ethical dimension	231
9.4.7.	Data collection coverage	232
9.5.	Applying a LETEC corpus approach to the data.....	232
9.5.1.	Instantiation	232
9.5.2.	Learning design	236
9.5.3.	Research protocol	239
9.5.4.	Public and private licences	240
9.6.	Overview of data analysis approach and operationalisation	241
9.6.1.	Computer-mediated discourse analysis approach and theoretical premises 241	
9.6.2.	Analytic methods and data selection	242
9.6.3.	Annotation of <i>Second Life</i> Buildjig sessions and transcription of <i>Second Life</i> group reflective sessions	245
9.6.4.	Transcription of verbal acts.....	247
Audio modality.....		247
Textchat modality.....		248
9.6.5.	Transcription of nonverbal acts.....	248
Entrance into and exit from the environment.....		249
Movement.....		249
Kinesic modality		249
Production		250
9.6.6.	Distinguished LETEC corpora from transcribed sessions	251
9.7.	Conclusion.....	251
PART IV – ANALYSES.....		253
Chapter 10.	Interplay between the nonverbal and verbal modes	254
10.1.	Introduction	254
10.2.	Outline of the research questions	254
10.3.	Analysis methodology and data coverage	255
10.4.	Results and discussion.....	258
10.4.1.	Floor space related to verbal acts	258
10.4.2.	Textchat modality.....	259

10.4.3.	Floor space related to nonverbal acts	260
10.4.4.	Shared visual space for collaborative activity	263
10.4.5.	Language difficulties and nonverbal acts	264
10.4.6.	Ambiguity of verbal deictics and nonverbal acts	265
10.4.7.	Proxemics and verbal interactions.....	266
10.4.8.	Activity achievement.....	268
10.5.	Synthesis of observations	269
Chapter 11.	Role of the nonverbal mode in identity construction related to L2 verbal participation and interaction.....	271
11.1.	Introduction	271
11.2.	Outline of research questions	271
11.3.	Analysis methodology and data coverage	272
11.4.	Results and discussion.....	273
11.4.1.	Students' perceptions of the importance of the avatar.....	273
11.4.2.	First world –inworld communication and identity distinctions	275
11.4.3.	Avatars' morphological evolution related to L2 verbal participation and interaction.....	277
11.4.4.	Nonverbal communication with respect to L2 verbal participation.....	281
11.5.	Synthesis of observations	285
Chapter 12.	Textchat modality related to the audio modality.....	287
12.1.	Introduction	287
12.2.	Outlining research questions	287
12.3.	Analysis methodology.....	289
12.3.1.	Coding the multimodal transcriptions of the <i>Second Life</i> reflective sessions for analysis of interplay between the voicechat and textchat modalities	289
12.4.	Data coverage	293
12.5.	Results and discussion.....	295
12.5.1.	Use of the textchat.....	296
	In synthetic worlds' multimodal context, is the textchat used for L2 communication?	296
	EFL and FFL groups' differing usage of the textchat	297
	Students' floor space across verbal modalities	299
	The role of the textchat.....	301
12.5.2.	Feedback.....	303
	Feedback on what type of errors is given? Is feedback predominantly lexical?....	303
	What type of feedback is offered?.....	304
	Is there uptake of the feedback, when does this occur and in which modality?	305
12.6.	Synthesis of observations	310
Chapter 13.	Conclusion.....	315
13.1.	Aims of this research project.....	315
13.2.	Results of this study	315
13.2.1.	Original contributions of this thesis	316
13.2.2.	Interplay between and within modes that supports verbal participation	317
	Proxemic organisation.....	317
	Avatar appearance	318
	Nonverbal acts and the duration of verbal acts	318
	Equalisation in the verbal mode	318
13.2.3.	Interplay between and within modes that supports verbal production in a foreign language	319

Nonverbal mode in support of the verbal mode during communication difficulties	319
Use of textchat modality for feedback on language form	320
13.3. Future research perspectives	321
References	325

INDEX OF FIGURES

Figure 1: Links between acts shown over three different communication modes (from Chanier & Vetter, 2006:78)	35
Figure 2: Chat circles (from Donath, Karahalios & Viagas, 1999).....	46
Figure 3: Intimate zone infraction in the 2D online graphical chat system <i>The Palace</i> from Krikorian <i>et al.</i> , 2009.	47
Figure 4: Example avatar looking at and away from participant in the study.	53
Figure 5: Kendon's continuum (1982).....	56
Figure 6: Gesture types Fussell <i>et al.</i> (2004)	66
Figure 7: Bicycle repair task	67
Figure 8: Configuration of Piwek's study.....	68
Figure 9: Furniture World	69
Figure 10: Sarah's view as Karen points with accompanying dialogue.....	70
Figure 11: Participant A's view (left) and participant T's view (right) with accompanying dialogue (From Hindmarsh <i>et al.</i> (2000:23)).	71
Figure 12: Typical visual presentation of synchronous text-based computer mediated communication environment.....	76
Figure 13: Micro conversations (from Noet-Morand, 2003:392).	85
Figure 14: Addressivity to find interaction partners (from Peterson, 2006:91)	87
Figure 15: Addressivity to exchange information and maintain contact (from Peterson, 2006:91).	87
Figure 16: Example of lexical self-correction from Kitade (2000:153).....	89
Figure 17: Example of self-correction of pragmatic appropriateness from Kitade (2000:155-6)	90
Figure 18: Example of active involvement in monitoring production from Kitade (2000:154-5).....	91
Figure 19: Self-correction over several turns (from Tudini, 2012:56).....	92
Figure 20: Classroom negotiation schema (as proposed by Varonis & Gass, 1985)	96
Figure 21: Sample of synchronous textchat negotiation that follows the classroom negotiation schema as exemplified in Blake (2000:125).	97
Figure 22 Names attributed to synthetic worlds (cited in Boellstorff, 2008).....	109
Figure 23: Public audio and textchat as part of the bottom task panel bar in <i>Second Life</i>	125
Figure 24: Icons to show the activation of audio within <i>Second Life</i>	126
Figure 25: Public textchat channel in <i>Second Life</i>	128
Figure 26: Example of a notecard with storage in the inventory shown in yellow.....	129
Figure 27: Group notices	130
Figure 28: Typology of nonverbal communication in <i>Second Life</i>	131
Figure 29: Written communication appearing in a text chat window causes a gaze reaction in the synthetic world (from Ventrella, 2011:11).....	133
Figure 30: Deictic gesture at a media object	136
Figure 31: Examples of avatar pantomimes for crying, smoking and typing	136
Figure 32: Examples of performative emblem gestures.....	137
Figure 33: Examples of meta-discursive emblem gestures	138
Figure 34: Examples of avatar iconic gestures for scissors and muscles.....	138
Figure 35: Gestures to indicate an emotional state (accompanied by vocal interjections)	139
Figure 36. The same avatar with changed clothing items and texture of the avatar's skin prim	139
Figure 37 : Adjusting avatar body thickness	140
Figure 38: The 4 Cs framework	144
Figure 39: The Language Triptych (from Coyle, 2000).....	145

Figure 40: Operation of the "affective filter (in Krashen, 1981:32).....	149
Figure 41: Cummins' 'iceberg' model (from http://www.jillrobbins.com/gwu/sattp.html) ...	156
Figure 42: The CLIL matrix.....	158
Figure 43: Auditing tasks using the CLIL matrix (from Coyle, Hood & Marsh, 2010).....	158
Figure 44: Degrees of collaboration between teachers (Coonan, 2003:33).	165
Figure 45: CLIL research approaches (adapted from Dalton-Puffer, 2011).....	168
Figure 46: Typical activity organisation for a day's workshop session: from lower-level to higher-level skills (from Kligerman, 2010).....	187
Figure 47: Sample primis available to students inworld	188
Figure 48: Potential interlocutors for the course, the communication environments and the potential status between interlocutors as given in the modelisation using <i>MotPlus</i>	190
Figure 49: Face-to-face environment	191
Figure 50: Student workgroup composition.....	192
Figure 51: Distance communication environments used during the <i>Building Fragile Spaces</i> course	193
Figure 52: Asynchronous oral interaction in a threaded discussion format.....	194
Figure 53a: Welcome posterboard	196
Figure 54: Communication protocol posterboard	196
Figure 55: Pre-built objects Figure 56: Cube provided for camera exercise.....	197
Figure 57: Modelisation of buildjig activity	198
Figure 58: Input provided to the student in the helper role.	199
Figure 59: <i>VoiceForum</i> individual reflection activity instructions	200
Figure 60: Distinct roles for students and language tutors during <i>VoiceForum</i> reflection activity.....	201
Figure 61: <i>Second Life</i> reflective session activities	202
Figure 62: Structured representation of the pedagogical scenario for <i>Building Fragile Spaces</i> (Adapted from Rodrigues <i>et al.</i> , in press)	204
Figure 63: Students' mother tongues	206
Figure 64: Students use of distance communication tools	207
Figure 65: Students' previous use and frequency of this use of social networks, synthetic worlds and synthetic gaming worlds.....	208
Figure 66: Schematic overview of the research methodology.	216
Figure 67: Facets of a 'corpus' (suggested by Chanier & Ciekanski, 2010).....	222
Figure 68: Main components of a LETEC corpus (Reffay, Betbeder & Chanier, in press) ..	223
Figure 69 : Structure of a LETEC corpus (from Chanier & Ciekanski, 2010)	224
Figure 70: Researcher present inworld in the form of a small bear avatar	228
Figure 71: Hierarchical organisation of the instantiation component using the structured interaction data model	233
Figure 72: Example of an entry in the <i>memberlist</i> for a course participant	234
Figure 73: Group information given in the <i>memberlist</i>	234
Figure 74: <i>Typology of nonverbal and verbal modalities by code</i>	235
Figure 75 : Distance communication environments used during the <i>Building Fragile Spaces</i> course	237
Figure 76 : Visualisation of the overall learning design for <i>Building Fragile Spaces</i> organized by day	238
Figure 77 : Visualization of the overall research protocol	240
Figure 78 : <i>ELAN</i> interface.....	246
Figure 79: Example of coding of audio track with reference to references to objects using <i>Nvivo</i>	257

Figure 80: Distribution of public audio floor space with respect to role during activity and workgroup	258
Figure 81: Distribution of nonverbal floor space with respect to role during activity and workgroup	261
Figure 82: Distribution of nonverbal communication cues identified for the four workgroups	261
Figure 83: Distribution of nonverbal and audio floor space	262
Figure 84: Avatar proxemics	267
Figure 85: In distance learning situations, being able to communicate through an avatar (movements, gestures, appearance) allows you to engage more in L2 interaction with other <i>Second Life</i> users	274
Figure 86: Avatars with human-like morphology Avatars with changed morphology.....	277
Figure 87: Terms of address for students whose avatar names did not correspond to their first name (see Figure 86)	277
Figure 88: Female student participant <i>Emmegi88</i> changes her avatar body shape between day one and three of course.....	278
Figure 89: Avatars with a scripted appearance – a light rotating around an avatar's head – and an avatar wearing an object which scripts the kinesic act of drinking	279
Figure 90: Evolution of students' avatar appearances during the course adapted from Warburton (2008).....	280
Figure 91: Number of verbal acts for students in groups GA, GL and GS during slrefl sessions day 2	281
Figure 92: Number of verbal and nonverbal acts by participant for workgroup GS during slrefl day 2	282
Figure 93: Number of verbal and nonverbal acts by participant for workgroup GA during slrefl day 2.....	283
Figure 94: Example of the identification of independent verbal and nonverbal acts.....	284
Figure 95 : Levels of annotation and codes used	291
Figure 96: Distribution of tpa-tpc acts during the sessions analysed.....	296
Figure 97: Distribution of tokens during sessions analysed.....	297
Figure 98: Division of textchat floor space between teacher and students for each session..	298
Figure 99: Percentage of audio floor space change (left) & textchat floor space change (right) between session GS-j2 and GS-j3	300
Figure 100: Textchat acts' functions.....	302
Figure 101 : Occurrences of feedback types offered by tutor	305
Figure 102: Students' responses to the EFL tutor's feedback	306
Figure 103 : Time lapse (in number of verbal acts) before corrective feedback was responded to by students.....	307
Figure 104 : Example of conversation doubling	309

INDEX OF TABLES

Table 1: Terminological differences applied to communicative and non-communicative gestures.....	55
Table 2: Categories of emotes using the present tense according to Cherny (1999)	77
Table 3: Functions and usage of emoticons as forwarded by Marcoccia (2007).....	79
Table 4: Characteristics of synchronous CMC pertaining to oral and written communication (as cited in Marcoccia, 2007)	80
Table 5: Mean number of acts in each environment	94
Table 6: Triggers for negotiation in NS-learner sessions out of a total of 61 instances (from Tudini, 2003b:150).....	100
Table 7: Order of acquisition of grammatical morphemes for learners of English L2	148
Table 8: Curricular models for CLIL education as described by Coyle, Hood & Marsh (2010:21-25).....	160
Table 9: Parameters that need to be stated in a CLIL pedagogical scenario which concern the micro level of planning	167
Table 10: Model of the distinctive characteristics of a tutoring scenario (Quintin, 2005:25).	178
Table 11: Components of the pedagogical scenario as defined by Daele <i>et al.</i> , (2002) and Nissen (2006).	180
Table 12: Workgroups.....	208
Table 13 Barlow's variables for learner corpora metadata (2006).....	218
Table 14 : Semi-directive interview structure	230
Table 15 : Summary of data collection	232
Table 16: Domains of language considered in CMDA (adapted from Herring, 2004: 55)....	243
Table 17 : Types of verbal acts	248
Table 18 : Codes used to transcribe different types of movements by avatars in <i>Second Life</i>	249
Table 19 : Codes used for transcription of kinesics	250
Table 20 : Codes used for the transcription of production acts.....	251
Table 21 : Categories used to code references to objects in the verbal mode.....	256
Table 22: Top categories of verbal acts referencing objects by type and student role with examples.....	263
Table 23: Coding at the act level.....	290
Table 24: EFL groups' verbal act breakdown by session and participant	294
Table 25: FFL groups' verbal act breakdown by session and participant	295
Table 26: Student floor space distribution for session GE-j3	301
Table 27: EFL teacher's use of the textchat modality	304

INDEX OF PRINCIPAL WORKS CITED

- Aarseth, 108, 325
Aldrich, 111, 325
Allen, 43, 63, 254, 260, 317, 325
Alvarez-Martinez, 325
Amiel *et al.*, 203
Anis, 77, 79, 80, 325
Annett, 314, 325
Antoniadou, 323, 325
Antonijevic, 130, 131, 134, 325
Archer, 45, 325
Argyle *et al.*, 48, 49
Arias, 44, 325
Barlow, 217, 218, 326
Barrier, 44, 326
Bartle, 107, 110, 326
Beattie & Coughlan, 61
Bell, 109, 110, 111, 112, 326, 327
Bertin, 173, 326
Birdwhistell, 48, 326
Blake, 33, 35, 37, 38, 96, 97, 101, 104, 299, 304, 321, 326
Blanchet, 230, 326
Bloom, 144, 325, 326
Boellstorff, 109, 112, 127, 327
Bonnet, 171, 327
Book, 110, 111, 327
Bourdieu, 25, 273, 327
Bower & Kawaguchi, 75, 95, 288, 290, 304, 311
Brown & Bell, 117
Butzkamm, 169, 327
Cabiria, 271, 327
Castronova, 109, 327
Chachkine, 175, 176, 180, 327
Chamberlin, 43, 327
Chanier, 29, 32, 35, 199, 220, 221, 223, 224, 232, 240, 251, 252, 283, 288, 297, 301, 310
Chanier & Wigham, 14, 18, 232, 233, 235, 252, 293, 316, 322
Chanier, Saddour & Wigham, 14, 251, 273, 283, 293
Chapelle, 231, 329
Cherny, 77, 78, 329
Chun, 82, 83, 329
Ciekanski & Chanier, 35, 36, 38, 74
Clark & Krych, 264
Classen, 67, 330
Coonan, 159, 162, 163, 164, 165, 166, 167, 330
Cosnier, 48, 55, 56, 57, 77, 330
Coyle, 142, 143, 144, 145, 146, 151, 154, 157, 158, 159, 160, 161, 167, 168, 169, 170, 330
Coyle, Hood & Marsh, 142, 143, 144, 146, 151, 154, 157, 158, 160, 167, 168, 169, 170
Cummins, 17, 142, 146, 155, 156, 157, 159, 330
Cziko & Park, 74, 75
Daele *et al.*, 166, 179, 180
Dalgarno & Lee, 12, 116, 118
Dalton-Puffer, 12, 142, 146, 154, 168, 169, 170, 171, 320, 331, 340
Davies, 108, 331, 341
De Freitas, 110, 331
De Reuiter, 331
De Singly, 229, 331
De Souza, 331
Deutschmann & Panichi, 287, 312, 314
Dickey, 115, 117, 332
Donath, Karahalios & Viagas, 45, 46
Dooly & Hauck, 33
Dresner & Herring, 51, 52
Ellis, 153, 180, 326, 332
Eurydice, 143, 332
Falloon, 11, 332
Feyereisen, 59, 332
Flewitt *et al.*, 10, 214, 245
Flowerdew, 220, 332
Foucher, 11, 166, 175, 176, 332, 343
Fraser, 65, 69, 70, 332, 335, 337
Freedman, 55, 59, 135, 333
Fussell *et al.*, 12, 66, 67, 68, 255, 319
Fynn, 11, 193, 333
Gajo, 166, 333
Garau *et al.*, 52, 53
Garner *et al.*, 11
Gartner Inc., 108, 333
Gaver *et al.*, 53
Goodman *et al.*, 23
Grabe & Stoller, 151
Graddol, 161, 333
Granger, 217, 219, 333, 334, 343, 345
Gu *et al.*, 11
Guichon & McLornan, 32
Guichon, Bétrancourt & Prié, 37

Gullberg, 10, 54, 61, 64, 315, 334
 Hall, 40, 41, 42, 43, 44, 45, 46, 47, 48,
 132, 334, 337, 341
 Halliday, 21, 23, 26, 27, 334
 Hampel, 10, 32, 36, 37, 38, 81, 272, 288,
 298, 299, 301, 321, 332, 334, 338
 Hampel & Stickler, 10, 33, 36, 37, 38, 298,
 299, 301, 321
 Harper, 50, 174, 267, 334
 Hasselgard & Johansson, 218
 Hauck & Youngs, 32
 Haviland, 62, 135, 335
 Henderson *et al.*, 12, 115, 116, 118, 119
 Herring, 51, 52, 124, 126, 128, 241, 242,
 243, 254, 332, 335
 Hindmarsh *et al.*, 71
 Hislope, 117, 335
 Hoffman, 55, 83, 135, 333, 335
 Hunter & Parchoma, 11, 173
 Hutchinson, 115, 335
 Jepson, 92, 103, 104, 335
 Jewitt, 21, 22, 23, 24, 27, 28, 29, 31, 326,
 332, 335, 336, 337, 340
 Jewitt *et al.*, 31
 Jonassen, 115, 336
 Jungheim, 64, 336
 Kellerman, 63, 65, 336
 Kelm, 83, 84, 336
 Kendon, 43, 49, 52, 55, 56, 57, 58, 132,
 135, 136, 336
 Kenning, 94, 336
 Kerbrat-Orecchioni, 81, 336
 Kern, 82, 84, 116, 330, 336, 341
 Kida & Faraco, 323
 Kiesler, Siegel & McGuire, 51
 Kirk, Rodden & Stanton Fraser, 65
 Kita, 57, 60, 64, 137, 337
 Kitade, 88, 89, 90, 91, 103, 288, 309, 337
 Kligerman, 184, 185, 187, 337
 Kolb & Kolb, 115
 Kötter, 76, 77, 78, 98, 99, 103, 104, 337
 Krashen, 17, 142, 146, 147, 148, 149, 150,
 151, 337
 Krauss, Chen & Chawla, 40
 Krauss, Chen & Gottesman, 57, 59
 Kraut, Fussell & Siegel, 52, 53, 267
 Kress, 21, 22, 23, 26, 27, 29, 31, 32, 336,
 337
 Kress & Jewitt, 21, 22, 26, 27, 29, 31
 Kress & van Leeuwen, 29
 Krikorian *et al.*, 46, 47
 Labov, 227, 337
 Lamy, 10, 12, 30, 32, 81, 94, 272, 325,
 330, 338
 Lamy & Hampel, 12
 Lazaraton, 63, 338
 Lee, 116, 117, 118, 331, 337, 338, 343
 Leech, 219, 338
 Lessikar, 48, 338
 Levelt, 59, 338
 Lim, 12, 33, 198, 338
 Long, 92, 95, 198, 314, 332, 338
 Long & Robinson, 92
 Lucietto, 167, 339
 Mahl, 55, 339
 Maina, 179, 339
 Maccoccia, 78, 79, 80, 339
 McCafferty, 10, 41, 59, 61, 62, 63, 64, 72,
 315, 332, 339, 342
 McCafferty & Stam, 10, 315
 McNeill, 54, 55, 57, 58, 60, 61, 62, 67,
 138, 327, 331, 332, 335, 336, 337, 339
 Nagy, 271, 340
 Nancy-Combes, 204, 340
 Negueruela *et al.*, 65
 Nelson & Erlandson, 110
 Nikula, 170, 340
 Nissen, 166, 168, 175, 176, 179, 180, 181,
 325, 340
 Nitsche, 108, 340
 Noet-Morand, 84, 85, 89, 91, 340
 Norris, 21, 24, 25, 340
 Norris & Jones, 24, 25
 Nummenmaa, 49, 340
 Örnberg, 341
 Palomeque, 121, 287, 312, 341
 Panichi & Deutschmann, 227
 Paquette, 173, 176, 177, 181, 236, 341
 Peachey *et al.*, 10, 111
 Pellettieri, 88, 89, 97, 99, 304, 341
 Peterson, 12, 78, 86, 87, 117, 118, 120,
 316, 322, 341, 342
 Piwek, 12, 67, 68, 255, 342
 Platt & Brooks, 50
 Py, 286, 342
 Quinslink, 50, 267, 342
 Quintin, 177, 178, 179, 343
 Rauscher, Krauss & Chen, 59
 Rayson & Baron, 219
 Robbins-Bell, 111, 343

Rodrigues *et al.*, 204
Sadler, 110, 111, 115, 118, 343
Sanchez, 107, 118, 343
Schmidt, 343
Schroeder, 109, 130, 343
Schwienhorst, 11, 93, 118, 343, 344
Scollon, 21, 24, 25, 26, 344, 346
Scollon & Levine, 21
Scollon & Scollon, 21, 24, 25, 26
Slobin, 64, 344
Smith-Robbins, 110, 112, 326, 341, 344
Snow & Brinton, 151, 152
Snow, Met & Genesee, 154
Snyder, 23, 344
Sommer, 43, 344
Sotillo, 93, 100, 101, 104, 344
Stam, 41, 59, 61, 62, 63, 64, 65, 72, 332,
339, 342, 344
Steuer, 117, 344
Stockwell, 338
Swain, 17, 88, 142, 146, 151, 152, 153,
154, 155, 156, 180, 327, 330, 344
Swann, 50, 344
Taylor, 110, 340, 345
Tellier, 57, 62, 63, 345
Teoh, 11, 118, 321, 345
Thornbury, 88, 153, 345
Toyoda & Harrison, 81
Tribble, 218, 345
Tsutsui, 310, 313, 345
Tudini, 80, 89, 90, 92, 97, 99, 100, 104,
304, 345
Ulicsak, 112, 345
Unsworth, 32, 345
Van Leeuwen, 21, 346
Varonis & Gass, 96
Ventrella, 130, 133, 134, 268, 346
Verhulsdonck & Morie, 130, 260
Vetter & Chanier, 32, 37, 288, 297, 301,
310, 311, 319, 323
Wadley, 107, 108, 111, 123, 124, 126, 127,
346
Wadley & Gibbs, 123
Warburton, 280, 346
Warschauer, 83, 341, 346
Wertsch, 24, 153, 347
Wigham, 232, 251, 252, 283
Wigham & Chanier, 14, 81, 109, 212, 217,
283
Yamada, 93, 94, 347
Yanguas, 101, 103, 104, 347
Yee *et al.*, 54, 131, 132
Yoshioka, 57, 64, 137, 347
Yun, 85, 347

SUBJECT INDEX

- affective filter hypothesis, 149, 150
appearance, 4, 18, 40, 119, 131, 139, 249,
271, 272, 273, 274, 275, 277, 278, 279,
280, 281, 286, 318, 321
audio modality, 4, 33, 34, 35, 36, 74, 75,
81, 88, 92, 93, 94, 96, 101, 103, 104,
121, 122, 123, 247, 259, 266, 269, 287,
292, 299, 300, 301, 303, 305, 306, 307,
309, 310, 311, 312, 313, 314, 318, 319,
320, 322, 323
avatar morphology, 277, 286
bilingualism hypothesis, 155, 157
buildjig, 197, 198, 245, 254, 255, 257
communication scenario, 161, 166, 173,
174, 175, 176, 180, 181, 192, 211
computer-mediated discourse analysis, 17,
212, 241, 245, 322
Content and Language Integrated
Learning, 4, 1, 11, 12, 17, 19, 142, 143,
144, 145, 146, 150, 151, 153, 154, 155,
157, 158, 159, 160, 161, 162, 163, 164,
165, 166, 167, 168, 169, 170, 171, 172,
173, 174, 211, 255, 268, 287, 320, 327,
330, 331, 332, 335, 340
corrective feedback, 13, 19, 39, 74, 88, 93,
95, 100, 101, 104, 105, 287, 288, 290,
291, 295, 303, 304, 305, 306, 307, 310,
311, 313, 314, 327
feedback, 4, 12, 13, 16, 36, 37, 38, 48, 74,
88, 95, 98, 100, 101, 105, 118, 153, 181,
185, 187, 194, 200, 202, 287, 288, 289,
290, 291, 292, 293, 303, 304, 305, 306,
307, 309, 310, 311, 312, 313, 314, 320,
322, 323, 334, 335, 344, 345
floor space, 18, 37, 75, 81, 82, 83, 84, 105,
170, 258, 259, 260, 261, 262, 269, 289,
290, 297, 298, 299, 300, 301, 303, 311,
318
gaming synthetic world, 111, 112
gaze, 21, 43, 44, 48, 49, 50, 51, 52, 53, 54,
72, 132, 133, 267, 268, 319, 323, 325,
333
gesture, 21, 50, 54, 55, 56, 57, 58, 59, 60,
61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72,
79, 120, 128, 132, 134, 135, 136, 137,
138, 250, 261, 262, 266, 278, 323, 326,
331, 335, 336, 340, 344
input hypothesis, 148, 337
inworld identity, 4, 12, 272, 275, 276, 285,
286, 321, 322
kinesics, 18, 48, 54, 131, 132, 235, 250,
254, 272
learning design, 142, 172, 181, 182, 220,
222, 236, 238, 239, 255
LETEC, 4, 1, 14, 17, 182, 212, 214, 217,
220, 221, 222, 223, 224, 225, 226, 231,
232, 233, 236, 239, 240, 246, 251, 252,
283, 316, 322, 329, 340
macro task, 119, 184, 188, 193, 199, 201,
203, 254, 305, 309
modality, 13, 15, 18, 28, 29, 30, 33, 34, 35,
36, 37, 40, 41, 48, 54, 72, 74, 75, 77, 81,
84, 86, 88, 92, 94, 101, 120, 121, 123,
124, 127, 132, 133, 139, 176, 245, 247,
248, 249, 254, 256, 259, 263, 266, 270,
272, 283, 287, 288, 289, 293, 296, 297,
298, 299, 301, 鶴303, 305, 307, 310,
311, 312, 313, 314, 318, 319, 320, 322,
323, 347
modality of usage, 30
mode, 3, 4, 16, 21, 22, 24, 26, 28, 29, 30,
32, 36, 37, 38, 40, 55, 62, 64, 74, 81, 93,
94, 120, 121, 124, 127, 130, 131, 136,
167, 254, 256, 258, 260, 269, 300, 311,
314, 315, 316, 319, 322, 323, 331, 337
monitor hypothesis, 147
multimodal interaction analysis, 15, 21, 24
negotiation of meaning, 13, 16, 39, 74, 81,
88, 95, 96, 97, 98, 99, 100, 101, 103,
104, 105, 119, 155, 171, 181, 287, 346
nonverbal mode, 4, 10, 11, 12, 15, 18, 28,
36, 40, 68, 72, 94, 119, 121, 122, 123,
131, 245, 254, 255, 258, 263, 266, 268,
269, 271, 272, 285, 316, 318, 319, 321,
322, 323
noticing, 88, 90, 93, 94, 152, 153, 314, 345
output hypothesis, 151, 152, 153, 154
pedagogical scenario, 18, 32, 159, 162,
163, 165, 166, 167, 168, 173, 174, 176,
177, 179, 180, 181, 182, 188, 193, 202,
203, 204, 211, 213, 214, 220, 236, 254,
270, 316, 318, 320, 339
proxemics, 18, 41, 42, 43, 44, 45, 46, 47,
72, 120, 131, 132, 133, 254, 267, 317,
318, 325, 334
reflective activities, 199, 200

research protocol, 18, 187, 211, 212, 213, 214, 221, 222, 226, 232, 239, 240, 252, 317

research questions, 12, 13, 14, 18, 101, 212, 213, 214, 239, 241, 242, 243, 254, 255, 258, 269, 271, 272, 285, 287, 288, 289, 295, 296, 311, 316, 321, 322

role of the textchat, 301, 311

self-correction, 89, 90, 91, 92, 93, 94, 103, 105, 304

shared visual space, 52, 70, 264

social synthetic world, 111, 112, 123

socio-semiotic approach, 4, 15, 21, 24, 26, 27, 28, 30, 31, 39, 124

support verbal production, 16, 74, 88, 93, 104, 105, 321

synthetic world, 1, 4, 10, 12, 13, 15, 16, 17, 18, 19, 28, 30, 54, 69, 71, 73, 74, 76, 86, 105, 107, 108, 109, 110, 111, 112, 113, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 126, 127, 130, 131, 132, 133, 134, 135, 139, 140, 142, 172, 186, 187, 192, 195, 196, 207, 208, 209, 210, 212, 220, 224, 235, 248, 252, 254, 255, 260, 261, 264, 266, 267, 268, 269, 270, 272, 275, 280, 286, 287, 288, 289, 296, 301, 302, 304, 305, 306, 311, 312, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324

textchat modality, 4, 12, 30, 34, 36, 37, 74, 75, 81, 82, 83, 84, 88, 89, 90, 92, 93, 95, 101, 119, 120, 121, 122, 127, 128, 248, 259, 266, 287, 288, 289, 292, 295, 296, 298, 299, 300, 301, 302, 303, 304, 305, 306, 309, 311, 312, 313, 314, 317, 320, 322, 323

transcription, 3, 4, 14, 15, 16, 17, 18, 123, 140, 212, 214, 224, 243, 245, 246, 247, 248, 250, 251, 252, 256, 257, 263, 282, 291, 316, 328, 329

uptake of feedback, 309

verbal deictics, 265

verbal mode, 4, 10, 12, 15, 16, 17, 18, 22, 29, 31, 32, 36, 37, 38, 40, 54, 74, 81, 82, 94, 105, 119, 122, 123, 133, 134, 136, 173, 245, 254, 255, 256, 258, 259, 263, 266, 267, 268, 269, 270, 289, 293, 298, 310, 311, 312, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324

verbal participation, 1, 4, 10, 11, 15, 16, 18, 19, 29, 35, 39, 74, 81, 82, 83, 105, 170, 173, 241, 271, 272, 275, 277, 281, 282, 285, 286, 288, 315, 316, 317, 318, 321, 322, 324