

Document downloaded from:

<http://hdl.handle.net/10251/63091>

This paper must be cited as:

Soler Monreal, C. (2015). Announcing one's work in PhD theses in computer science: A comparison of Move 3 in literature reviews written in English L1, English L2 and Spanish L1. *English for Specific Purposes*. 40:27-41. doi:10.1016/j.esp.2015.07.004.



The final publication is available at

<http://dx.doi.org/10.1016/j.esp.2015.07.004>

Copyright Elsevier

Additional Information

# **Announcing one's work in PhD theses in computer science: A comparison of Move 3 in literature reviews written in English L1, English L2 and Spanish L1**

Soler-Monreal, Carmen

Applied Linguistics Department, *Gale*

Universitat Politècnica de València, Spain

## **Abstract**

In this paper I explore cross-linguistic rhetorical variation in the Literature Review chapters of 30 doctoral theses of computer science written by English L1 (EngL1), Spanish L1 (SpaL1) and English L2 (EngL2) writers. Using Kwan's (2006) genre-analytical framework (Move 1: Establishing one part of the territory of one's own research; Move 2: Creating a niche; Move 3: Occupying the research niche), I particularly examine how writers present their research in Move 3 (M3). The results show the functional importance of M3 strategies in the computer science PhD thesis LRs. The texts in English present a higher number of occurrences and a wider range of M3 strategies than the SpaL1 texts. However, the SpaL1 texts are more homogeneous in terms of rhetorical distribution. Variation is also found in the linguistic mechanisms the writers of the three groups use to make themselves visible and promote their work. National writing styles, discipline conventions and language barriers to effective interpersonal communication seem to interact with these writers. EAP courses and specific genre-based writing instruction could help emerging writers to successfully manage M3 strategies.

Key words: PhD thesis, computer science, literature review, move structure, rhetorical variation, self-mention, self-promotion

## **1. Introduction**

New knowledge and scientific advances are mainly communicated in English, as a result of globalisation and the use of English as the *lingua franca* of academia. This has encouraged many studies to explore the textual organisation of research articles (RAs) in different disciplines written in English (Swales, 1990; Brett, 1994; Berkenkotter & Huckin, 1995; Lewin & Fine, 1996; Holmes, 2001, Lewin, Fine & Young, 2001;

Samraj, 2002; Soler-Monreal & Gil-Salom, 2010; Kwan et al. 2012). The findings have contributed to the understanding of the nature and practice of the most widely used academic genre for the transmission of knowledge. Rhetorical models have been proposed for the RA sections and have been extensively applied to other written academic genres, such as dissertations and PhD theses. A widespread framework of analysis has been Swales' (1990) CARS model, consisting of Move 1 (Establishing a territory), Move 2 (Establishing a niche) and Move 3 (Occupying the niche).

Based on the English generic conventions, researchers have also compared the rhetorical choices of texts written in English with those of other languages so as to identify cultural influences on writing tendencies (Mauranen, 1993). To mention but a few, some authors have undertaken contrastive analyses of English and Eastern European languages (see Duszak, 1997). In other related work, Hirano (2009) compared RA introductions in English and Brazilian Portuguese, Loi (2010) compared RA introductions in English and Chinese, and Martín-Martín (2003), Perales-Escudero & Swales (2011) and Martín & León Pérez (2014) focused on the similarities and differences in move structures between academic texts written in English and in Spanish. Martín-Martín applied Swales' CARS model to a corpus of RA abstracts in social sciences. He found that Move 2 was used less frequently in the introduction section of the RA abstracts in Spanish than in the English RA abstracts and explained that the members of the international and the Spanish scientific communities have different expectations. Martín & León Pérez's (2014) study on the realisation of Move 3 in RA introductions in health and social sciences showed that the differences in how Spanish and English writers promote their research were attributable to both national cultural variables and disciplinary conventions.

To a lesser extent research has also been conducted on doctoral writing. Organisational patterns of PhD theses in different disciplines written in English have been studied. For instance, Bunton analysed the introduction (Bunton, 2002) and the conclusion chapters (Bunton, 2005) of PhD theses in 10 disciplines, but principally chemistry, ecology and biodiversity. Lim (2014) and Lim, Loi & Hashim (2014) examined the introductions of a corpus of dissertations in applied linguistics. The rhetorical strategies of literature review chapters have been described by Kwan (2006), who focused on applied linguistics, Thompson (2009), who investigated agricultural botany, agricultural economics, food science and technology, and psychology, and Ridley (2011) who analysed eight disciplines in the hard and soft sciences. As for

comparative research, Ono (2012) compared Japanese and English introductory chapters of literature PhD theses. He identified more steps in the English introductions than in the Japanese ones. He also found that the Japanese group put more emphasis on Move 2 than did the English group. However, in a study by Soler-Monreal, Carbonell-Olivares & Gil-Salom (2011) on PhD thesis introductions in computer science written in English and in Spanish, it was concluded that Move 2 was obligatory in the English texts but not in the Spanish ones. This suggests the existence of both disciplinary and language-specific variations in rhetorical features of the PhD genre.

Another branch of research has examined cross-cultural variation among writers of English L1 and L2 (Dong, 1996; Flowerdew, 1999; Duszak & Lewkowicz, 2008; Hanauer & Englander, 2011; Mansourizadeh & Ahmad, 2011; Yayli, 2011). Comparative studies of rhetorical aspects of English L1, English L2 and Spanish L1 RA introductions in applied linguistics (Burgess, 2002; Sheldon, 2011) confirmed that all the texts used Swales' move-step model in RA introductions, although some rhetorical differences were found among the groups. Burgess found that Spanish writers tended to delete Move 2 and to either delete or introduce Move 3 abruptly and with a single sentence or clause after the extended treatment of Move 1, often revealing an unstable relationship with the audience. Sheldon, however, found that all groups exhibited Move 3 and with more information compared to Burgess's study, probably because of the time elapsed between both studies and the increasing pressure on Spanish writers to publish in English international publications. She also found that although the Spanish L1 RA introductions showed a movement towards the conventions of the English register, the English L2 texts did not show a strong resemblance to the discourse conventions in English in regards to Moves 2 and 3 (Sheldon, 2011: 247). However, it remains to be seen whether these differences are valid for other academic genres. This paper contributes to the study of academic discourse from a cross-linguistic (English L1, English L2 and Spanish L1) perspective on the rhetorical strategies used in a corpus of PhD theses. On the other hand, rhetorical variation in English and Spanish has been investigated mainly in the fields of applied linguistics, social sciences and health sciences, but is underrepresented in other disciplines. Further comparative rhetorical studies of academic genres written in English and Spanish may reveal variations in specific disciplines.

Research on the discipline of computer science has analysed structural and lexicogrammatical aspects of RAs written in English (Anthony 1999; Posteguillo; 1999;

Harwood, 2005; Shehzad 2007a, 2008, 2010, 2011; Soler-Monreal & Gil-Salom, 2010). Among these analyses are comparisons of the rhetorical organisation of a corpus of computer science thesis introductions written in English and in Spanish (Carbonell-Olivares, Gil-Salom & Soler-Monreal, 2009; Soler-Monreal, Carbonell-Olivares & Gil-Salom, 2011). According to these studies, Move 2 is not always used in the Spanish texts. Further, the thesis introductions in English are more complex rhetorically and use a wider range of strategies than the texts in Spanish, especially in Moves 2 and 3. But, to my knowledge, there is no comparative study of theses in computer science written by English-speaking students and Spanish-speaking students writing their PhD theses in Spanish and in English. My aim is to add to the understanding of the rhetorical strategies applied in PhD theses of computer science across English-language and Spanish-language contexts by specifically focusing on the literature review chapter.

Literature reviews (LR) allow the writer to show her/his knowledge in an area of research and place her/his work on a research topic within the appropriate social and disciplinary context. In the majority of theses, they are either single or recurrent separate chapters, depending on the complexity of the topic, or part of other chapters, usually introductions (Thompson, 2009; Ridley, 2011). As Thompson (2009: 52) argues, LRs typically summarise the findings of related studies and establish gaps or weaknesses in present knowledge, paving the way for new knowledge claims. Thus, the rhetorical organisation of distinct LR chapters tends to follow the CARS model (Swales, 1990) for introductions. Once the thesis writer has established the setting for the research (Move 1), she/he creates a research space because related research is challenged or a knowledge gap or limitation is acknowledged (Move 2). This allows her/him to present the current study to the thesis examiners as one link in a chain of research that is developing and enlarging knowledge in the field, thus justifying the thesis research and consolidating the writer's research space (Move 3). However, in her study on the LR chapters of PhD theses on applied linguistics written in English, Kwan (2006) concluded that Move 3 is optional. It remains to be seen whether Kwan's findings are valid for other disciplines and for other languages.

In this paper I analyse the separate LR chapters of 30 PhD theses of computer science written by English L1 (EngL1), Spanish L1 (SpaL1) and English L2 (EngL2) writers. This work was done in response to my interest in discovering what conventions of discourse in English and what features of the Spanish writing style could be found in the Eng L2 texts.

Working from the assumption based on Burgess' (2002) and Sheldon's (2011) results and my own findings for PhD thesis introductions (Soler-Monreal, Carbonell-Olivares & Gil-Salom, 2011) that there likely is variation in the use of Move 3 in the LR chapters of PhD theses written in English and Spanish, I particularly wanted to explore the rhetorical and linguistic techniques the EngL1, EngL2 and SpaL1 writers in the corpus most often draw upon to announce their research and focus the reader's attention on the actions she/he has taken. The study sought the answers to two research questions.

- (1) To what extent is Move 3 incorporated in the separate LR chapters of a set of EngL1, SpaL1 and EngL2 PhD theses of computer science?
- (2) What rhetorical strategies and linguistic mechanisms of Move 3 do doctoral writers use in these LR chapters to announce and promote their contribution?

The results may offer valuable pedagogical implications for assisting both doctoral research writers and thesis supervisors in the process of writing a thesis in a target language. This is important because academic practices are known to be hard for students to comprehend. Thus, this comparison of the patterns and forms that are used in the LR chapters of a corpus of 30 PhD theses of computer science written by EngL1, SpaL1 and EngL2 writers can help students to understand and use conventions of structure, discourse and social interaction appropriate to the academic, disciplinary and language context. The findings of the study will give rise to fruitful discussion in post-graduate EAP classes. The Spanish students of EFL courses will be aware of the English conventions and will be able to use them when required.

## **2. Method**

### **2.1 The corpus**

The corpus consists of three sets of the separate LR chapters of 30 computer science PhD theses in electronic form written mostly between 2008 and 2012 and selected from university repositories. Ten theses were written in English and were defended at the University of Glasgow, UK, between 2008 and 2010. Ten theses were written in Spanish and were defended at the Universitat Politècnica de València, Spain (UPV) between 2003 and 2010. Ten theses were written in English and were defended at the UPV between 2008 and 2012. The first ten computer science theses in English available

electronically from the UPV repository, which date back to 2008, were selected for analysis. While the EngL1 and SpaL1 theses were selected randomly, all the EngL2 theses in computer science in the UPV repository were collected.

I cannot confirm that the writers of the EngL1 theses are native speakers of English but I assume their theses meet native-speaker standards for English since the doctoral research took place in an institution located in UK. The first language of the thesis writers at the UPV is Spanish, as corroborated through personal communication in some cases and by the information available on the web in other cases: 17 writers were born in Spain and three writers were from Mexico (two writers of SpaL1 theses, one writer of an EngL2 thesis). They carried out at least part of their studies and their postgraduate research in the same Spanish-speaking institution located in Spain, which makes their texts comparable.

Writing their PhD thesis in English is an attractive alternative for Spanish doctoral students of computer science for several reasons. Firstly, the relevant literature in the field of computer science is in English. Secondly, most Spanish doctoral students have already published related research in English in international journals, which makes it natural for them to use English. Thirdly, they seek the award of a European Doctorate, which means that they obtain a complementary certificate to the traditional doctorate in Spain.

Each set of theses contains examples of the four types of theses described by Paltridge (2002). Seventeen theses in the corpus have the traditional IMRD structure of RAs, eight theses are simple and nine theses have a traditional IMRD complex format. Six theses are compilations of RAs and five theses are topic-based<sup>1</sup>. Besides, two theses, one in the EngL2 set (EngL2-T9) and one in the SpaL1 group (SpaL1-T7), have Problem-Solution structures<sup>2</sup>. Although this diversity affects the general rhetorical layout of the theses, they share contextual factors, namely, genre, field of study, global communicative purpose, situation and participants (Moreno, 2008). It is these shared

---

<sup>1</sup>Traditional simple theses report on a single study while the traditional complex structure presents an Introduction, a LR, an optional General Methods chapter, different case studies under the IMRD format, a Discussion and a Conclusions chapter. The article-compilation format is a collection of closely-related publishable or published manuscripts prefaced by an introductory chapter and closed with a concluding chapter. Topic-based theses follow the structure: Introduction, LR (optional), Theoretical Framework (optional), Method, Topic 1: Analysis-Discussion, Topic 2: Analysis-Discussion...Conclusion. (Paltridge, 2002; Swales, 2004).

<sup>2</sup> Instead of following the traditional IMRD structure, the theses with a Problem-Solution pattern start with an introduction in which a problem is put forward or a question is raised about the current state of knowledge, and a possible solution/answer is offered in the following chapters (Swales and Feak, 2005).

contextual factors and the existence of specific separate chapters dedicated to the literature review that made the corpus selected appropriate for the purposes of the study. The total number of pages under analysis amounts to 1112 pages (EngL1: 355 pages, mean 35.5 SD: 16.79; EngL2: 354 pages, mean 35.4 SD: 16.45; SpaL1: 403 pages, mean 40.3 SD: 36.05) and about 280,000 words.

## 2.2 The model

For the comparative genre-analysis of the rhetorical practices used in the computer science PhD LRs produced by the three groups of writers, I used Swales' (1990) CARS model and Kwan's (2006) move-strategy framework created for a corpus of LR chapters of doctoral theses of applied linguistics.

As my research interest was how the writers announce their work (Move 3), I further developed the move in Kwan's model and included other rhetorical choices suited to the actual writing practices of the computer science texts under analysis (see Fig. 1, modifications in italics). In the examples, characters in bold face highlight specific words or portions of text. Italics are used for my own English translation of the Spanish passages.

Fig. 1. Move structure of LR chapters based on Kwan (2006)

<b>Move 1</b>	<b>Establishing one part of the territory of one's own research by:</b>
Strategy A	surveying the non-research-related phenomena or knowledge claims
Strategy B	claiming centrality
Strategy C	surveying the research-related phenomena
<b>Move 2</b>	<b>Creating a research niche (in response to Move 1) by:</b>
Strategy A	counter-claiming
Strategy B	gap-indicating
Strategy C	asserting confirmative claims about knowledge or research practices surveyed
Strategy D	asserting the relevancy of the surveyed claims to one's own research
Strategy E	abstracting or synthesizing knowledge claims to establish a theoretical position or a theoretical framework
<b>Move 3(optional)</b>	<b>Occupying the research niche by announcing:</b>
Strategy A	<i>nature of work done</i> , research aims, focuses, research questions or hypotheses, <i>justification</i>
Strategy B	theoretical/ <i>methodological</i> frameworks
Strategy C	research design/processes
Strategy D	interpretations of terminology used in the thesis
<i>Strategy E</i>	<i>value of work done</i>

The additional aspects of Strategy A are as follows.



1. Nature of work done. Writers direct reader's attention to their achievements. This aspect refers explicitly to the framework, system or algorithm that has been the result of the research described in the thesis.

- (1) Although simulation-based methods have been used to test query modification techniques (Harman 1988, Ruthven 2003) and to detect concept shifts (Lam, Mukhopadhyay, Mostafa & Palakal 1996, Mostafa, Mukhopadhyay & Palakal 2003), to our best knowledge not much research has been carried out in creating realistic searcher models for evaluating information filtering systems[...] **In this study, I present a framework for** evaluating recommendation systems based on hybrid approach between searcher simulation techniques and user-centered experiments. EngL1-T10
- (2) **This work deals with systems that take advantage of** the Auto-ID capabilities of mobile devices in order to improve the business processes in an organization. EngL2-T1
- (3) Una opción muy interesante es que sea el propio algoritmo de agrupamiento el que genere los antecedentes y consecuentes de la regla (Díez et al. 2002a). Esta idea será implementada por **el algoritmo que se propone** en el capítulo 8 de esta tesis. SpaL1-T6  
*/A very interesting option is to make the grouping algorithm itself generate the antecedents and consequents of the rule (Díez et al. 2002a). This idea will be implemented by **the algorithm which is proposed** in Chapter 8 of this thesis. SpaL1-T6/*

It may be argued that this aspect overlaps with *research aims/focuses*; however, through these strategies the writers mention the purpose and scope of their research but do not refer to their actual achievements.

- (4) In the thesis **we focus on** biological data which is mainly represented in 1D, 2D or is multi-dimensional. EngL1-T4
- (5) **This work deals with** business processes in which physical elements are involved. EngL2-T1
- (6) En particular, **este análisis se centra en** las soluciones dadas por estos métodos para el diseño e implementación de servicios Web. SpaL1-T1  
*/Particularly, **this analysis focuses on** the solutions given by these methods for the design and implementation of Web services. SpaL1-T1/*

2. Justification. Writers state the reasons which have lead them to their research.

- (7) **Since no solution was available, we opted to integrate** Communication Analysis and the OO-Method. EngL2-T9

As regards Strategy B, there are instances in the corpus referring not only to theoretical frameworks but also to the methods, algorithms and models on which the study relies. Much of the research in computer science consists in applying an existing method (which is described in the LR chapter) to new problems or in new conditions. For this reason, the strategy was labeled *theoretical/methodological frameworks* in the adapted model.

- (8) **Within this work, we therefore apply** simulation-based evaluation schemes that are based on the above introduced methodologies. EngL1-T7
- (9) **These statistical models are the basis of the systems developed in this thesis.** EngL2-T6
- (10) **Dichas técnicas son las más apropiadas en el marco de esta Tesis[...].** SpaL1-T6  
*/Such techniques are the most appropriate in this thesis framework[...]. SpaL1-T6/*

In addition, Strategy E *value of work done*, with the main rhetorical function of stating the value of the present research (Swales, 2004), was added to the model<sup>3</sup>. Although Kwan considered that value-claiming co-occurred with at least one of the Move 3 strategies and did not propose it as a separate strategy, I noticed it had a persuasive/promotional function which was worth to take into account. Unlike Strategy *A nature of work done*, which baldly presents the thesis work, this strategy emphasises the advantages of the present research. The writers in examples 9, 10 and 11 highlight the improvements of their achievements with respect to previous models.

- (11) **These limitations have subsequently been addressed in the *Trasure, Yoshi and Far Crys*systems developed as part of this thesis, [...].** EngL1-T1
- (12) Regarding the HERA, UWAT+, OOHDM, OO-H, MIDAS and WSDM proposals, up to date there is no tool supporting the extensions proposed by each of them.  
Solution Proposed in this thesis:  
**In this thesis, we have developed an Eclipse-based tool that supports the modelling and the transformation phases** that allow building a BP-driven Web application based on the specification performed at the modelling level. EngL2-T7
- (13) **En el siguiente capítulo se desarrolla un algoritmo de estimación basado en un observador Luenberger[...], mejorando su convergencia respecto a los desarrollos clásicos.** SpaL1-T4

---

<sup>3</sup>In a recent study by Gil-Salom & Soler-Monreal (2014), Strategy E was labelled *contribution to research*. However, I think the expression *value of work done* reflects the promotional purpose of the strategy more clearly.

*/In the next chapter an estimation algorithm is developed based on a Luenberger observer [...], thus improving its convergence with respect to classical/traditional developments. SpaL1-T4/*

### 2.3 The procedure

A comprehensive reading of all the LRs was required to identify the move development of each LR chapter using an analytical method adapted from Kwan's (2006) model in which Move 1 (M1) presents the research background, Move 2 (M2) involves establishing a niche which justifies the relevance of the thesis research and Move 3 (M3) presents the thesis work. I first focused on identifying the three major M1-M2-M3 moves in all the texts. Second, I examined all the segments connected with the strategies for M3. I then proceeded to reread the samples in search of the prominent linguistic features employed by the writers in the three sets to promote their work.

Being conscious of the degree of subjectivity that is involved in this type of analysis and in order to obtain more reliable results, a colleague and I independently coded all the texts segments in the LRs. Attention was first focused on identifying the three major M1-M2-M3 moves in all the texts. Second, all the segments connected with the strategies for M3 were examined. After carrying out the analysis individually, we discussed our respective analyses and resolved discrepancies.

In order to learn whether the doctoral students were provided with any institutional guidelines, I searched the Glasgow University and the UPV webs for thesis guides. I found only layout and formatting instructions. Each university offers voluntary training courses to help doctoral students with thesis research methods and layout issues. But it seems that decisions on the style of the theses, apart from the contents, are the results of negotiation between the students and the thesis supervisors in both institutions.

Nine different supervisors were identified for the EngL1 theses. One supervised three theses, two supervised two theses and no supervisor was mentioned in two other theses. Fourteen supervisors were in charge of the EngL2 theses and also 14 supervisors were explicitly referred to in the SpaL1 theses. Four theses in the EngL2 corpus had one supervisor, four theses had two supervisors and two other theses shared the same supervisor. As for the SpaL1 theses, each supervisor supervised only one thesis. Four texts had one supervisor, five texts were supervised by two supervisors and no supervisor was mentioned in one thesis. Many supervisors of theses at the UPV

supervise theses written either in English or in Spanish. In fact, two supervisors had each supervised a thesis in Spanish and a thesis in English in the corpus.

I invited all the supervisors of the theses in the corpus to participate in my research and answer a questionnaire (see Appendix) in order to explore their general views of thesis writing and learn about the guidance they give to their doctoral students, particularly with respect to the communicative functions of the LR chapters. Of the nine thesis supervisors at the University of Glasgow, three answered the questionnaire. For the theses defended at the UPV, I gave the questionnaire to 17 supervisors of theses (written either in Spanish or in English), after having added five questions related to the language chosen to write the thesis. Nine respondents sent back their answers. These 12 respondents played the role of specialist informants who provided useful information for starting the research. I was also able to interview five thesis writers at the UPV. I asked them about what guides had helped them to structure their theses, about the instructions they had received from their supervisors for writing the LR chapter and about the linguistic resources they had used to emphasise the thesis contribution. Their answers helped to contextualise and support my claims.

I present a quantitative and qualitative description of variation in the use of the rhetorical and linguistic features that the writers in a corpus of EngL1, EngL2 and SpaL1 PhD LRs on computer science use for occupying a niche in research.

### **3. Results and discussion**

Some general findings based on the specialist informants' answers to the questionnaire are first reported here before the quantitative results of the frequencies of M3 strategies and the description of some linguistic practices are presented. All informants confirmed that doctoral students consult previous models of theses in their field of research and use them as guides to structure their own theses, due to the lack of guidance other than layout and presentation given by the universities. The informants of the EngL1 theses said they tended to provide guidance on the format of the actual LR. One of them added that writing the LR is not a completely new task for the research students because they have typically been through similar exercises when writing undergraduate project dissertations or master's dissertations. The informants at the UPV

said that additional guidelines might be provided by supervisors or the research team within which the research is being carried out.

The informants at both universities stressed the need to establish a niche in research (M2) and to emphasise the contribution of the study to the field (M3) in the thesis. The main difference between the two groups of supervisors lies in their opinion about the obligation to use M3 in the LR chapter. While all the EngL1 supervisors said the LR is the natural place to indicate the gaps in previous research and state the student's contribution, M3 was considered to be compulsory in a LR chapter by only three informants at the UPV. For most of the UPV supervisors, the use of M3 in a LR chapter is advisable, but it is really done in full in the introduction and the conclusions chapter at the end of the entire thesis. In any case, they all agreed that it is crucial to clearly explain the contribution of the current research to the examiners.

Other interesting information about the theses at the UPV is that doctoral students writing in English are not supplied with guidelines different from those provided to the writers of theses in Spanish. On this point, six informants considered that it was more natural and easier for students to write in English as they were familiar with English academic writing, an opinion which was shared by the students interviewed. Three other informants also mentioned that writing a thesis in English adds to international visibility. The supervisors took for granted that the doctoral writers were proficient enough at English. They all stated that they valued contents over correctness in English, but four of them explained that they usually had the English checked by native speakers of English or translation services.

### 3.1 Move structure analysis of the corpus

The results obtained revealed cross-linguistic differences in the frequency of occurrence of M3 in the three sets of LRs.

Table 1 shows the frequency of occurrence of the three moves in the three sets of computer science PhD LRs. M1 and M2 are used in all the LRs in the corpus. As for M3, it is used in all the EngL1 LRs, in 90% of the LRs in the EngL2 set and in 80% of the SpaL1 group.

Table 1. Frequency of moves in the computer science PhD LRs of the corpus

Moves	N EngL1 (%)	N EngL2 (%)	N SpaL1 (%)
Move 1 Establishing one part of the territory of one's	10 (100)	10 (100)	10 (100)

own research			
Move 2 Creating a niche	10 (100)	10 (100)	10 (100)
Move 3 Occupying the niche	10 (100)	9 (90)	8 (80)
M1-M2-M3 pattern	10 (100)	9 (90)	8 (80)

In her model for LRs of applied linguistics, Kwan (2006) proposed M3 as optional. However, following Sheldon's (2011) criterion that a move is mandatory if the percentage of its occurrences equals or is higher than 80%, we can state that the three M1-M2-M3 moves are key components of the LRs under study. We might, however, point out that the pattern M1-M2-M3 is more distinctive of the LRs written in English than of the LRs in Spanish in the sample analysed.

As the specificity of the topic increases and the field of research is narrowed, the LR chapters in the corpus use M1-M2 cycles. To show the advance in a specific area, M1 is usually followed by an embedded [M2] move (Carbonell-Olivares, Gil-Salom & Soler-Monreal, 2009; Soler-Monreal, Carbonell-Olivares & Gil-Salom, 2011) indicating that a gap/problem/need/limitation which was identified at a certain stage of investigation was addressed by other researchers but was not completely. This M1[M2] cyclicity allows for recurrent uses of M3, whenever the writer explicitly seeks to overcome the remaining or still existing gap/problem/need/limitation by announcing the current research.

In more than one third of the M1-M2-M3 LRs, instances of M3 are used in initial, medial and final positions of the literature review, as shown in Table 2. The structure of these LRs can be described as recurrent complete M1-M2-M3 cycles: M3-M1-M2-M3-M1-M2-M3-...-M2-M3. One third of the LRs use M3 in initial and final positions only, under the pattern M3-M1 [M2]-M1 [M2]-....-M2-M3. The remaining LRs present instances of M3 only at the beginning, in the middle or at the end of the literature review.

Table 2. Position of M3 in the computer science PhD LRs of the corpus

EngL1	start	middle	end	EngL2	start	middle	end	SpaL1	start	middle	end
T1	x		x	T1	x	x	x	T1	x		x
T2			x	T2	x	x	x	T2			x
T3	x		x	T3			x	T3	x	x	x
T4	x	x	x	T4	x	x	x	T4	x		x
T5	x	x	x	T5			x	T5	x	x	x
T6	x		x	T6	x		x	T6	x	x	x
T7		x	x	T7	x		x	T7			x

T8	x		x	T8	x			T8	x
T9			x	T9	x	x	x	T9	
T10	x	x	x	T10				T10	

When M3 occurs in an initial position, its main function is to inform readers of the purpose of the thesis (Strategy A). In medial positions, M3 is used to occupy the niche identified in M2 mainly by announcing the work done and research focuses (Strategy A), the research design/processes (Strategy C) and/or the theoretical/methodological frameworks (Strategy B). In final positions, M3 presents the work done (Strategy A) and/or highlights its value (Strategy E). In most LRs, medial and final M3s establish the connection between what has been done and the work presented in the thesis, which leads to M2-M3 shifts (Lim, 2012). The announcement of their main research goals and achievements serves to promote their research.

### 3.2 Analysis of Move 3

#### 3.2.1 Rhetorical strategies of Move 3: Quantitative analysis

The results obtained for the three groups of computer science LRs reveal some rhetorical differences in the use of M3 strategies.

Tables 3, 4 and 5 reveal that the EngL1 LRs have the highest number of M3 strategies, followed by the EngL2 texts. Far fewer occurrences were found in the SpaL1 texts. These results indicate that the EngL2 texts are more similar to the EngL1 texts in terms of M3 than to SpaL1 texts. Although all of the Spanish doctoral students receive the same guidelines from their supervisors, the higher frequency of M3 in the Eng L2 LRs seems to reflect that the EngL2 writers align their texts with the English models to a greater extent than the SpaL1 writers do. One reason for this may be that they read theses written in English and follow the models in these texts. Reading theses in their language of choice, the UPV supervisors and thesis writers pointed out, leads them to reproduce English patterns.

Regarding the number of theses in the corpus using M3 strategies, the Tables show that Strategies A (nature of work done, research aims, focuses, research questions or hypotheses, justification), B (theoretical/methodological frameworks) and C (research design/processes) are prevalent in the EngL1 and EngL2 texts. The most popular options for the SpaL1 writers are Strategies A and C.

The Tables also show the number of strategies of M3 used in each thesis in each set. No thesis uses the five M3 strategies. Eighty percent of the EngL1 LRs and 60% of the EngL2 writers use at least three strategies to occupy the niche in research, which indicates great awareness of international rhetorical practices. Conversely, in the SpaL1 set, only three writers (30%) use three or four different M3 strategies.

Table 3. Number of strategies in M3 used by the EngL1 writers

<b>Move</b>	<b>3</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>Total N of strategies in the corpus</b>	<b>Total N of theses using the strategy</b>
Strategy A	1	3	4	6	3	11	13	1	1	2	45	10	
Strategy B	4		8	1	2		4			1	20	6	
Strategy C	1	4	1	4	1	7	9	2	1	3	33	10	
Strategy D		2			1	1	1				5	4	
Strategy E	1	1					1				3	3	
<b>Total</b>	<b>7</b>	<b>10</b>	<b>13</b>	<b>11</b>	<b>7</b>	<b>20</b>	<b>27</b>	<b>3</b>	<b>2</b>	<b>6</b>	<b>106</b>		

Table 4. Number of strategies in M3 used by the EngL2 writers

<b>Move</b>	<b>3</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>Total N of strategies in the corpus</b>	<b>Total N of theses using the strategy</b>
Strategy A	9	1	2	3		1	1	2	2		21	8	
Strategy B	3	1		5	1	3	1	1	1		15	8	
Strategy C	7	3		2	2	4	1		1		20	7	
Strategy D				3							3	1	
Strategy E		1						11			12	2	
<b>Total</b>	<b>19</b>	<b>6</b>	<b>2</b>	<b>13</b>	<b>3</b>	<b>8</b>	<b>14</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>71</b>		

Table 5. Number of strategies in M3 used by the SpaL1 writers

<b>Move</b>	<b>3</b>	<b>T1</b>	<b>T2</b>	<b>T3</b>	<b>T4</b>	<b>T5</b>	<b>T6</b>	<b>T7</b>	<b>T8</b>	<b>T9</b>	<b>T10</b>	<b>Total N of strategies in the corpus</b>	<b>Total N of theses using the strategy</b>
Strategy A	2				1	3	3	1	1			11	6
Strategy B				1			3	1				5	3
Strategy C			1	1	2	1	3		1			9	6
Strategy D				1								1	1
Strategy E	1			1	1							3	3
<b>Total</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>9</b>	<b>2</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>29</b>	



Table 5 shows that the SpaL1 writers use far fewer M3 strategies than the other two groups. However, measures of central tendencies indicate that the SpaL1 texts are more homogeneous in terms of rhetorical distribution (Table 6). Except for SpaL1-T6, the median and mean measures for the SpaL1 set reveal 2-3 occurrences of M3 strategies in the SpaL1 corpus. The figures seem to indicate that announcing the present research in the LR chapter is not the essential purpose of the SpaL1 thesis writers, as confirmed by most of the UPV supervisors and thesis writers interviewed. Interestingly, however, after further experience with academic writing and publishing in English in international journals, one SpaL1 thesis writer revealed in an interview that she regretted not sufficiently highlighting the novelty of her research when she wrote the LR chapter and the whole of her thesis. An awareness of such regret could help students reflect on effective rhetorical resources to achieve promotion.

The medians for the EngL1 and the EngL2 groups are 8.5 and 5 respectively (Table 6), which are considerably higher than those for the SpaL1 LRs. But the SD measures show that these sets have greater variability. The heterogeneous spread of M3 occurrences among the EngL1 and EngL2 texts indicates that there are great differences among the theses. Indeed, three theses in each set contain half of the total occurrences in the sets (Tables 3 and 4). The supervisors' personal views and recommendations, individual styles and the research topic might explain this heterogeneity. In the case of EngL2 (Table 4), for example, the supervisor of both EngL2-T1 and EngL2-T7, with 19 and 14 occurrences of M3 strategies, said in his answers to the questionnaire that he insisted on the crucial need to establish a niche and occupy it in the LR chapter of a thesis. This explains why the highest number of occurrences in these theses focuses on announcing the work done (EngL2-T1) and highlighting the value of the thesis contribution (EngL2-T7). For the EngL1 texts (Table 3), the figures for EngL1-T7 and EngL1-T9 are striking, given that both their supervisors agreed that their students should highlight the thesis contribution to research. An analysis of a larger corpus might reveal that the high of 27 (EngL1-T7) and the low of two (EngL1-T9) are outliers and cannot be considered to be usual practice.

On the other hand, the large number of occurrences of M3 strategies in EngL1-T7 and EngL2-T7 may also be the result of the organisation of their LR chapters, which are divided into different sections with discussion/conclusions sub-sections allowing for the repetition of M3 strategies throughout the chapter. Analysing samples of authentic material with different thesis formats in the classroom would allow students of specific

genre-based writing courses to reflect on the ways to manage the rhetorical moves in the LR chapter and emphasise the thesis contribution.

Table 6. Statistical data regarding M3 in the three sets of theses

Theses	N occurrences	Median	Mean	SD (Standard deviation)
Eng L1	106	8.5	10.6	7.76
Eng L2	71	5	7.1	6.2
Spa L1	29	2.5	2.9	2.64

### 3.2.2 Linguistic features of M3: Qualitative analysis

The social function of a PhD thesis is to represent the doctoral student's scholarly knowledge and academic expertise to a set of examiners who assess whether the writer deserves to be accepted as a member of the academic community (Peters, 2011). To accomplish this goal, the writer's own claims must be expressed in convincing ways. Self-mention and authorial positions are mechanisms of commitment, voice and stance seeking to appropriately claim responsibility, connect with the reader and assess research achievements. In the review of previous research in the LR, much of the authorial voice is attributed to previous relevant expert voices coming from other members of the disciplinary community. However, the author's own voice needs to be heard in order to show authority and promote the thesis work. The linguistic resources associated with the expression of the self are varied and may differ across languages.

The results obtained from the comparative analysis of the texts in the corpus of computer science LRs revealed some differences in the linguistic choices by the EngL1, EngL2 and SpaL1 writers in terms of promoting both their authority as competent researchers and the thesis contribution to research in M3.

Here I focus on two of the most explicit elements of self-mention and personal opinion: personal attribution through first person pronouns and evaluative lexis.

#### 3.2.2.1 Personal attribution

The analysis of the corpus revealed some cross-linguistic differences related to self-mention.

First person pronouns provide maximum visibility and can be used for promotional purposes. To be persuasive, the thesis writer must project a voice of individual expert authority throughout the text (Thompson, 2012) and take full responsibility for the decisions made at the different stages of the research. In her study on computer science RA introductions, Shehzad (2007b: 61) claimed that exclusive *we* was used with a high frequency in this discipline and this sub-genre as a marketing strategy to convince readers that the methods or design have worked best. In line with Shehzad's findings, the results revealed that first person plural possessives and personal pronouns are used in the EngL1 and EngL2 LRs of computer science PhD theses so that the writers' voices can be explicitly heard. What is more, the EngL1 LRs contain first person singular forms which help the writer's commitment (*my work, my own approach, my own study, I decided, I explore, I build*). In contrast, the results for the SpaL1 group show the avoidance of self-mention. Sheldon (2009), who studied self-representation in English and Castilian Spanish RAs in applied linguistics and language teaching, found that the texts in Spanish contained slightly more personal forms than the texts in English. However, this claim is not corroborated in my study, perhaps because I explored only one move in a chapter of a different genre.

Combined with verb constructions, first person pronouns assume rhetorical roles which convey voice and stance related to the self. These combinations reflect a level of authorial power as the writers make decisions on the focus, framework of analysis and procedural steps of the investigation. This helps to reinforce their status as reliable competent researchers deserving the award doctorate. Following Fløttum (2012: 224), the most prominent roles authors take on when referring to themselves are: researcher, writer (or reader-guide) and arguer. In my study, investigation of the co-text revealed that the thesis writer can promote her/himself as an authority in her/his research through these roles. In Strategies A and B, first person pronouns take on predominantly the rhetorical role of researcher and contribute to showing that the writer masters the decisions related to the research she/he has undertaken/set out on, like in the following.

- (1) The two last tasks presented by Shneiderman are history and extract. They are very important and useful for all scientific fields, including biology, however **we do not focus on** them in the thesis. EngL1-T4
- (2) Note that within this work, **we will focus on** recommender systems and personalized search, neglecting the other paradigms. EngL1-T7

- (3) Sometimes, it can be necessary not only to compute the best word sequences, but also the n-best word sequences in the word graph. In this work **we are going to use** the algorithm known as “Recursive Enumeration Algorithm” (REA) [Jm99]. The main reason that supports this decision is its simplicity to calculate best paths on demand. EngL2-T6
- (4) We first reviewed the literature to find out whether there was an existing model-driven requirements engineering method available for use. [...] Since no solution was available, **we opted to** integrate Communication Analysis and the OO-Method. EngL2-T9

In Strategies A, C and D, the role of writer (or reader guide) provides reader guidance about what is done while evidencing the writer’s power for making decisions related to the research topic, as illustrated by these examples.

- (5) Given the confusion over the naming and attribution of work categories, I feel it is incumbent on me to make clear what I consider the various categories to be [...] As a result, from this point on, **I will be using** the terms Perfective, Adaptive, Corrective, Preventative in reference to this classification system. EngL1-T2
- (6) In accordance with these statements, it is obvious how the boundaries among these figurative devices are not clearly differentiable. Therefore, in this thesis and according to our objective, **we will understand** irony in the following terms [...]. EngL2-T4

The role of arguer, the clearest stance-marking role for Fløttum, which exhibits the writer’s self-confidence and commitment by critically presenting her/his position and judgements, was also reported in the two groups in Strategies A, B and D.

- (7) I have settled on using the term “software immigrant “ as **I feel it** clearly distinguishes itself from “novice”[...]. EngL1-T2
- (8) [...] **we agree with** White et al. (2005) that user simulations should only be seen as a pre-implementation method which will give further opportunity to develop appropriate systems and subsequent user-centred evaluations. Within this work, we therefore apply simulation-based evaluation schemes that are based on the above introduced methodologies. EngL1-T7
- (9) Based on this integral vision of language, [...], **we will subscribe** the arguments to describe, analyze and support our approach. EngL2-T4

In Spanish, the first-person pronoun working as the subject of a clause is contained in the verb form but not usually mentioned explicitly. Taking this into account, in only one LR in the SpaL1 set does the writer employ two first person plural forms and take on the role of researcher (nos centramos/*we focus on*/, abordamos/*we deal with*/). In the

SpaL1 texts impersonal and passive constructions together with active constructions with research nouns in subject position predominate. This aligns with the Spanish thesis writers' answers. They admitted they never used first person forms and preferred to use writer-hiding techniques. As recommended by some Spanish thesis guidelines (Omil, 2003), the writers of the SpaL1 texts avoid taking personal responsibility for their claims, perhaps for reasons of caution and modesty.

- (10) **Esta tesis se centrará** en aquellos métodos que emplean los modelos TS borrosos para calcular las predicciones del proceso [...]. SpaL1-T3  
*/This thesis will focus on those methods that employ TS fuzzy models to calculate the process predictions [...]. SpaL1-T3/*

### 3.2.2.2 Evaluative markers

Linguistic choices reflect the writer's attitude towards a claim with the aim of guiding and convincing the reader to see the propositional content in her/his way. This involves attitudinal language that comprises evaluative lexis (Stotesbury, 2003; Koutsantoni, 2004), conveys the writer's affective values and adds a positive or negative judgement to the sentence/statement. In LRs, the writer makes judgements and demonstrates her/his position about the literature in relation to her/his research (Paltridge & Starfield, 2007). The writer's linguistic choices show critical engagement and persuade the reader of the coherent link which can be established between previous research in an area of study and her/his work by comparing, analysing and evaluating. This happens particularly in M1 and M2, where writers highlight the strengths, weaknesses and omissions of existing literature, providing a critique of the research, but is nonetheless found in M3 as well, to focus on the thesis contribution and lead the reader to accept the validity of the claims. Thus, evaluation is central to academic writing as it helps to construct a text in successful interactive ways. Despite its importance, the use of evaluative language is hard for doctoral students.

LRs are carefully assembled to justify the need of the current research and show why it is distinct from what has gone before. In light of this, it is then important to construct a persuasive dialogue between the writer and the reader which persists throughout the text. However, as regards the use of evaluative lexis in M3 to explicitly highlight the contribution of the thesis, few occurrences were found in the samples analysed. In general, the writers of the texts in the corpus did not evaluate their work, but simply presented it, perhaps because doctoral work is assessed by a board of examiners who

alone determine whether the writer should be awarded a doctorate. Indeed, the UPV thesis writers interviewed admitted avoiding evaluative lexis when stating the value of the work presented and using, instead, distancing techniques they judged more appropriate for the interaction between themselves and the audience in the context of the defense of the thesis. However, in spite of the writers' tendency not to evaluate the work done, I found instances of evaluation in the three groups of LRs.

Evaluative lexis in M3 is used by both the EngL2 and the SpaL1 writers to evaluate the relevance and appropriateness of employing a particular approach or tool in their research (Strategies B and C). The SpaL1 LRs use a variety of adjectives, verbs and nouns with positive meaning, but in the EngL2 texts only three occurrences were found and were expressed using the evaluative adjectives *central* and *interesting*. This may be due to the second language barriers to effective interpersonal communication faced by these non-native English writers. Both the UPV supervisors and the thesis writers said that the EngL2 writers are recommended to use short sentences and simple words to avoid grammar and vocabulary mistakes, which probably has an effect on their use of language and their relationship with the reader.

- (11) This analysis allows us to determine the way in which each proposal addresses the aspects that are **central** in our approach. EngL2-T1
- (12) [...] the tools which are **interesting** for the purposes of this thesis must be interoperable and must comply with the industrial standards for modeling, metamodeling and model transformations. EngL2-T5
- (13) Una opción **muy interesante** es que sea el propio algoritmo de agrupamiento el que genere los antecedentes y consecuentes de la reglas (Díez et al., 2002a). Esta idea será implementada por el algoritmo que se propone en el capítulo 8 de esta Tesis. SpaL1-T6  
/A **very interesting** option is to make the grouping algorithm itself generate the antecedents and consequents of the rules (Díez et al., 2002a). This idea will be implemented by the algorithm which is proposed in chapter 8 of this thesis. SpaL1-T6/
- (14) La aplicación de las técnicas de agrupamiento, por las que se ha optado en este trabajo [...] son **una buena forma de evitar este problema**, ya que **permiten** construir un modelo borroso basado en reglas únicamente desde datos experimentales [...], **con la ventaja de que** la identificación podría quedar automatizada. SpaL1-T6  
/Applying grouping techniques, which has been decided in this work [...] is **a good way of avoiding this problem**, since they **allow** researchers to construct a fuzzy rule-based model out of experimental data [...], **with the advantage** that the identification could be automatic. SpaL1-T6/
- (15) En la presente tesis se proponen mecanismos como TDMA con posibilidad de *polling intra-cluster* o ACKs para conseguir realizar el envío de datos **de la mejor manera posible**. SpaL1-T8  
/In the current thesis mechanisms such as TDMA with the alternative of polling intra-cluster or ACKs are proposed to succeed in forwarding data **in the best possible way**. SpaL1-T8/

For Strategies A and E there are very few examples of positive evaluation in the SpaL1 group and even fewer examples in the EngL2 LRs that highlight how the thesis

work advances the research in its field. These are two examples that contain comparisons.

- (16)[...] **our approach allows to better detail** the way in which the physical-virtual linkage is established and the degree to which users participate in the workflow. EngL2-T1
- (17)En el siguiente capítulo se desarrolla un algoritmo de estimación basado en un observador Luenberger cuya matriz de ganancia será determinada considerando las incertidumbres del modelo, debido a los problemas en el conocimiento de la planta, **mejorando su convergencia respecto a los desarrollos clásicos**. SpaL1-T4  
*/In the following chapter an estimation algorithm is developed based on a Luenberger observer whose profit matrix will be determined by considering the uncertainties of the model, due to the problems in knowing the plant, **thus improving its convergence with respect to classical/traditional developments**. SpaL1-T4/*

Conversely, the examples in the EngL1 LRs show more varied lexical choices in relation to evaluative language. To describe the goals and focus of the work presented in the thesis (Strategy A) and for justifying the choice of the theoretical/methodological basis of the theses (Strategy B), adjectives and adverbs meaning importance are used.

- (18)A fundamental premise in this thesis is that obtaining an overview is an **essential** early stage in the exploration of any collection of information. EngL1-T3
- (19)Appropriated use is something that is **extremely important** to the work presented in this thesis. EngL1-T5
- (20)**Most importantly** for this thesis, an adaptive system based on context-awareness must monitor the external environment and also its internal structure. The Domino system introduced in Chapter 5 is one of the first examples of such a system. Eng1-T1

When they promote their contribution, the EngL1 writers stress the novelty and simplicity of the work done and the design process (Strategies A and C), which are highly valued characteristics in the field of computer science<sup>4</sup>.

- (21)As part of the evaluation methodology I propose a **novel technique** to capture the trend of user interests during the profiling process. EngL1-T10
- (22)Ideally a recommendation system would recognize and adapt to drifting interests with no extra effort from the user. By gathering relevance feedback through implicit means, Columbus has followed an **effortless approach** to document recommendations. EngL1-T10

Overall, the analysis of the corpus has revealed that there is variation in M3, especially in the way the writers in the three sets promote their work. While the SpaL1 and the EngL2 writers claim that previous techniques have been adequate and stress that their work represents an improvement over previous achievements, the EngL1 writers claim centrality and stress the novelty and simplicity of their contribution.

---

<sup>4</sup>The characteristics of novelty and simplicity of a method/system/model/design are typically stressed in areas related to the field of computer science (cf. Anthony's (1999) findings on software engineering RA introductions).

#### 4. Conclusions

In this empirical study I analysed the separate LR chapters of 30 PhD theses written in English (EngL1) and Spanish (SpaL1) as well as in English (EngL2) by Spanish-background writers in the field of computer science using a revised version of Kwan's (2006) move-strategy framework. In particular, I explored cross-linguistic rhetorical variation in the prominent strategies employed to announce current research (M3). The results revealed some differences in the frequency of occurrence of some of the rhetorical strategies and linguistic mechanisms used in the three sets of LRs.

The analysis of the corpus showed that M1, M2 and M3 are obligatory moves in the computer science PhD LRs (M1, M2 and M3 found in 27 of the 30 LRs). So much of the literature on computer science is written in English that rhetorical preferences in English must have impacted on these doctoral writers (Sheldon, 2011: 245) and their supervisors have guided them on the uses of these shared rhetorical conventions, thus reflecting their understanding of how knowledge is disseminated in the area.

As regards M3, it was found that the writers in the three groups place M3 strategies in initial, medial and final positions, and this may reflect the functional importance of promoting one's research in the three sets of computer science PhD LRs. Even though some UPV supervisors do not consider this move essential in the thesis LR, the results show that the Spanish doctoral writers follow the English conventions they are familiar with through the models and publications in English in the area of computer science. However, the EngL1 texts present a wider range of M3 strategies and a higher number of occurrences than the SpaL1 and EngL2 texts. Our results suggest that, although interdisciplinary variation could be found between other sets of data in other academic disciplines (Yakhontova, 2006), the influence of the Spanish tradition and culture seems to undermine writers' ability to engage in self-promotion in M3 in the computer science area. On the other hand, the comparative quantitative analysis of the EngL2 and SpaL1 sets showed that the EngL2 texts use more strategies and occurrences of M3 than the SpaL1 texts. In accordance with Martín and León Pérez (2014: 12), who examined variation between English and Spanish RA introductions in health and social sciences, this seems to indicate that in the SpaL1 LRs cultural factors "tend to override the influence of disciplinary context", but the Spanish writers of the EngL2 texts do use



more of the English conventions than do those of the SpaL1 texts. When an academic text is written in English, this implies that the original work can be presented to a potentially broader audience, which is consistent with the need to achieve greater visibility. In fact, this is the reason why Spanish writers decide to write their theses in English. As they have based their own writing on models in EngL1, these EngL2 writers have to a certain extent offset the effects of SpaL1 rhetorical and stylistic features when writing in EngL2 (Moreno et al. 2012).

In contrast, the SpaL1 texts are more homogeneous in terms of rhetorical organisation, although the median of M3 strategies is low in comparison with the data of the other two groups. This may reflect that the Spanish writers in the computer science community do use the international rhetorical norms but are not fully conscious of the persuasive function of M3 strategies. In the EngL1 and EngL2 texts the range of variation is wider because some of the writers overemphasise certain strategies in M3. This may also reflect that, although aware of the need to point to their claims, specific genre-based writing instruction could help these emerging writers to successfully manage M3 strategies.

Most of the EngL1 (80%) and the EngL2 writers (60%) use at least three strategies to occupy the niche in research, namely Strategies A (work done, research aims, focuses, research questions or hypotheses, justification), B (theoretical/methodological frameworks) and C (announcing one's research design/processes). Conversely, only 30% of the writers in the SpaL1 set use three or four different M3 strategies. The most widely adopted options for the SpaL1 writers are Strategies A and C. By employing these strategies, the writers in the corpus mainly announce their work, research aims or research design and present the methodology. They do not, as a general rule, evaluate their research. Indeed, Strategy E (value of work done) is used in the three sets of theses by only 30% of the EngL1 and SpaL1 writers and 20% of the EngL2 writers. This contrasts with Shehzad's (2010) results for computer science RA introductions that revealed a high occurrence of statements used to enhance the significance of the work presented. This difference suggests that highlighting the value of the work done is not an essential strategy in the LR of a computer science PhD thesis, although it might be appropriate in other chapters of the thesis, as some specialist informants at the UPV pointed out. Further research on the introduction and conclusion chapters could help to verify whether this is so.

With regard to the self-mention, the writers of the texts in English let their voices be heard to a greater extent than do the SpaL1 writers, who distance themselves from their work. Although the SpaL1 writers prefer impersonalisation techniques, the EngL2 writers, like the EngL1 writers, make themselves present in their texts by using first person pronouns. As for evaluative markers in M3, they are scarce in the samples in the corpus. The EngL2 writers refrain from promoting their contribution. Instead, they mainly use a restricted range of evaluative lexis when they assess extant techniques or processes directly related to their work (Strategies B and C). Similarly, the SpaL1 writers center their texts on highlighting the appropriateness of a tool or method for their research. But few M3 instances in the two groups evaluate the research outcome, thus reducing self-promotion. Conversely, the EngL1 writers draw upon more varied linguistic resources to promote the value of their study. Their general trend is to highlight the simplicity and novelty of their proposals, as is typically done in areas related to computer science.

The above findings are limited to the corpus of this study. Further comparative and statistical research is still needed in order to generalise the results to the three groups of academic writers in the field of computer science. It also remains to be seen if promotional strategies are more characteristic of other chapters of the thesis.

The study is of interest for its pedagogical implications. Newcomers to computer science need to align their work with the established practices of their discipline community in order to be accepted as members of the community (Wenger, 2000). In light of this, careful observation and imitation of sample models can contribute to students' understanding of rhetorical patterns and ways to achieve full membership. However, according to Yayli (2011), some of the established disciplinary writing practices might not be evident from mere reading and imitation. Together with the conventions of academic texts, genre-based and EAP courses should include the notions of academic voice and stance to help students interact efficiently with the audience and intervene successfully in their writings. The heterogeneity of the EngL1 and EngL2 texts suggests that genre-based writing instruction could guide novice researchers in the correct understanding of the discursal expectations and the adequate use of the conventional practices of their discipline community. Awareness of the effectiveness of the strategies to emphasise their contribution to research would help SpaL1 students acquire genre knowledge of the rhetorical practices and social purposes of their own local discourse community compared with the standardised international norms. Given

that publishing computer science research in English medium international journals is the typical means of spreading research results, the approach could prove useful in increasing the likelihood that their research articles will be accepted for publication.

Mastery of the genre conventions required in a communicative situation will provide students with the strategies needed for writing successfully. To this end, different teaching activities can be designed based on authentic PhD LR chapters to reveal the purposes and patterns of literature reviews. By teaching students to analyse the structure of the LR chapters of PhD theses in computer science, instructors can guide them to discover effective rhetorical patterns. At a lexico-grammatical level, frequency lists and concordances can provide useful information for doctoral students and can also be converted into teaching materials. When tackling the ways to occupy the niche in research, instructors can use the lists of predominant evaluative adjectives, nouns and verbs to plan activities in the classroom aiming at making them appreciate the importance of letting their self be felt along their texts. They can also lead them to compare the strategies that are generated in different language contexts and decide on those which are most pertinent to their own requirements.

I hope this work has provided insights into rhetorical variation in M3 in the field of computer science by exploring the separate LR chapters of a corpus of EngL1, SpaL1 and EngL2 PhD theses. Cross-linguistic studies on academic discourse like the one which has been presented here may add to the understanding of how genres operate in comparable academic contexts and disciplines across the world.

## **Appendix**

Questionnaire for computer science informants (PhD supervisors) at the University of Glasgow:

1. Do doctoral candidates consult previous models of theses to learn about the conventional structure of a thesis?
2. Are students provided with any general guidelines?
3. Do doctoral students have previous knowledge about what information the Literature Review chapter of a doctoral thesis must include?
4. Are doctoral students required to:

- a. emphasise explicitly the contribution/significance of the study to the field?
  - b. establish or indicate a gap/need/niche in research?
  - c. criticise openly previous studies?
  - d. highlight the novelty of the research?
5. Is this done in the Literature Review chapter or in other chapters of the thesis?
  6. When supervisors read the texts, do they check that the contribution is highlighted enough?

Questionnaire for computer science informants (PhD supervisors) at the UPV:

1. Do doctoral students consult previous models of theses to learn about the conventional structure of a thesis? Do they consult theses written in Spanish or in English?
2. Are doctoral students provided with any general guidelines?
3. Do doctoral students have previous knowledge about what information the Literature Review chapter of a doctoral thesis must include?
4. Are doctoral students required to:
  - a. emphasise explicitly the contribution/significance of the study to the field?
  - b. establish or indicate a gap/need/niche in research?
  - c. Criticise previous studies openly?
  - d. highlight the novelty of the research?
5. Is this done in the Literature Review chapter or in other chapters of the thesis?
6. Is there any variation as regards these issues if the thesis is written in English?
7. Are doctoral students recommended to write the thesis in English?
8. In general, are the doctoral students writing their thesis in English given specific guidelines different from those given to the writers of theses in Spanish?
9. When the supervisors read the texts, do they check that the contribution is highlighted enough?
10. To what extent do the supervisors check the English writing? Do they focus on contents?

## References

- Anthony, L. (1999). Writing research article introductions in software engineering: How accurate is a standard model? *IEEE Transactions on Professional Communication*, 42, 38-46.
- Berkenkotter, C. & Huckin, T.N. (1995). *Genre knowledge in disciplinary communication: Cognition/culture/power*. Hillsdale, N. J.: Lawrence Erlbaum.
- Brett, P. (1994). A genre analysis of the results section of sociology articles. *English for Specific Purposes*, 13, 47-59.
- Bunton, D. (2002). Generic moves in Ph.D. thesis introductions. In J. Flowerdew (Ed.), *Academic discourse* (pp. 57-75). London: Pearson Education.
- Bunton, D. (2005). The structure of PhD conclusion chapters. *Journal of English for Academic Purposes*, 4, 207-224.
- Burgess, S. (2002). Packed houses and intimate gatherings: Audience and rhetorical structure. In J. Flowerdew (Ed.), *Academic discourse* (pp. 216-232). London: Pearson Education.
- Carbonell-Olivares, M., Gil-Salom, L. & Soler-Monreal, C. (2009). The schematic structure of Spanish PhD thesis introductions. *Spanish in Context*, 6(2), 151-176.
- Dong, Y.R. (1996). Learning how to use citations for knowledge transformation: Non-native doctoral student dissertation writing in science. *Research in the Teaching of English*, 30(4), 428-457.
- Duszak, A. (1997) (Ed.). *Culture and styles of academic discourse* (pp. 11-39). Berlin: Mouton de Gruyter.
- Duszak, A. & Lewkowicz, J. (2008). Publishing academic texts in English: A Polish perspective. *Journal of English for Academic Purposes*, 7, 108-120.
- Flowerdew, J. (1999). Problems in writing for scholarly publication in English: The case of Hong Kong. *Journal of Second Language Writing*, 8, 243-264.
- Fløttum, K. (2012). Variation of stance and voice across cultures. In C. Sancho-Guinda and K. Hyland (Eds.), *Stance and voice in written academic genres* (pp. 218-231). New York: Palgrave MacMillan.
- Gil-Salom, L. & Soler-Monreal, C. (2014). Writers' positioning in literature reviews in English and Spanish computing doctoral theses. *Journal of English for Academic Purposes*, 16, 23-39.
- Hanauer, D.I. & Englander, K. (2011). Quantifying the burden of writing research articles in a second language: Data from Mexican scientists. *Written Communication*, 28, 403-416.
- Harwood, N. (2005). I hoped to counteract the memory problem, but I made no impact whatsoever: Discussing methods in computing science using I. *English for Specific Purposes*, 24, 243-267.
- Hirano, E. (2009). Research article introductions in English for specific purposes: A comparison between Brazilian Portuguese and English. *English for Specific Purposes*, 28, 240-250.
- Holmes, R. (2001). Variation and text structure: The discussion section in economics research articles. *ITL Review of Applied Linguistics*, 107-135.
- Koutsantoni, D. (2004). Attitude, certainty and allusions to common knowledge in scientific research articles. *Journal of English for Academic Purposes*, 3, 142-175.
- Kwan, B. (2006). The schematic structure of literature reviews in doctoral theses of applied linguistics. *English for Specific Purposes*, 25, 30-55.
- Kwan, B., Chan, H. & Lam, C. (2012). Evaluating prior scholarship in literature reviews of research articles: A comparative study of practices in two research paradigms. *English for Specific Purposes*, 31, 188-201.
- Lewin, B.A. & Fine, J. 1996. The writing of research texts: genre analysis and its applications. In G. Rijlaarsdam, H. van der Bergh & M. Couzijn (eds.), *Theories, models and methodology in writing research* (pp. 423-444). Amsterdam: Amsterdam University Press.
- Lewin, B.A. Fine, J. & Young, L. 2001. *Expository discourse*. London: Continuum.
- Lim, J.M.H. (2012). How do writers establish research niches? A genre-based investigation into management researchers' rhetorical steps and linguistic mechanisms. *Journal of English for Academic Purposes*, 11, 229-245.
- Lim, J.M.H. (2014). Formulating research questions in experimental doctoral dissertations on Applied Linguistics. *English for Specific Purposes*, 35, 66-88.

- Lim, J. M.H., Loi, C. K & Hashim, A. (2014). Postulating hypotheses in experimental doctoral dissertations on Applied Linguistics: A qualitative investigation into rhetorical shifts and linguistic mechanisms. *Ibérica*, 27, 121-142.
- Loi, C. K. (2010). Research article introductions in Chinese and English: A comparative genre-based study. *Journal of English for Academic Purposes*, 9, 267-279.
- Mansourizadeh, K. & Ahmad, U.K. (2011). Citation practices among non-native expert and novice scientific writers. *Journal of English for Academic Purposes*, 10, 152-161.
- Martín-Martín, P. (2003). A genre analysis of English and Spanish research paper abstracts in experimental social sciences. *English for Specific Purposes*, 22, 25-43.
- Martín, P. & León Pérez, I.K. (2014). Convincing peers of the value of one's research: A genre analysis of rhetorical promotion in academic texts. *English for Specific Purposes*, 34, 1-13.
- Mauranen, A. (1993). *Cultural differences in academic rhetoric: A textlinguistic study*. Frankfurt am Main: Peter Lang.
- Moreno, A. I. (2008). The importance of comparable corpora in cross-cultural studies. In U. Connor, E. Nagelhout, & W. V. Rozycki (Eds.), *Contrastive rhetoric: Reaching to intercultural rhetoric* (pp. 147-168). Amsterdam: John Benjamins.
- Moreno, A. I., Rey-Rocha, J., Burgess, S. López-Navarro, I. & Sachdev, I. (2012). Spanish researchers' perceived difficulty writing research articles for English-medium journals: the impact of proficiency in English versus publication experience. *Ibérica*, 24, 157-184.
- Omil, F. 2003. <http://www.cep.org.pe/cicep/I-curso/MANUAL%20DE%5B1%5D...pdf>. Last 11 March 2014.
- Ono, M. (2012). A genre analysis of Japanese and English introductory chapters of Literature PhD theses. In C. Berkenkotter, V.K. Bhatia & M. Gotti (Eds.), *Insights into academic genres* (pp. 191-214). Bern. Peter Lang.
- Paltridge, B. (2002). Thesis and dissertation writing: An examination of published advice and actual practice. *English for Specific Purposes*, 21, 125-143.
- Paltridge, B. & Starfield, S. (2007). *Thesis and dissertation writing in a second language*. London & New York: Routledge.
- Perales-Escudero, M., & Swales, J. (2011). Tracing convergence and divergence in pairs of Spanish and English research article abstracts: The case of *Ibérica*. *Ibérica*, 21, 49-70.
- Peters, S. (2011). Asserting or deflecting expertise? Exploring the rhetorical practices of master's theses in the philosophy of education. *English for Specific Purposes*, 30, 176-185.
- Posteguillo, S. (1999). The schematic structure of computer science research articles. *English for Specific Purposes*, 18, 139-160.
- Ridley, D. (2011). *The literature review. A step-by-step guide for students* (2<sup>nd</sup> ed.). London: Sage Publications.
- Samraj, B. (2002). Introductions in research articles: Variation across disciplines. *English for Specific Purposes*, 21, 1-17.
- Shehzad, W. (2007a). How to end an Introduction in a Computer Science article? A corpus based approach. In E. Fitzpatrick (Ed.), *Corpus linguistics beyond the word: Research from phrase to discourse* (pp. 243-255). Amsterdam: Rodopi.
- Shehzad, W. (2007b). Explicit author in scientific discourse: A corpus-based study of the author's voice. *Malaysian Journal of ELT Research*, 3, 56-73.
- Shehzad, W. (2008). Move two: Establishing a niche. *Ibérica*, 15, 25-49.
- Shehzad, W. (2010). Announcement of the principal findings and value addition in Computer Science research papers. *Ibérica*, 19, 97-118.
- Shehzad, W. (2011). Outlining purposes, stating the nature of the present research, and listing research questions or hypotheses in academic papers. *Journal of Technical Writing and Communication* 41: 139-160.
- Sheldon, E. (2009). From one *I* to another. Discursive construction of self-representation in English and Castilian Spanish research articles. *English for Specific Purposes*, 28, 251-265.
- Sheldon, E. (2011). Rhetorical differences in RA introductions written by English L1 and L2 and Castilian Spanish L1 writers. *Journal of English for Academic Purposes*, 10, 238-251.

- Soler-Monreal, C., & Gil-Salom, L. (2010). Moves, steps and linguistic signals in RA Discussion sections. In W. Hahn & C. Vertan, (Eds.), *Specialised Language in Global Communication. Language in the Society, vol 30* (pp. 519-528). Bern: Peter Lang.
- Soler-Monreal, C., Carbonell-Olivares, M. & Gil-Salom, L. (2011). A contrastive study of the rhetorical organisation of English and Spanish PhD thesis introductions. *English for Specific Purposes, 30*(1), 4-17.
- Stotesbury, H. (2003). Evaluation in research article abstracts in the narrative and hard sciences. *Journal of English for Academic Purposes, 2*, 327-341.
- Swales, J. (1990). *Genre analysis*. Cambridge: Cambridge University Press.
- Swales, J. (2004). *Research genres: Explorations and applications*. Cambridge: Cambridge University Press.
- Swales, J. and Feak, C. (2004). *Academic writing for graduate students* (2<sup>nd</sup> ed.). Ann Arbor, Michigan: The University of Michigan Press.
- Thompson, P. (2009). Literature reviews in applied PhD theses: Evidence and problems. In K. Hyland and G. Diani (Eds.), *Academic evaluation. Review genres in university settings* (pp. 50-67). New York: Palgrave MacMillan.
- Thompson, P. (2012). Achieving a voice of authority in PhD theses. In C. Sancho-Guinda and K. Hyland (Eds.), *Stance and voice in written academic genres* (pp. 119-133). New York: Palgrave MacMillan.
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization, 7*(2), 225-246.
- Yakhontova, T. (2006). Cultural and disciplinary variation in academic discourse: The issue of influencing factors. *Journal of English for Academic Purposes, 5*, 153-167.
- Yayli, D. (2011). From genre awareness to cross-genre awareness. A study in an EFL context. *Journal of English for Academic Purposes, 10*, 121-129.