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Doctoral writing and development: A socially situated perspective

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DOCTORAL THESIS

Title	Doctoral writing and development: A socially situated perspective
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CHAPTER ONE
Introduction

The purpose of this thesis is to contribute to the understanding of doctoral development by studying it from a socially situated theoretical perspective, which ultimately should allow us to improve the design of resources and support provided to doctoral students, supervisors and other stakeholders.

The exponential changes of societal needs in the 21st century require a redefinition of the role of research to responsibly address the emerging demands. Research is shifting from *science for society to science with society* (European Comission, 2017), which calls for greater internationalization, transparency and transference of knowledge into the society. Thus, research communication is also changing and increasing. Nowadays researchers[1] need to be effective in writing, communicating and applying their findings in and through multiple ways and genres to reach and engage very different types of audiences.

Doctoral education is essential in the construction of a new profile of researchers who can understand, adapt to and transform the new contexts. Nonetheless, in Europe most of the changes occurred in doctoral education so far had been related to shorter time to complete the doctorate, higher productivity demands, promotion of mobility and more structured training, There is little evidence about whether doctoral education is meeting the new demands and promoting the emergence of a new profile of researchers capable of addressing the societal needs (Paré, 2017).

In order for us to design and improve doctoral programs to provide relevant and effective education to doctoral candidates, there is a need for in-

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[1] In this thesis, we use the plural for *researchers, doctoral students, supervisors*, etc., as well as the plural pronoun *they,* to avoid gender identification. However, when we refer to a generic single individual, we chose to use the feminine form, as the majority of participants in our studies, the co-authors and, in general, doctoral researchers in our context are female.

depth analysis of this situation. To this end, as displayed in Figure 1, research on this field has increased exponentially in the last decade (see, for instance, Levecque, Anseel, De Beuckelaer, Van der Heyden, & Gisle, 2017; Martinsuo & Turkulainen, 2011; Neumann & Rodwell, 2009), especially in the Anglo-Saxon context (Boud & Lee, 2009; Gardner, 2010; McAlpine, & Amundsen, 2011), aimed at gaining greater insight on doctoral students' experiences, learning and careers.
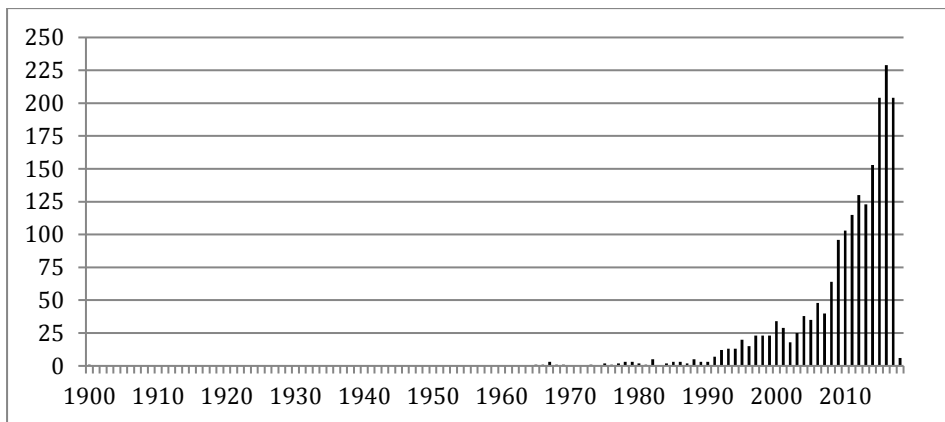
Figure 1. Results per year in Web of Science using the keyword "doctoral students".

In our context, despite some recent research studies (Bermúdez, Castro, Sierra, & Buela-Casal, 2009; de Miguel Díaz, 2010; Orellana, Darder, Pérez, & Salinas, 2016) and official reports (Agència per a la Qualitat del Sistema Universitari de Catalunya, 2017; Ministerio de Educación, Ciencia y Deporte, 2017) which analysed doctoral education outcomes and the characteristics of the students and graduates, little is still known about how doctoral students learn along the doctorate and what are the most effective ways to promote their development. Moreover, although research in the field is rapidly evolving, there is still the need to design and apply innovative research tools that allow researchers to approach the topic from a more complex and comprehensive perspective; a perspective that needs to account not only for individuals' performance but also for their social and cultural context. To address these gaps, the SINTE-Lest research team

launched the projects *FINS-RIDSS*[2] (CSO2013-41108-R) and *Erasmus+ Researcher Identity Development* (201-1-ES01-KA203-038303). These projects are aimed at generating knowledge about early career researchers' (ECR) development and trajectories and their multiple dimensions, and designing and implementing research-based resources and tools to support them. Moreover, their scope goes beyond the national context to explore ECRs' development across five European countries.

Closely linked to the aims and methods of these two projects, the present thesis has two main objectives: to explore doctoral students' development and especially doctoral writing from a socially situated theoretical perspective, and to map, design, implement and assess different methodological tools to analyse these issues.

In the next pages, we present the theoretical framework and concepts that have been the basis of this thesis and the four individual studies that compose it: the conceptualization of doctoral education and writing from a socially situated perspective. Our intention is to offer an overview of the theoretical basis and the key concepts that are further discussed in the introduction of each chapter, extend on those notions that are not presented in-depth in the chapters and emphasize the relationship among all of them. In the second section, we discuss the methodological implications that stem from the theoretical perspective adopted. The introductory chapter ends with the description of the structure of the thesis.

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[2] *Formación de la Identidad del Investigador Novel en Ciencias Sociales* - Researcher Identity Development in the Social Sciences.

Conceptualising doctoral development

Drawing on a socially situated perspective, in this thesis we conceptualise *doctoral development* as a *process of learning to be(come) an independent researcher within one or many (inter)disciplinary communities[3]* (Gardner, 2008; Lovitts, 2005; McAlpine, Jazvac-Martek, Hopwood, 2009). Underlying this definition, there are several assumptions and concepts that are essential to our understanding of doctoral development and therefore deserve a closer look. In the following sections, we examine each part of this definition in greater depth.

… a process of learning…

Doctoral development is a *learning process* not only because it is designed by and within formal education institutions, but also because its main objective is for individuals to learn a set of research competences. *Learning* has many meanings and can be defined in very different ways depending on the theoretical perspective from which we stand. Thus, as it is a central concept of this thesis, it is necessary for us to clarify our conceptualization of it. For doctoral students, learning is a socially situated activity, which means that the cognitive activity it involves cannot be understood without the context in which it takes place because this context determines what, how and why individuals learn (Greeno, 2006; Lave & Wenger, 1991). In complex activities, such as the doctorate, learning does not merely happen through acquisition or participation but also, and most importantly, through expansion (Engeström & Sannino, 2010; 2016). Doctoral education seeks to promote transformative processes of learning (*expansive learning*). Learners are not (only) expected to acquire the existing knowledge and abilities; they are prompted to 'learn something that is not yet

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[3] We use the term disciplinary community intentionally to also include professional disciplinary communities. While doctorates typically prepare doctoral students to take part in academic research communities, claims have been made for also preparing them to participate in disciplinary professional communities. Some initiatives have been started, such as professional or industrial doctorates, among others (Paré, 2017).

there' (Engeström & Sannino, 2010; p.2), to redefine a new object(ive)[4] for their activity and construct new knowledge and tools by means of identification, analysis, reinterpretation and expansion of the existing knowledge and tools, that they will ultimately use to achieve the newly defined objective. More specifically, doctoral students are prompted to conduct original research, which always involves learning something new, that will answer some existing questions in their field and create new ones. To that end, students need to acquire the research designs, methods and concepts available within their discipline and transform and apply them to their own research.

Three concepts emerge from the former definition that are particularly important in the doctoral development: (1) expansive learning implies a cultural-historical dimension; (2) expansive learning involves learners' internalization of the external (sociocultural) means, knowledge and tools; and (3) expansive learning does not happen within the mind of the individual learner, but in their social interaction with other individuals, groups and institutions (Leontiev, 1981). The first concept will be discussed below, while the second and the third will be explored in the subsequent sections (*to be(come) an independent researcher* and *within one or many (inter)disciplinary communities* respectively).

The cultural-historical dimension involves taking into account the development and evolution of the activity and the individuals involved in it (Engeström, 2001). In research contexts, this dimension is undoubtedly core in the development of communities and disciplines and the advancement of knowledge (Bazerman, 2012). Moreover, the cultural-historical perspective is also very important at the individuals' level, especially in relation to the attainment of the objective of the activity (Kaptelinin & Nardo, 2006), although the doctorate is primarily assessed through products (e.g. doctoral dissertation

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[4] 'Object', a central concept in activity theory, can be understood as a synonym of objective (Kaptelinin & Nardo, 2006, p.66), a concept that is more widely used in doctoral education literature. Thus, for the sake of clarity, from this point we will use the term 'objective' to refer to the 'object' of an activity.

and viva), and even students themselves tend to see the PhD as a product, with the thesis as a finish line (Kandiko & Kinchin, 2013).

The objective of the activity is not achievable directly but through a series of actions, aimed at smaller and more specific goals (Engeström & Sannino, 2010; Kaptelinin & Nardo, 2006). During their doctoral trajectory, students (in cooperation with other agents) undertake many and diverse actions that, taken in isolation, do not involve realization of the objective but, taken together from a cultural-historical perspective, they bring the activity and the student closer to the fulfilment of the objective. In addition to these intentional and self-initiated actions, doctoral students also face and live many other experiences, challenges and problems during their trajectory (Castelló, Pardo, Sala-Bubaré, Suñé-Soler, 2017; Pyhältö, Toom, Stubb, & Lonka, 2012). The experiences they live and how they interpret, react to and manage them may foster or, on the contrary, hinder students' attainment of their objective, their learning and development as researchers (Hopwood, 2010; McAlpine & Amundsen, 2009; Pyhältö & Keskinen, 2012). While the main focus of this thesis is to explore the actions and experiences related to doctoral students' research activity, it is important to mention that this activity interacts with other areas and activities in the individuals' life. Tensions and contradictions between students' personal and academic life are frequent and can have a significant impact on their development, professional objectives and success.

… to be(come) an independent researcher…

As mentioned above, an activity is directed towards an objective, which is both personal (of the subject) and social (of the community in which the activity takes place) (Leontiev, 1979). This objective is future-oriented in that it gives the activity, and therefore the subjects, meaning, sense and direction.

Even though the objective will necessarily vary among and within individuals and communities, it seems fair to ascertain that, in doctoral education, the objective is related to (if not all, at least partially) doctoral

students' appropriation of research competencies and ultimately to their graduation (Brew, Boud, & Un Namgung, 2011). Becoming a researcher, in turn, involves three processes: internalization, scaffolding, and identity development.

From a sociocultural perspective, individuals learn through a process of *internalization* (Vygotsky, 1980). The knowledge, tools and competencies that are relevant to conduct research on a certain topic are available in doctoral students' context and are initially learnt through mediation of other more expert researchers. Along the doctorate, students internalize the cultural means thanks to the interaction with these means and with other individuals. Internalization is not a mere reproduction of the externally mediated functions, but the individual's active reconstruction and appropriation of the cultural means, which involves their ability to use them autonomously to conduct their own research. However, external mediation does not disappear, as doctoral students continue interacting with other researchers. Instead, there is a redistribution of the internal and external mediating components. The result is a change in the way the student interacts with research and other individuals and groups.

Other agents, and especially the supervisor, play a significant role in promoting and supporting the internalization of concepts and tools. At the beginning of the doctorate, doctoral students are expected to work with and receive help and support from others to learn about the research topic and methodologies and to design and conduct their research (Pyhältö, Toom, et al., 2012). Through *scaffolding*, that is, the provision of support and resources, supervisors accompany and guide students and facilitate increasing levels of autonomy along the process (Hasrati, 2005). The expectation is, therefore, that at the end of the doctorate, students will have developed the competences of an independent researcher (Gardner, 2008). These competencies include, among others, generating new knowledge, managing research projects, publishing in refereed journal, supervising research students and collaborating with others (Agència per a la Qualitat del Sistema Universitari de Catalunya, 2017; Brew, et

al., 2011), although the last two are not directly assessed nor visualised in the evaluation of doctoral candidates.

The result of the internalization and processes of (expansive) learning is a reconstruction of the activity itself, and also of the individual(s) involved in the activity. Thus, as research has highlighted, be(com)ing an independent researcher is fundamentally a process of *identity development* (Cotterall, 2015; McAlpine & Amundsen, 2009; Sweitzer, 2008). Going into detail about the different understandings of identity is beyond the scope of this introduction. However, this concept emanates from our conceptualization of doctoral development and underlies many of the issues discussed along these pages. Not only do doctoral students need to learn the competencies of research work, they are transformed by this learning. Moreover, identity development is the objective of the doctorate, as doctoral students need to transition from being students and to develop their identity as researchers (Baker & Pifer, 2011), which is related to the ability to think, act and develop a unique and distinctive voice (Castelló, Iñesta, & Corcelles, 2013). Doctoral students face many difficulties in relation to the development of their identity as researchers (Aitchison, Catterall, Ross, & Burgin, 2012; Barnacle & Mewburn, 2010; Hall & Burns, 2009; McAlpine & Amunsden, 2009; Paré, 2011). Receiving negative (or positive) feedback from a journal, discussing with peers about different theoretical approaches, or making decisions about the future professional career are examples of situations in which doctoral students need to enact and negotiate their identity. Noticeably, many of these situations are related to the presence -physical or otherwise- of others. In the following section, we will expand on the social dimension of doctoral education.

… within one or many (inter)disciplinary communities.

The objective of doctoral education is for graduates to be independent researchers. However, the competencies, concepts and tools a researcher needs to master are highly dependent on the contexts she participates in, that is, in her

disciplinary communities. Each community has its particular characteristics, norms and rules that define the socially accepted ways of knowing and being within it (Lave & Wenger, 1991), which despite being fairly stable, from a cultural-historical perspective, evolve and change thanks to participants' activity (Camps & Castelló, 2013; Engeström & Sannino, 2016; Hyland & Jiang, 2017). Doctoral education aims to socialise students in the disciplinary community of their research topic; they need to learn and *internalize* the culture and rules and participate in the community by interacting with other groups and individuals, texts and discourses.

Participation and socialization in the community take place in different layers, which means that they occur in doctoral students' interaction and relationships with individual, small and large groups and the broad disciplinary community (Pyhältö, Nummenmaa, Soini, Stubb, & Lonka, 2012; Sala-Bubaré & Castelló, 2017). Among these agents, supervisors are, of course, essential agents of socialization since they support students in understanding, engaging and learning the rules of the community and their activities (e.g. characteristics of the genre) and, in general, in their development as researchers (Hasrati, 2005; Kamler & Thompson, 2006; Martinsuo & Turkulainen, 2011; Pyhältö, Vekkaila, & Keskinen, 2015). That is, the scaffolding that supervisors provide students is aimed at facilitating their socialization in the disciplinary community. Yet, support can also come from other individuals and groups along the doctoral journey, such as peers, research teams or special interest groups, who can have a very significant contribution to doctoral students' development (McAlpine, Paulson, Gonsalves, & Jazvac-Martek, 2012; Sala-Bubaré & Castelló, 2017).

Socialization and participation are not, however, a mere act of assimilation and passive reception of support. As part of the learning and internalization processes, socialization and participation require students to take active roles to get involved in a number and diversity of activities and interactions within the community (Pyhältö & Keskinen, 2012; Sweitzer, 2008). At the beginning of the doctorate, students are legitimate peripheral participants

(Lave & Wenger, 1991) and through their engagement in and contribution to different research activities, they negotiate their position within each community and group and might progress towards a fuller participation or towards other alternative positions, depending on their objectives, opportunities and abilities (Hopwood, 2010; Prior, 1995; Sala-Bubaré & Castelló, 2017). Relational agency is, thus, crucial to their success and development (Pyhältö & Keskinen, 2012; McAlpine, et al., 2012).

Doctoral students' identity will mediate most of their interactions with the different layers of the community (Baker & Pifer, 2011). In turn, these interactions and students' participation, in general, will shape, undermine or promote their identity as researchers (Castelló, et al., 2013; Pyhältö, Nummenmaa, et al., 2012). *Doctoral students' position in the community will be explored in relation to the most relevant experiences along the doctoral journey in Chapter Two.*

Conceptualising doctoral writing

Expansive learning is mediated by cultural tools and signs. These tools act as *second stimuli:* using and learning how to use them shape individuals' and groups' interaction with the world and effect changes also in the objective of the activity, thus allowing individuals' and groups' to go further, to direct their activity towards more evolved, complex and ambitious objectives (Engeström & Sannino, 2010; Russell, 1997; Sannino, 2015). Writing is one of the most powerful cultural tools in the doctoral trajectory, and in research activities in general. It is a privileged and essential resource for the advancement of knowledge; the main mean of communication among scholars and the main forum for discussion and reflection. Through writing, researchers develop their ideas, define their objectives and studies, reflect on and communicate their results and conclusions and, ultimately, contribute to moving knowledge forward (Bazerman, 2009). Thus, conceptualised from a sociocultural perspective, writing emerges as closely related to the processes and concepts discussed above and, most importantly, as

an essential tool to mediate and promote all them. In this section, we will discuss doctoral writing in relation to the same dimensions used for doctoral development.

… *process of learning*…

The relationship between writing and learning is twofold. On the one hand, writing is a cultural tool that needs to be learnt. On the other, it is an essential mediator of learning, an *epistemic tool*. These two processes, learning to write and writing to learn, are highly intertwined and cannot be easily differentiated because using writing as a tool to learn requires writers to learn to write about the topic they want to learn.

From a socially situated perspective, the former involves learning the rules and knowledge of the particular context and situation in which writing takes place (Castelló, 2002; Prior, 2006). Thus, when learning to write, doctoral students are not only learning an ability; they learn about the social and cultural practices of the context, they appropriate the experience accumulated in the community, its ways of being and knowing, its genres and discourses (Bazerman, 2017; Castelló, et al., 2013; Leontiev, 1979). They learn about their context and topic while learning how to write. Learning to write is, in itself, an activity that involves expansive learning and that is embedded within a broader activity, the doctorate. In order for doctoral students to be successful in overcoming the challenges and contradictions they face during the doctorate, they need to develop and improve strategies aimed at learning to use and using writing.

However, there is the widespread belief that individuals learn how to write only during compulsory education (Bazerman, 2013; Solé, Teberosky, & Castelló, 2012) and doctoral candidates already know how to write and do not need to be taught. These beliefs are not only frequent among doctoral supervisors and expert writers, but also among doctoral students themselves (Castelló, McAlpine, & Pyhältö, 2017; Lonka, et al., 2013). Thus, doctoral students need to also learn to conceptualise writing as an epistemic and transformative

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tool, an 'artifact-in-activity' (Castelló, et al., 2013; Prior, 2006). Transformative or *adaptive* conceptions allow for writers to be more flexible in managing the writing process; experience fewer blocks and procrastination and be more productive (Lonka, et al., 2013). *In Chapter Three, we present a study analysing the research writing perceptions of Spanish, Finnish and English doctoral students and their relationship with students' participation in and perceived support from the disciplinary community.*

Learning to write within a disciplinary community allows doctoral students to use writing as a second stimuli, that is, as a tool to learn new concepts, resolve challenges and contradictions, transform the objective and outputs of the activity (Engeström, Kajamaa, & Nummijoki, 2015) and take control over their interaction with the world and their own behaviour (Sannino, 2015). Writing allows doctoral students to participate in different and more active ways in the community (e.g. through published articles); interact with their supervisors in a different manner; reformulate their topic knowledge and develop their reasoning about the content and process of their research. In other words, through writing doctoral students can regulate their learning and writing processes in more effective and transformative ways.

… to (be)come an independent researcher…

As discussed in the previous section, in any process of expansive learning, the result is a reconstruction of the individual(s) involved in the activity and the activity itself. Writing, as an epistemic and mediating artifact in the whole activity, affords and promotes changes in the individuals involved in the activity. It is a mediator and promoter of identity development and also the stage where researcher identity is rehearsed and enacted (Cotterall, 2015; Matsuda, 2015).

One the one hand, it is generally accepted that identity is mostly shaped discursively (Kamler & Thomson, 2014; Matsuda, 2015), through dialogue with other individuals but also through writing practices. Doctoral students can develop their identity through engagement and participation in discursive

practices; through the negotiation of different voices and research traditions and their positioning in relation to the disciplinary conversation and map (Cotterall, 2015; Starke-Meyerring, 2011).

On the other hand, writing is where the identity under development is rehearsed and enacted. Doctoral students, as any writer, project their identity as researchers, their *voice*, in texts they write through choices of genre, topic, theoretical and methodological perspective and other linguistic and discursive mechanisms (Castelló, Corcelles, Iñesta, Vega, & Bañales, 2011; Hyland & Guinda, 2012; Ivanic, 1994). Voice is an important feature of academic and research texts. Readers (e.g. journal reviewers, thesis committee, scholars in the field) construct their perception of the authors' identity, they imagine who the author is, what she wants and what is her position in the community through the voice authors project in the text and they assess its quality according to it (Matsuda, 2015; Matsuda & Tardy, 2007; Nelson & Castelló, 2012). Thus, doctoral students' awareness and appropriation of the features that make different forms of voice possible are important to make informed decisions about how they position themselves and how they want to be read by others (Hyland, 2010).

… within one or many (inter)disciplinary communities.

As a sociocultural and situated activity, writing is highly influenced by the different –simultaneous- contexts and the particular communicative situation in which it takes place (Castelló, et al., 2013; Delacambre & Donahue, 2012). The concrete situation involves the conditions in which students are writing (e.g. in a quiet office or with a pressing deadline), the objectives they have for the writing session (e.g. finish a first draft of the article) and the text (e.g. getting it published in a good journal), and the characteristics of the writer (e.g. confident and self-assured). Regarding the different –simultaneous- contexts, as we mentioned in the previous section, disciplinary communities, as well as institutions, research teams and even individuals (e.g. supervisors), have a set of rules and norms that include, among others, the socially accepted ways of writing. These rules, which

define opportunities and restrictions for the writing processes and the texts that are written (Hyland, 2010), are articulated around discourses and genres (Russell, 1997; Russell, Lea, Parker, Street, & Donahue, 2009).

Discourses are socially accepted and recognisable associations among (writing) practices, values and beliefs that inform decisions and actions (Ivanic, 2004) and which can be used to identify oneself or others as members of a particular group, in this case, of a particular disciplinary community (Gee, 1996). In turn, genres are social practices; a constellation of interconnected rhetorical forms (Campbell & Jamieson, 1978) that puts together substantive, stylistic and situational characteristics to respond rhetorically to the demands of a given situation (Miller, 1984). In doctoral education, there are many discourses and genres that doctoral students may have to write at some point, but academic and scientific discourse and research articles and thesis genres are the most widely common and valued, although, as it can be deduced from the definition, each community favours some discourses and genres over others and their characteristics greatly vary among disciplines and cultures (Camps & Castelló, 2013; Russell, et al., 2009).

This social dimension of writing is not only related to the consensus of the community in regards to what and how to write. The mere act of writing is social in that writers have a communicative objective and, through texts, they establish a dialogue between the writer and the reader about a socially shared knowledge (Matsuda & Tardy, 2007). Doctoral students may write a research article to communicate results of a study and convince other academics in the field of the relevance of their conclusions, or they may write a grant application to present themselves as suitable candidates. Proper and explicit definition of the communicative objectives and enough knowledge about the reader and their objectives and expectations have an important impact on the writing process and promote success in the task (Hyland, 2001). Following the former example, depending on her perceptions about writing and the particular situation, the doctoral student writing a research article may aim at telling the results or, in

contrast, at convincing the reviewers that the study is a sound and original contribution to the field. In the second case, the student would benefit from knowing the type of scholars who read the journal she wants to submit the paper (e.g. experimental psychologists or social psychologists). Texts are the result of many conversations among different voices as writers discuss their results with other authors' theories and findings, and they make authors talk to each other (Castelló, et al., 2011). Even the original words of a writer are the reconstruction and reinterpretation of previous conversations, readings and interactions (Bakhtin, 1982; Dysthe, 2012).

Finally, in research contexts, writing is a social, multi-voiced activity also because most of the relevant texts researchers produce are co-constructed, co-written and co-authored. This is especially true in the case of doctoral students, who write and learn how to write with the support of their supervisors and other colleagues, and through the social writing practices they engage in, such as giving and receiving feedback, talking about the writing process and the text, discussing about other articles and theories and *joint texting* (Aitchison, et al., 2012; Kamler & Thompson, 2006; Paré, 2011).

Writing regulation processes

As presented here, writing is a highly complex activity that involves issues of participation in the community, negotiation of position and construction of an identity as a researcher (Castelló, et al., 2013; Cotterall, 2015; Matsuda & Tardy, 2007). Effective writing regulation is crucial to successfully deal with the complex demands and challenges involved in writing and learning to write in the doctorate. Writing regulation has been widely studied in relation to young students (Kieft, Rijlaarsdam, & van den Bergh, 2006; van den Bergh, Rijlaarsdam, & van Steendam, 2016). However, the study of older writers' regulation is more recent and scarce, especially in the doctorate. *The study in Chapter Four is a systematic literature review analysing the characteristics of the studies on HE writers' regulation.*

In other related education fields, such as motivation and Computer-Supported Collaborative Learning, Järvela and her colleagues (Hadwin & Oshige, 2011; Järvelä, Volet, & Järvenoja, 2010) have recently adopted a socially shared regulation approach that tries to bridge the cognitive and sociocognitive theories of learning, traditionally focused on understanding individual learners' cognitive processes and the variables influencing them, with a sociocultural perspective that stresses the dialogical and situated nature of regulation. In the context of teamwork, these authors analyse self-regulation (individual), co-regulation (interpersonal) and socially shared regulation (group) processes, and the relationships among them, taking into account the context of collective regulation (Hadwin & Oshige, 2011) and combining methods of discourse analysis with methods to trace subjects' activity and actions.

Inspired by this perspective, our conceptualization of writing regulation also attempts to look both at individuals' cognitive (writing) processes and the activity and context where (and when) these take place. Writing regulation is defined as recursive sequences of action, thought and emotion that take place along the whole writing process (*cyclical dimension*) and that are embedded and highly dependent on the different social and cultural layers of the community (*situated dimension*) (Castelló et al., 2013; Iñesta & Castelló, 2012; Donahue & Lillis, 2014). Writing regulation processes are the explicit and implicit solutions that a writer puts into action in order to achieve a particular objective, to solve a challenge or problem that emerges during the production of a text (Iñesta & Castelló, 2012). Writers, and more specifically doctoral students, can gain awareness and control over their regulation processes and learn strategies to regulate them in more effective ways. Their engagement in social practices of and about writing, especially in those aimed at discussing the writing process, can have a significant role in the development of regulation strategies. *Chapter Five presents the last study of the thesis, which analyses the writing regulation processes of two doctoral students writing their first scientific article before and after receiving feedback.*

Researching doctoral writing and development

In relation to the second general objective, mapping, designing, implementing and assessing different tools to analyse doctoral development and writing, in this section, we present the methodological implications that stem from the conceptualization of doctoral development and doctoral writing discussed above. This conceptualization raises four key issues that, in our opinion, should guide the decision-making regarding the methods and instruments to be used in exploring this topic:

- Emphasis on participants' perceptions, interpretations, objectives and goals. The views of the protagonists, understanding how they experienced the process and their perceptions of the resulting learning and outputs, are crucial to increasing our knowledge about doctoral education.

- Emphasis on the situated nature of learning. Perceptions, processes and outputs need to be observed in natural situations, rather than provoked in laboratories under experimental conditions.

- Emphasis on the contextual and social factors involved in the activity. Even when the individual doctoral student is the centre of the study, the methods used should allow us to learn about the context in which the activity is produced and used and the social factors that influenced it.

- Emphasis on learning and developmental process, not only on the products and outcomes of doctoral development. In order to understand a particular moment or situation in a particular activity, it is important to take a longitudinal perspective and learn about the evolution of the doctoral trajectory and the student.

Research in doctoral education and writing has privileged two instruments depending on their theoretical approach: questionnaires and surveys have been used to explore relationships among different variables, while individual semi-structured interviews are employed to deepen in doctoral students' interpretations of the experience. However, these instruments and methods do not seem to completely meet the complexity of the processes involved in the

doctoral trajectory, especially when used in as the only data source. Consequently, in this thesis, we sought to design and assess innovative methods and instruments to collect and analyse learning and the developmental process, participants' perceptions about them and their social and situated nature. Ultimately, one of our intentions is for this thesis to contribute new methods and instruments to explore different areas of doctoral education and writing.

To this end, the thesis as a whole employed a multi-methodological and mixed-method approach both in relation to the research design and data collection and analysis to explore doctoral trajectory and writing. According to Kaptelinin & Nardo (2006), 'activity theory does not prescribe a single method of study (...) [it] starts from the problem and then moves to the selection of a method' (p.71). Thus, each study used a different design and methodology selected according to the specific research questions, which have then been assessed in regards to their adequacy and utility.

The thesis is composed of three empirical studies and one systematic literature review. Regarding the empirical studies, Chapters Two and Five used an interpretative multiple case study approach as a way to explore participants' activity and its development in depth. In Chapter Two, we conducted individual semi-structured interviews mediated by the use of two innovative visual methods, the Journey Plot (Shaw, Holbrook, Scevak, & Bourke, 2008; Turner, 2015) and Communities Plot (Sala-Bubaré & Castelló, 2017), aimed at capturing the evolution of doctoral students' experience in the whole doctoral trajectory and their position in the research communities. In turn, the study in Chapter Five took a micro-perspective. To analyse doctoral students' on-line regulation processes when writing a scientific article, we combined activity (keystroke logging and screen capture software), discourse -self-reported- instruments (open-ended questionnaire and writing logs) and students' production (written drafts). In both studies, data were analysed with an interpretative content analysis strategy of participants' discourse and productions. Descriptive quantitative analysis complemented the qualitative analysis in Chapter Five. In

both cases, the analysis and report of the results place a strong emphasis on the visualization and understanding of participants' trajectory along the activity under analysis. On the other hand, Chapter Three presents a large-scale study using a correlational cross-sectional design. We used the FINS-RIDSS questionnaire to analyse doctoral students' research writing perceptions and their relationship with other critical variables. The analysis of the data goes beyond the factorial and correlational approaches to also explore individual variation and cross-cultural differences by means of the identification of different participants' profiles.

The non-empirical study is presented in Chapter Four. As we already mentioned, despite there have been a lot of efforts in relation to compulsory education writers (see, for instance, Bangert-Drowns, Hurley, & Wilkinson, 2004; Graham, 2006; Graham, McKeown, Kiuhara, & Harris, 2012; van den Bergh, et al., 2016), writing regulation processes have been underexplored in relation to doctoral writing. Therefore, to design the study aimed at exploring doctoral students' regulation processes, we first wanted to learn about the cultural and historical tools within the broader field of writing regulation in Higher Education, which allowed us to select among these tools the most appropriate in regards to our objectives and our conceptualization of writing regulation. More specifically, we analysed the methods used in the literature in relation to the theoretical approach and the objectives of each study in order for us to get a better understanding of the reasons and uses of each method and instrument.

We expect that the methodological diversity used in this thesis will help us gain a better understanding of the complexity of the phenomenon and draw new methodological challenges.

Structure of the thesis

After this introductory chapter, we present the four studies that compose this thesis. Chapter Two presents the first empirical study, focused on the most significant experiences along the doctorate of four advanced ecology doctoral students and their perceived position in the research community. Then, in Chapter Three, the second empirical study is introduced, which focuses on doctoral students' research writing perceptions and the relationship with their research conditions and social support. Chapter Four presents the only non-empirical study: a systematic review of the research conducted about of writing regulation processes in Higher Education students. The last empirical study is introduced in Chapter Five. Building on the literature review in the previous chapter, this study focuses on two doctoral students' regulation processes when starting to write their first research article and how these processes change after receiving feedback on their first draft. Then, in Chapter Six we present the main conclusions of each study, the main contributions of the thesis and its limitations and we suggest some lines for future research. Finally, Chapter Seven introduces the final remarks of my own learning process.

This dissertation is a hybrid product, halfway between a thesis by publication and a traditional monograph. Studies presented in Chapter Two and four are published, while studies in Chapter Three and Five have already been submitted to peer-review journals. We chose to preserve the articles as they were published or submitted to each journal, including the design and the citation and reference styles. The references included in the introduction and conclusions of the thesis are presented together at the end of the document in APA style.

INTRODUCCIÓ - versió en català

El propòsit d'aquesta tesi és contribuir a la comprensió de la formació doctoral estudiant-la des d'una perspectiva teòrica socialment situada, amb l'objectiu últim de millorar el disseny de recursos i suports per a la formació d'estudiants de doctorat, supervisores i altres grups d'interès.

Els canvis radicals de les necessitats i característiques de la societat del segle XXI requereixen una redefinició del paper de la recerca per atendre de manera responsable les demandes emergents. De la noció de *ciència per a la societat* passem a concebre la recerca com a *ciència amb la societat* (Comissió Europea, 2017), la qual cosa exigeix una major internacionalització, transparència i transferència del coneixement a la societat. Això, alhora, comporta canvis importants en la comunicació de la recerca. Així doncs, les investigadores[5] han de ser competents en escriure, comunicar i aplicar els seus resultats a través de múltiples formes i gèneres per arribar a diferents tipus de públic.

L'educació de doctorat és essencial en la construcció d'un nou perfil d'investigadores que pugui comprendre, adaptar i transformar els nous contextos. No obstant això, a Europa, la majoria dels canvis ocorreguts fins al moment han estat relacionats amb la reducció del temps per a completar el doctorat, demandes de major productivitat, una promoció de la mobilitat d'estudiants predoctorals i una formació més estructurada, i hi ha poques evidències respecte l'eficàcia d'aquesta formació a l'hora d'atendre les noves demandes i promoure l'aparició d'un nou perfil d'investigadores capaces d'oferir resposta a les necessitats de la societat (Paré, 2017).

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[5] En aquesta tesi hem optat per a utilitzar, en la mesura del possible, paraules epicenes que designen indiferentment els individus mascles i femelles. Per aquest motiu, utilitzarem l'*estudiant de doctorat* per referir-nos a un conjunt indefinit d'estudiants de doctorat, i *la* o *les persones* quan parlem de processos i conceptes generals. No obstant, en els casos en què no disposem d'una paraula o expressió de gènere neutre, hem optat per utilitzar la forma femenina (per exemple, investigadores, supervisores, *les* estudiants, etc.) ja que la majoria de les persones que han participat en els nostres estudis, les seves co-autores, i el conjunt d'estudiants de doctorat en el nostre context són dones.

Per a poder dissenyar una formació doctoral rellevant i eficaç és necessari fer una anàlisi en profunditat d'aquesta situació. Amb aquesta finalitat, tal com es mostra a la figura 1, la recerca sobre aquest camp ha augmentat de manera exponencial en l'última dècada (vegeu, per exemple, Levecque, Anseel, De Beuckelaer, Van der Heyden i Gisle, 2017; Martinsuo i Turkulainen, 2011; Neumann i Rodwell, 2009), especialment en el context anglosaxó (Boud i Lee, 2009; Gardner, 2010; McAlpine, i Amundsen, 2011), amb l'objectiu de conèixer millor les experiències, l'aprenentatge i trajectòries d'estudiants de doctorat.
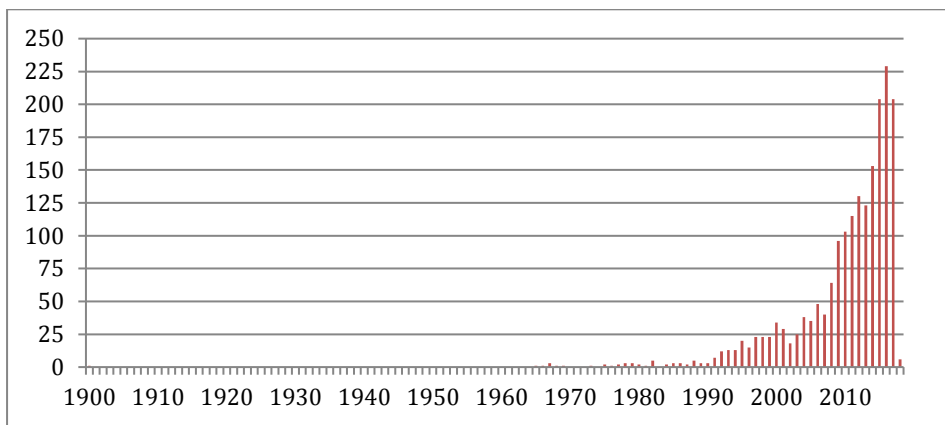
Figura 1. Resultats per any a Web de Science utilitzant la paraula clau 'doctoral students'.

En el nostre context, malgrat alguns estudis (Bermúdez, Castro, Sierra, i Buela-Casal, 2009, Miguel Díaz, 2010, Orellana, Darder, Pérez i Salinas, 2016) i informes oficials recents (Agència per a la Qualitat del Sistema Universitari de Catalunya, 2017; el Ministeri d'Educació, Ciència i Esport, 2017) que analitzen els resultats de l'educació doctoral i les característiques d'estudiants i doctores, encara sabem poc de com aquestes aprenen al llarg del doctorat i quins són els mètodes més eficaços per promoure el seu desenvolupament. A més, tot i que la investigació en aquest àmbit evoluciona ràpidament, encara hi ha la necessitat de dissenyar i aplicar eines de recerca innovadores que permetin a les investigadores abordar el tema des d'una perspectiva més complexa i comprensiva; una perspectiva que ha de tenir en compte no només el rendiment de les persones, sinó també el seu

context social i cultural. Per a respondre a aquestes necessitats, l'equip de recerca SINTE-Lest ha dut a terme els projectes *FINS-RIDSS*[6] (CSO2013-41108-R) i *Erasmus+ Researcher Identity Development* (201-1-ES01-KA203-038303). Aquests projectes tenen com a finalitat generar coneixement sobre el desenvolupament i les trajectòries de les investigadores novells i les seves múltiples dimensions, i dissenyar i implementar recursos i eines formatives i de suport basats en la recerca. A més, aquests projectes van més enllà de l'àmbit nacional i busquen explorar el desenvolupament de les investigadores novells en cinc països europeus.

Vinculada als objectius i mètodes d'aquests dos projectes, la present tesi té dos objectius principals: explorar la formació doctoral i, especialment, els processos d'escriptura des d'una perspectiva teòrica socialment situada, i planificar, dissenyar, implementar i avaluar diferents eines metodològiques per a analitzar aquests temes.

En les pàgines següents, es presenta el marc teòric i els conceptes que han estat la base d'aquesta tesi i dels quatre estudis individuals que la componen: la conceptualització de l'educació i escriptura doctorals des d'una perspectiva socialment situada. La nostra intenció és oferir una visió general de la base teòrica i els conceptes clau que es discuteixen més a fons en la introducció de cada capítol; aprofundir en les nocions que s'introdueixen en cadascun dels capítols i fer èmfasi en la relació entre els diversos estudis i conceptes. A la segona part de la introducció es discuteixen les implicacions metodològiques que es deriven de la perspectiva teòrica adoptada. El capítol introductori conclou amb la descripció de l'estructura de la tesi.

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[6] *Formación de la Identidad del Investigador Novel en Ciencias Sociales* - Researcher Identity Development in the Social Sciences

Conceptualització de la formació doctoral

Partint d'una perspectiva socialment situada, en aquesta tesi conceptualitzem la formació doctoral com un procés d'aprenentatge per arribar a ser una investigadora autònoma dins d'una o diverses comunitats (inter)disciplinàries[7] (Gardner, 2008; Lovitts, 2005; McAlpine, Jazvac-Martek , Hopwood, 2009). D'aquesta definició se'n desprenen diverses hipòtesis i conceptes que són essencials per a la nostra comprensió de la formació doctoral. Als apartats següents, examinarem cada part d'aquesta definició amb més profunditat.

... un procés d'aprenentatge...

La formació doctoral és un procés d'aprenentatge no només perquè està dissenyat per i en institucions d'educació formal, sinó també perquè el seu objectiu principal és que les persones aprenguin un conjunt de competències de recerca. La paraula *aprenentatge* té molts significats i es pot definir de maneres molt diferents segons la perspectiva teòrica on ens situem. Donat que es tracta d'un concepte central d'aquesta tesi, cal aclarir la nostra posició. Per a les estudiants de doctorat, l'aprenentatge és una activitat socialment situada, la qual cosa significa que l'activitat cognitiva que implica no es pot entendre sense el context en què es produeix perquè aquest context determina què, com i per què les persones aprenen (Greeno, 2006; Lave i Wenger, 1991). En activitats complexes, com el doctorat, les persones no aprenen només per adquisició o participació sinó també, i principalment, per expansió (Engeström i Sannino, 2010; 2016). L'educació doctoral pretén promoure processos transformadors d'aprenentatge (aprenentatge expansiu). No (només) s'espera que les aprenents

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[7] En aquesta tesi, utilitzem el terme comunitats disciplinàries de forma intencionada per a incloure les comunitats disciplinàries professionals. Tot i que el doctorat tradicionalment ha preparat l'estudiant per a formar part de les comunitats de recerca acadèmiques, en els últims anys diverses veus han denunciat que la formació ha d'anar enfocada a preparar-les també per a participar en comunitats disciplinàries professionals. Algunes iniciatives ja s'han posat en marxa en aquesta direcció, com ara els doctorats industrials i professionals (Paré, 2017).

adquireixin els coneixements i habilitats existents; se'ls insta a "aprendre alguna cosa que encara no hi és" (Engeström i Sannino, 2010; p.2), a que redefineixin un nou object(e/iu)[8] de la seva activitat i que construeixin nous coneixements i eines mitjançant la identificació, l'anàlisi, la reinterpretació i l'expansió dels coneixements i eines existents, que alhora s'utilitzaran per assolir l'objectiu redefinit. Més concretament, les estudiants de doctorat han de realitzar una investigació original que respondrà a algunes preguntes existents en el seu camp i en generarà de noves. Per això, les estudiants han d'adquirir els dissenys, els mètodes i els conceptes de recerca disponibles dins de la seva disciplina i transformar-los i aplicar-los a la seva pròpia investigació.

Tres conceptes sorgeixen de la definició anterior que són especialment importants en la formació doctoral: (1) l'aprenentatge expansiu implica una dimensió cultural-històrica; (2) l'aprenentatge expansiu implica que els aprenents interioritzin els mitjans, coneixements i eines externs (socioculturals); i (3) l'aprenentatge expansiu no passa dins de la ment de l'aprenent individual, sinó en la seva interacció social amb altres persones, grups i institucions (Leontiev, 1981). El primer concepte es tractarà a continuació, mentre que el segon i el tercer s'exploraran a les seccions posteriors (*arribar a ser una investigadora independent* i *dins d'una o diverses comunitats (inter)disciplinàries* respectivament).

La dimensió cultural-històrica implica tenir en compte el desenvolupament i l'evolució de l'activitat i les persones que hi participen (Engeström, 2001). En contextos de recerca, aquesta dimensió és, sens dubte, un nucli fonamental en el desenvolupament de comunitats i disciplines i en l'avanç del coneixement (Bazerman, 2012). A més, la perspectiva històrica-cultural també és molt important a nivell individual, especialment en relació amb l'assoliment de l'objectiu de l'activitat (Kaptelinin i Nardo, 2006), tot i que el

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[8] L''objecte', concepte central en la teoria de l'Activitat, es pot entendre com a sinònim d'objectiu (Kaptelinin i Nardo, 2006, p.66); concepte que s'ha utilitzat de forma generalitzada en el camp de l'educació doctoral. Per tant, per a major claredat, en aquesta tesi utilitzem el terme *objectiu* per a referir-nos també a l'objecte d'una activitat.

doctorat s'avalua principalment a través de productes (per exemple, la tesi doctoral i la defensa), i fins i tot les mateixes estudiants solen veure el doctorat com a producte, amb la tesi com a línia de meta (Kandiko i Kinchin, 2013).

L'objectiu de l'activitat no es pot assolir directament, sinó mitjançant una sèrie d'accions, dirigides a objectius més petits i específics (Engeström i Sannino, 2010; Kaptelinin i Nardo, 2006). Durant la seva trajectòria de doctorat, l'estudiant (en cooperació amb altres agents) realitza moltes i diverses accions que, analitzades de forma aïllada, no impliquen l'assoliment de l'objectiu. No obstant, analitzades conjuntament des d'una perspectiva històrica-cultural, apropen l'activitat i l'estudiant al compliment de l'objectiu. A més d'aquestes accions intencionals i auto-iniciades, l'estudiant de doctorat també s'enfronta i viu moltes altres experiències, reptes i problemes durant la seva trajectòria (Castelló, Pardo, Sala-Bubaré, Suñé-Soler, 2017; Pyhältö, Toom, Stubb i Lonka , 2012). Les experiències que viu i la seva interpretació, reacció i gestió poden fomentar o, al contrari, dificultar l'assoliment dels objectius, l'aprenentatge i desenvolupament com a investigadora (Hopwood, 2010; McAlpine i Amundsen, 2009; Pyhältö i Keskinen , 2012). Si bé l'objectiu principal d'aquesta tesi és explorar les accions i experiències relacionades amb l'activitat de recerca de les estudiants de doctorat, és important esmentar que aquesta activitat interactua amb altres àrees i activitats de la vida de les persones. Les tensions i contradiccions entre la seva vida personal i acadèmica són freqüents i poden tenir un impacte significatiu en el seu desenvolupament, objectius i èxit professional.

... per a arribar a ser una investigadora independent...

Com hem esmentat anteriorment, les activitats estan dirigides a un objectiu, que és alhora personal (de la persona) i social (de la comunitat en què es desenvolupa l'activitat) (Leontiev, 1979). Aquest objectiu està orientat cap al futur ja que dóna sentit, significat i direcció a l'activitat i, per tant, a les persones.

Tot i que l'objectiu variarà necessàriament entre persones i comunitats i dins de cadascuna d'elles, sembla just afirmar que, en l'educació doctoral l'objectiu es relaciona (com a mínim en part) amb l'apropiació de competències de recerca i, en última instància, de la graduació de les estudiants de doctorat (Brew, Boud, i Un Namgung, 2011). Esdevenir una investigadora, alhora, implica tres processos: internalització, *scaffolding* -o guiatge- i desenvolupament identitari.

Des d'una perspectiva sociocultural, les persones aprenem a través d'un procés d'internalització (Vygotsky, 1980). El coneixement, les eines i les competències que són rellevants per a fer recerca sobre un determinat tema estan disponibles en el context de l'estudiant de doctorat i són inicialment apresos a través de la mediació realitzada per altres investigadores més expertes. Al llarg del doctorat, l'estudiant interioritza els sabers culturals gràcies a la interacció amb aquests sabers i amb altres persones. La internalització no és una mera reproducció de les funcions mediades externament, sinó una reconstrucció i apropiació activa per part de la persona dels sabers culturals, la qual cosa implica la seva capacitat per utilitzar-los de manera autònoma per dur a terme la seva pròpia investigació. No obstant això, la mediació externa no desapareix, ja que l'estudiant continuarà interactuant amb altres investigadores, sinó que es modifica la distribució i equilibri entre els components mediadors interns i externs. El resultat és un canvi en la manera com l'estudiant interactua amb la recerca i amb altres persones i grups.

Altres agents, i especialment la directora de tesi, tenen un paper important a l'hora de promoure i donar suport a la internalització de conceptes i eines. Al començament del doctorat, s'espera que l'estudiant de doctorat treballi i rebi ajuda i suport d'altres agents per tal d'adquirir coneixement sobre el tema, les metodologies d'investigació i de dissenyar i dur a terme la seva recerca (Pyhältö, Toom, et al., 2012). A través d'*scaffolding*, és a dir, la dotació de suport i recursos, la supervisora acompanya i guia l'estudiant i en promou nivells creixents d'autonomia al llarg del procés (Hasrati, 2005). L'expectativa és, doncs,

que al final del doctorat, l'estudiant haurà desenvolupat les competències necessàries per a dur a terme investigacions de forma independent (Gardner, 2008). Aquestes competències inclouen, entre d'altres, la generació de nous coneixements, la gestió de projectes de recerca, la publicació en revistes indexades, la supervisió d'investigadores i la col·laboració amb altres (Agència per a la Qualitat del Sistema Universitari de Catalunya, 2017; Brew et al., 2011), tot i que les darreres dues competències no són directament avaluades ni visualitzades en l'avaluació del doctorat.

El resultat de la internalització i els processos d'aprenentatge (expansiu) és la reconstrucció de l'activitat en sí mateixa i també de les persones implicats en l'activitat. Així, tal i com han destacat estudis previs en aquest àmbit, esdevenir i ser una investigadora independent és fonamentalment un procés de desenvolupament de la identitat (Cotterall, 2015; McAlpine i Amundsen, 2009; Sweitzer, 2008). Aprofundir en les diferents conceptualitzacions i teories sobre identitat està fora de l'abast d'aquesta introducció. Tanmateix, aquest concepte emana de la nostra conceptualització de la formació doctoral i és subjacent a molts dels temes tractats al llarg d'aquestes pàgines. L'estudiant de doctorat no només necessita aprendre competències de recerca, sinó que a més es transforma i canvia a través d'aquest aprenentatge. A més, aquest desenvolupament identitari és un dels objectius del doctorat, ja que l'estudiant de doctorat necessita passar de ser estudiant a desenvolupar la seva identitat com a investigadora (Baker i Pifer, 2011), la qual cosa està relacionada amb la seva capacitat de pensar, actuar i desenvolupar una veu pròpia (Castelló, Iñesta, i Corcelles, 2013). Les estudiants de doctorat afronten moltes dificultats en relació al desenvolupament de la seva identitat com a investigadores (Aitchison, Catterall, Ross, i Burgin, 2012; Barnacle i Mewburn, 2010; Hall i Burns, 2009; McAlpine i Amunsden, 2009; Paré, 2011). Rebre comentaris negatius (o positius) d'una revista científica, discutir amb altres sobre diferents enfocaments teòrics o prendre decisions sobre la futura carrera professional són exemples de situacions en què l'estudiant ha d'actuar i negociar la seva identitat. Cal destacar

que moltes d'aquestes situacions es relacionen amb la presència -física o no- d'altres. A la secció següent, aprofundirem en la dimensió social de l'educació doctoral.

... dins d'una o diverses comunitats (inter)disciplinàries.

L'objectiu de l'educació doctoral és que l'estudiant esdevingui una investigadora independent. No obstant això, les competències, conceptes i eines que una investigadora ha de dominar depenen molt dels contextos en què participa, és a dir, de les comunitats disciplinàries. Cada comunitat té les seves característiques, normes i regles particulars que defineixen les formes socialment acceptades de conèixer i ser (Lave i Wenger, 1991), que tot i ser bastant estables, des d'una perspectiva històrica-cultural, evolucionen i canvien gràcies l'activitat de les participants (Camps i Castelló, 2013; Engeström i Sannino, 2016; Hyland i Jiang, 2017). L'educació doctoral pretén socialitzar l'estudiant en la comunitat disciplinar del tema de la seva recerca, que ha d'aprendre i interioritzar la cultura i les regles i participar a la comunitat a través de la interacció amb altres grups i persones, textos i discursos.

La participació i la socialització a la comunitat tenen lloc en diferents nivells, la qual cosa significa que es produeixen en la interacció i relacions de l'estudiant amb grups petits i grans i amb la comunitat disciplinar àmplia (Pyhältö, Nummenmaa, Soini, Stubb i Lonka, 2012; Sala-Bubaré i Castelló, 2017). Entre aquests agents, les supervisores són, per descomptat, agents essencials de la socialització ja que donen suport a l'estudiant en la comprensió, apropiació i aprenentatge de les regles i activitats de la comunitat (per exemple, les característiques del gènere) i, en general, en el seu desenvolupament com a investigadores (Hasrati, 2005; Kamler i Thompson, 2006; Martinsuo i Turkulainen, 2011; Pyhältö, Vekkaila, i Keskinen, 2015). És a dir, el guiatge (*scaffolding*) que les supervisores proporcionen a les estudiants té com a objectiu facilitar la seva socialització en la comunitat disciplinar. No obstant això, el suport també pot provenir d'altres persones i grups al llarg de la trajectòria doctoral,

com ara companyes, equips d'investigació o grups d'interès especial, que poden tenir una contribució molt important al desenvolupament de l'estudiant de doctorat (McAlpine, Paulson, Gonsalves i Jazvac-Martek , 2012; Sala-Bubaré i Castelló, 2017).

La socialització i la participació no són, tanmateix, un simple acte d'assimilació i recepció passiva de suport. Igual que en els processos d'aprenentatge i internalització, i com a component intrínsec d'aquests, la socialització i la participació requereixen que l'estudiant adopti un paper actiu per a implicar-se nombroses i diverses activitats i interaccions dins de la comunitat (Pyhältö i Keskinen, 2012; Sweitzer, 2008). Al començament del doctorat, l'estudiant és una participant legítima perifèrica (Lave i Wenger, 1991) i a través de la seva implicació i contribució a diferents activitats de recerca, negociarà la seva posició dins de cada comunitat i grup i pot progressar cap a una participació més plena o cap a altres posicions alternatives, depenent dels seus objectius, oportunitats i habilitats (Hopwood, 2010; Prior, 1995; Sala-Bubaré i Castelló, 2017). L'agència relacional és, per tant, crucial per al seu èxit i desenvolupament (Pyhältö i Keskinen, 2012; McAlpine, et al., 2012).

La identitat de l'estudiant de doctorat actuarà de mediadora en la majoria de les seves interaccions amb els diferents agents de la comunitat (Baker i Pifer, 2011). Alhora, aquestes interaccions i participació de l'estudiant conformaran, promouran o debilitaran la seva identitat com a investigadora (Castelló, et al., 2013; Pyhältö, Nummenmaa, et al., 2012). *En el Capítol Dos, presentem un estudi enfocat a explorar la posició de les estudiants de doctorat a la comunitat en relació a les experiències més rellevants al llarg de la trajectòria doctoral*.

Conceptualització de l'escriptura doctoral

L'aprenentatge expansiu està mediat per eines i signes culturals. Aquestes eines actuen com a segon estímul: el seu aprenentatge i utilització tenen un alt impacte en la interacció que persones i grups estableixen amb el món i alhora promouen canvis en l'objectiu de l'activitat. Alhora, això permet que les persones i els grups vagin més enllà i que dirigeixin la seva activitat cap a objectius més evolucionats, complexos i ambiciosos (Engeström i Sannino, 2010; Russell, 1997; Sannino, 2015). L'escriptura és una de les eines culturals més potents en la trajectòria doctoral, i en activitats de recerca en general. És un recurs privilegiat i essencial per a l'avenç del coneixement; el principal mitjà de comunicació entre acadèmiques i el principal fòrum de debat i reflexió. A través de l'escriptura, les investigadores desenvolupen les seves idees, defineixen els seus objectius i estudis, reflexionen i comuniquen els seus resultats i conclusions i, en definitiva, contribueixen a fer avançar el coneixement (Bazerman, 2009). Així doncs, conceptualitzada des d'una perspectiva sociocultural, l'escriptura està estretament vinculada als processos i conceptes descrits anteriorment i, més específicament, emergeix com a eina imprescindible de mediació i promoció d'aquests processos. En aquesta secció, presentem l'escriptura doctoral en relació amb les mateixes dimensions utilitzades per a discutir la formació doctoral.

... un procés d'aprenentatge...

La relació entre l'escriptura i l'aprenentatge és doble. D'una banda, l'escriptura és una eina cultural que cal aprendre. De l'altra, és un mediador essencial de l'aprenentatge, una eina epistèmica. Aquests dos processos, aprendre a escriure i escriure per aprendre, estan molt entrellaçats i no són fàcilment diferenciables l'un de l'altre ja que utilitzar l'escriptura com a eina per aprendre requereix que les escriptores aprenguin a escriure sobre el tema que volen aprendre.

Des d'una perspectiva socialment situada, el primer procés implica aprendre les regles i el coneixement del context i la situació particulars en què es produeix l'escriptura (Castelló, 2002; Prior, 2006). D'aquesta manera, quan aprèn a escriure, l'estudiant de doctorat no només aprèn una habilitat; aprèn sobre les pràctiques socials i culturals del context, s'apropia de l'experiència acumulada a la comunitat, de les formes de ser i conèixer, dels seus gèneres i discursos (Bazerman, 2017; Castelló, et al., 2013; Leontiev, 1979). L'estudiant aprèn sobre el seu context i tema mentre aprèn a escriure. Aprendre a escriure és, en si mateix, una activitat que implica un aprenentatge expansiu i que està integrada en una activitat més àmplia, els estudis de doctorat. Per tal de que l'estudiant de doctorat superi de forma exitosa els reptes i contradiccions que ha d'afrontar durant el doctorat, necessita desenvolupar i millorar estratègies dirigides a per aprendre a utilitzar i fer ús de l'escriptura.

Tanmateix, existeix una creença generalitzada segons la qual les persones aprenen a escriure només durant l'educació obligatòria (Bazerman, 2013, Solé, Teberosky i Castelló, 2012) i l'estudiant de doctorat ja sap escriure quan accedeix al doctorat. Aquestes creences no només són freqüents entre supervisores de doctorat i escriptores expertes, sinó també entre les mateixes estudiants de doctorat (Castelló, McAlpine, i Pyhältö, 2017; Lonka, et al., 2013). Així doncs, l'estudiant de doctorat també ha d'aprendre a conceptualitzar l'escriptura com a eina epistèmica i transformadora, un "artefacte en activitat" (Castelló, et al., 2013; Prior, 2006). Les concepcions transformadores o *adaptatives* permeten a les escriptores ser més flexibles en la gestió del procés d'escriptura; experimentar menys bloquejos i procrastinació i ser més productives (Lonka, et al., 2013). *En el Capítol Tres, presentem un estudi que analitza les percepcions sobre escriptura científica d'estudiants de doctorat espanyoles, finlandeses i angleses i la relació amb la seva participació en la comunitat i el suport percebut per part d'aquesta.*

Aprendre a escriure en una comunitat disciplinar permet a l'estudiant de doctorat utilitzar l'escriptura com un segon estímul, és a dir, com a eina per aprendre nous conceptes, resoldre els reptes i contradiccions, transformar els

objectius i els resultats de l'activitat (Engeström, Kajamaa, i Nummijoki, 2015) i controlar la seva interacció amb el món i les seves pròpies accions (Sannino, 2015). L'escriptura permet a l'estudiant de doctorat participar de manera diferent i més activa a la comunitat (per exemple, mitjançant la publicació d'articles), interactuar amb les seves supervisores d'una manera diferent, reformular els seus coneixements sobre el tema i desenvolupar els seus processos de pensament sobre el contingut i el procés de recerca. En altres paraules, mitjançant l'escriptura l'estudiant de doctorat pot regular els seus processos d'aprenentatge i escriptura de manera més eficaç i transformadora.

... per a arribar a ser una investigadora independent...

Tal i com mencionàvem en la secció anterior, en qualsevol procés d'aprenentatge expansiu, el resultat és la reconstrucció de les persones implicades en l'activitat i de l'activitat en si mateixa. L'escriptura, com a artefacte epistèmic i mediador de l'activitat, permet i promou canvis en les persones implicades en l'activitat. És mediadora i promotora del desenvolupament identitari i també l'escenari en què la identitat investigadora és assajada i actuada (Cotterall, 2015; Matsuda, 2015).

D'una banda, la identitat es configura principalment de forma discursiva (Kamler i Thomson, 2014; Matsuda, 2015), a través del diàleg amb altres persones, però també a través de pràctiques d'escriptura. L'estudiant de doctorat pot desenvolupar la seva identitat a través de la seva implicació i participació en pràctiques discursives; a través de la negociació de diferents veus i tradicions d'investigació i el seu posicionament en les discussions disciplinàries (Cotterall, 2015; Starke-Meyerring, 2011).

D'altra banda, l'escriptura constitueix un escenari d'assaig i presentació de la identitat que s'està desenvolupant. L'estudiant de doctorat, com qualsevol escriptora, projecta la seva identitat com a investigadora, la seva veu, en els textos que escriu a través de l'elecció del gènere, el tema, la perspectiva teòrica i metodològica i altres mecanismes lingüístics i discursius (Castelló, Corcelles, Iñesta, Vega i Bañales, 2011 ; Hyland i Guinda, 2012; Ivanic, 1994). La veu és una

característica important dels textos científics. L'audiència (per ex., equip editorial d'una revista, comitès de tesi, expertes en el camp) construeix la seva percepció de la identitat de les autores, imaginen qui són, què volen i quina és la seva posició a la comunitat a través de la veu que les autores projecten en el seu text i avaluen la qualitat del text d'acord a aquests elements (Matsuda, 2015; Matsuda i Tardy, 2007; Nelson i Castelló, 2012). D'aquesta manera, cal que l'estudiant de doctorat prengui consciència i s'apropiï de les característiques que fan possibles diferents formes de veu per tal de poder prendre decisions fonamentades sobre com es posiciona i com vol ser llegida per altres (Hyland, 2010).

... dins d'una o diverses comunitats (inter)disciplinàries.

Com a activitat sociocultural i situada, l'escriptura està altament influenciada pels diferents contextos i la situació comunicativa particular en què es produeix (Castelló, et al., 2013; Delacambre i Donahue, 2012). Les característiques de la situació concreta inclouen les condicions en què l'estudiant escriu (per exemple, en una oficina tranquil·la o amb una data límit); els objectius de la sessió d'escriptura (per exemple, finalitzar un primer esborrany de l'article) i del text (per exemple, publicar-lo en una bona revista); i les característiques de l'escriptora (per exemple, segura i confiada). Pel que fa als diferents contextos, com hem esmentat a l'apartat anterior, les comunitats disciplinàries, així com les institucions, els equips de recerca i fins i tot les persones (per exemple, les supervisores) tenen un conjunt de regles i normes que inclouen, entre d'altres, els tipus i processos d'escriptura socialment acceptats. Aquestes regles, que defineixen oportunitats i restriccions per als processos d'escriptura i els textos (Hyland, 2010), s'articulen al voltant de discursos i gèneres (Russell, 1997; Russell, Lea, Parker, Street, i Donahue, 2009) .

Els discursos són associacions socialment acceptades i recognoscibles entre pràctiques, valors i creences (d'escriptura) que guien les decisions i accions (Ivanic, 2004) i que poden ser utilitzades per identificar-se a un mateix o altres com a membres d'un grup concret, en aquest cas, d'una determinada comunitat

disciplinar (Gee, 1996). Alhora, els gèneres són pràctiques socials; una constel·lació de formes retòriques interconnectades (Campbell i Jamieson, 1978) que combina característiques substantives, estilístiques i situacionals destinades a respondre retòricament a les demandes d'una determinada situació (Miller, 1984). Durant el doctorat, l'estudiant pot haver d'utilitzar i escriure molts discursos i gèneres diferents en algun moment, però el discurs acadèmic i científic i els articles de recerca i la tesi doctoral són els més comuns i valorats, tot i que, com es pot deduir de la definició , cada comunitat valora uns discursos i gèneres més que d'altres i les seves característiques varien molt entre disciplines i cultures (Camps i Castelló, 2013; Russell, et al., 2009).

La dimensió social de l'escriptura no només està relacionada amb el consens de la comunitat en relació a què i com escriure. El simple acte d'escriure és, en si mateix, social ja que les escriptores tenen un objectiu comunicatiu i, a través de textos, estableixen un diàleg entre escriptores i lectores sobre un coneixement socialment compartit (Matsuda i Tardy, 2007). L'estudiant de doctorat pot escriure un article de recerca per comunicar els resultats d'un estudi i convèncer altres acadèmiques de l'àmbit de la rellevància de les seves conclusions, o bé pot escriure una sol·licitud de finançament per a presentar-se com a la candidata adequada. La definició adequada i explícita dels objectius comunicatius i el coneixement suficient sobre les lectores i els seus objectius i expectatives tenen un impacte important en el procés d'escriptura i promouen l'èxit en la tasca (Hyland, 2001). Seguint amb l'exemple anterior, depenent de les seves percepcions sobre l'escriptura i la situació particular, l'estudiant que escriu un article d'investigació pot tenir com a objectiu explicar els resultats o, per contra, convèncer a les avaluadores que el seu estudi suposa una contribució important i original a l'àmbit de coneixement. En el segon cas, a l'estudiant li serà útil conèixer el tipus d'audiència de la revista a la que vol enviar el manuscrit (per exemple, psicòlogues experimentals o psicòlogues socials). Els textos són el resultat de moltes converses entre veus diferents, ja que les autores discuteixen els seus resultats amb les teories i resultats d'altres autores i fan que conversin

entre elles (Castelló, et al., 2011). Fins i tot les paraules originals d'una escriptora són la reconstrucció i la reinterpretació de converses, lectures i interaccions anteriors (Bakhtin, 1982; Dysthe, 2012).

Finalment, en els contextos de recerca, l'escriptura és una activitat social i multivocal, ja que la majoria dels textos són co-construïts, co-escrits i en co-autoria. Això és especialment cert en el cas d'estudiants de doctorat, que escriuen i aprenen a escriure amb el suport de les seves supervisores i altres col·legues, i a través de les pràctiques socials d'escriptura que realitzen, com ara donar i rebre retroalimentació, parlar sobre el procés d'escriptura i el text, discutir sobre altres articles i teories i pràctiques de *textualització conjunta* (Aitchison, et al., 2012; Kamler i Thompson, 2006; Paré, 2011).

Processos de regulació de l'escriptura

Des de la conceptualització presentada en aquesta tesi, l'escriptura és una activitat altament complexa que involucra la participació a la comunitat, negociació de posició i construcció d'una identitat investigadora (Castelló, et al., 2013; Cotterall, 2015; Matsuda i Tardy, 2007). La regulació efectiva de l'escriptura és crucial per respondre de forma exitosa les demandes i els reptes complexos que comporta escriure i aprendre a escriure durant el doctorat. La regulació de l'escriptura ha estat àmpliament estudiada en contextos d'educació primària i secundària (Kieft, Rijlaarsdam, i van den Bergh, 2006; van den Bergh, Rijlaarsdam, i van Steendam, 2016). Tanmateix, l'estudi dels processos de regulació d'escriptores expertes és més recent i escàs, especialment en el context del doctorat. *L'estudi del Capítol Quatre és una revisió sistemàtica de la literatura que analitza les característiques dels estudis sobre la regulació de l'escriptura d'estudiants d'educació superior.*

En altres camps d'investigació educativa, com ara la motivació i l'aprenentatge col·laboratiu recolzat per ordinador (*Computer-Supported Collaborative Learning*), Järvelä i les seves col·legues (Hadwin i Oshige, 2011; Järvelä, Volet, i Järvenoja, 2010) han adoptat recentment un enfocament

denominat *regulació socialment compartida* que intenta establir ponts i connexions entre perspectives cognitives i sociocognitives, centrades en la comprensió dels processos cognitius de l'estudiant i les variables que els influeixen, i perspectives socioculturals que posen èmfasi en la naturalesa dialògica i situada de la regulació. En el context del treball cooperatiu, aquestes autores analitzen els processos d'autoregulació (individual), co-regulació (interpersonal) i de regulació socialment compartida (grupal), i les relacions entre elles, incorporant en l'anàlisi el context de la regulació col·lectiva (Hadwin i Oshige, 2011) i combinant mètodes d'anàlisi del discurs i amb mètodes de seguiment de l'activitat i accions de les participants.

En línia amb aquesta perspectiva, la nostra conceptualització de la regulació de l'escriptura també intenta explorar tant els processos cognitius (d'escriptura) com l'activitat i el context on es produeixen. La regulació de l'escriptura es defineix com a seqüències recursives d'acció, pensament i emoció que tenen lloc al llarg de tot el procés d'escriptura (*dimensió cíclica*) i que estan integrades i són altament dependents dels diferents nivells socials i culturals de la comunitat (*dimensió situada*) (Castelló et al ., 2013, Iñesta i Castelló, 2012; Donahue i Lillis, 2014). Els processos de regulació de l'escriptura són les solucions explícites i implícites que una escriptora posa en marxa per aconseguir un objectiu particular, per resoldre un repte o problema que sorgeix durant la producció d'un text (Iñesta i Castelló, 2012). Les escriptores i, més concretament, les estudiants de doctorat, poden prendre consciència i controlar els seus processos de regulació i aprendre estratègies per regular-los de manera més eficaç. La seva implicació en pràctiques socials d'escriptura, especialment en les que tenen com a objectiu discutir el procés d'escriptura, pot ser clau en el desenvolupament d'estratègies de regulació. *El Capítol Cinc presenta l'últim estudi de la tesi, que analitza els processos de regulació de l'escriptura de dues estudiants de doctorat escrivint el seu primer article científic abans i després de rebre retroalimentació sobre el text.*

Investigar la formació i escriptura doctoral

En relació amb el segon objectiu general, conèixer, dissenyar, implementar i avaluar diferents eines per analitzar la formació i l'escriptura doctoral, en aquesta secció, presentem les implicacions metodològiques que es deriven de la conceptualització de la formació i l'escriptura doctoral presentades anteriorment. Aquesta conceptualització planteja quatre aspectes clau que, al nostre parer, han de guiar la presa de decisions sobre els mètodes i instruments a utilitzar per explorar aquest tema:

- Èmfasi en les percepcions, interpretacions, objectius i objectius de les participants. Les opinions de les protagonistes, entendre la seva experiència del procés i les seves percepcions de l'aprenentatge i els resultats, són crucials per augmentar el nostre coneixement sobre l'educació doctoral.
- Èmfasi en el caràcter situat de l'aprenentatge. Les percepcions, els processos i els resultats han de ser explorats en contextos naturals, i no en laboratoris en condicions experimentals.
- Èmfasi en els factors contextuals i socials implicats en l'activitat. Fins i tot quan l'estudiant individual és l'objecte d'estudi, els mètodes utilitzats ens han de permetre conèixer el context en què es produeix l'activitat i els factors socials que l'han influït.
- Èmfasi en el procés d'aprenentatge i desenvolupament, no només en els productes i els resultats de la formació doctoral. Per entendre un moment o situació concret d'una activitat particular és important adoptar una perspectiva longitudinal i conèixer l'evolució de la trajectòria i l'estudiant.

La recerca en educació i escriptura en el doctorat ha utilitzat, de forma majoritària, dos instruments diferents en funció l'enfocament teòric adoptat: per una banda, s'han utilitzat qüestionaris i enquestes per explorar les relacions entre diferents variables i, per l'altra, s'han emprat entrevistes semiestructurades individuals per a aprofundir en les interpretacions de l'experiència de les estudiants de doctorat. Tanmateix, aquests instruments i mètodes no permeten abastar la gran complexitat dels processos implicats en la trajectòria de doctorat,

especialment quan s'utilitzen com a única font de dades. En conseqüència, en aquesta tesi, ens vam proposar dissenyar i avaluar mètodes i instruments innovadors per recollir i analitzar l'aprenentatge i el procés de desenvolupament, les percepcions de les participants sobre aquests processos i la seva naturalesa social i situada. Un dels objectius últims d'aquesta tesi és aportar nous mètodes i instruments per explorar diferents àrees de l'educació i escriptura doctoral.

Per a assolir aquest objectiu, la tesi en el seu conjunt va emprar un enfocament multimetodològic tant en relació als dissenys de recerca com a la recollida i anàlisi de dades per explorar la trajectòria i l'escriptura de les estudiants de doctorat. Segons Kaptelinin i Nardo (2006), "la teoria de l'activitat no prescriu un únic mètode d'estudi (...) parteix del problema i després passa a seleccionar un mètode [d'estudi]" (p.71). D'aquesta manera, per a cada estudi vam utilitzar un disseny i una metodologia diferents en funció de les preguntes de recerca específiques, que van ser posteriorment avaluats en relació a la seva adequació i utilitat.

La tesi està formada per tres estudis empírics i una revisió sistemàtica de la literatura. Pel que fa als estudis empírics, els Capítols Dos i cinc van utilitzar un enfocament interpretatiu de casos múltiples com a forma d'explorar en profunditat l'activitat i desenvolupament de les participants. En el Capítol Dos, vam realitzar entrevistes semiestructurades individuals mediades per dos instruments visuals innovadors, el Journey Plot (Shaw, Holbrook, Scevak, i Bourke, 2008; Turner, 2015) i el Communities Plot (Sala-Bubaré i Castelló, 2017), que tenen com a objectiu captar l'evolució de l'experiència de les estudiants de doctorat durant tota la trajectòria i la seva posició en les comunitats de recerca. Per la seva banda, l'estudi del Capítol Cinc va adoptar una perspectiva micro. Amb l'objectiu d'analitzar els processos de regulació online de les estudiants de doctorat a l'hora d'escriure un article científic, vam combinar la utilització d'instruments de registre de l'activitat (*keystroke logging* i registre de pantalla en vídeo) i del discurs de les participants (qüestionari de preguntes obertes i diaris d'escriptura) i les seves produccions (esborranys). En ambdós estudis, es van

analitzar les dades seguint una estratègia d'anàlisi de contingut interpretatiu del discurs i la producció de les participants. L'anàlisi quantitativa descriptiva complementa l'anàlisi qualitativa en el Capítol Cinc. En tots dos casos, l'anàlisi i presentació dels resultats posen un gran èmfasi en la visualització i la comprensió de la trajectòria de les participants al llarg de l'activitat analitzada. D'altra banda, el Capítol Tres presenta un estudi a gran escala que utilitza un disseny transversal i cross-seccional. Vam utilitzar el qüestionari FINS-RIDSS per analitzar les percepcions d'escriptura científica d'estudiants de doctorat i la seva relació amb altres variables crítiques. L'anàlisi de les dades va més enllà dels enfocaments factorials i correlacionals tradicionals per a explorar també la variació individual i les diferències transculturals mitjançant la identificació de diferents perfils de participants.

L'estudi no empíric es presenta al Capítol Quatre. Com ja hem esmentat, tot i que són abundants els estudis realitzats en contextos d'educació obligatòria (vegeu, per exemple, Bangert-Drowns, Hurley i Wilkinson, 2004; Graham, 2006; Graham, McKeown, Kiuhara i Harris, 2012 ; van den Bergh, et al., 2016), els processos de regulació de l'escriptura d'estudiants de doctorat han rebut escassa atenció fins al moment. Per tant, per dissenyar l'estudi enfocat a explorar els processos de regulació d'estudiants de doctorat, primer volíem conèixer les eines culturals i històriques utilitzades en el camp de la regulació de l'escriptura en contextos d'ensenyament superior, la qual cosa ens va permetre seleccionar d'entre aquestes eines les més apropiat per als nostres objectius i la nostra conceptualització de la regulació de l'escriptura. Més concretament, vam analitzar els mètodes utilitzats en la literatura en relació a l'enfocament teòric i els objectius de cada estudi per tal d'obtenir una millor comprensió de les raons i usos de cada mètode i instrument.

Esperem que la diversitat metodològica emprada en aquesta tesi ens ajudi a comprendre millor la complexitat del fenomen i a definir nous reptes metodològics.

Estructura de la tesi
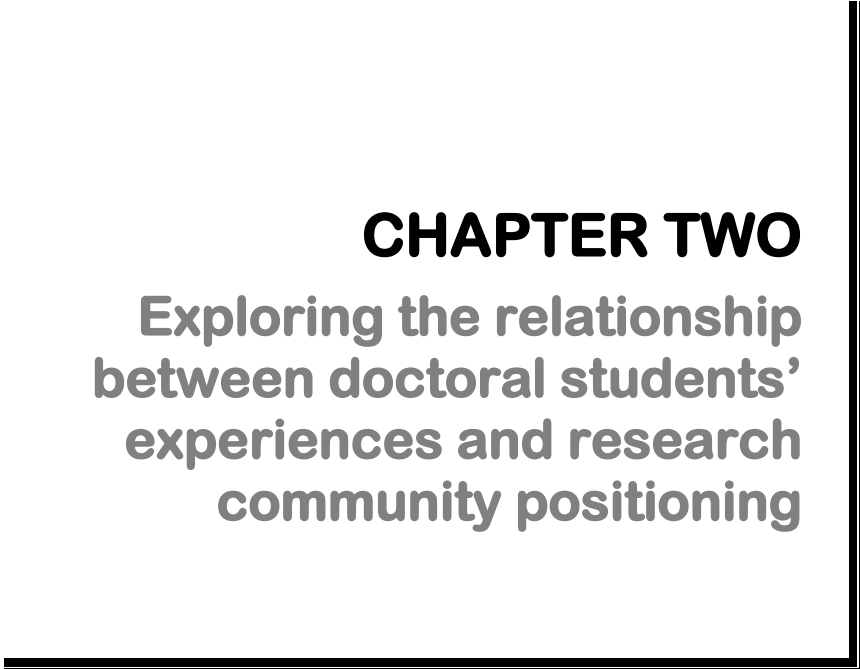
Després d'aquest capítol introductori, presentem els quatre estudis que componen aquesta tesi. El Capítol Dos presenta el primer estudi empíric, centrat en les experiències més significatives al llarg del doctorat de quatre estudiants de doctorat d'ecologia i la seva posició percebuda en la comunitat investigadora. Després, al Capítol Tres, s'introdueix el segon estudi empíric, que se centra en les percepcions d'escriptura científica d'estudiants de doctorat i la relació amb les seves condicions de recerca i suport social. El Capítol Quatre presenta l'únic estudi no empíric: una revisió sistemàtica de la investigació sobre els processos de regulació de l'escriptura en estudiants d'educació superior. L'últim estudi empíric es presenta al Capítol Cinc. Partint de la revisió de la literatura del capítol anterior, aquest estudi se centra en els processos de regulació de dues estudiants de doctorat quan comencen a escriure el seu primer article de recerca i com aquests processos canvien després de rebre retroalimentació sobre el primer esborrany. A continuació, al Capítol Sis presentem les conclusions més destacades de cada estudi, les principals aportacions de la tesi i les seves limitacions i proposem línies per a futures investigacions. Finalment, el Capítol Set presenta els comentaris finals del meu propi procés d'aprenentatge.

Aquesta tesi és un producte híbrid, a mig camí entre una tesi per compendi d'articles i una monografia tradicional. Els estudis presentats en els Capítols Dos i Quatre ja han estat publicats, mentre que els estudis dels Capítols Tres i Cinc es troben en procés de revisió en revistes indexades. La presentació d'aquests estudis en la tesi intenta preservar al màxim el format dels articles en la seva publicació o enviament a cada revista, incloent el disseny i els estils de citació i referències. Les referències incloses en la introducció i les conclusions de la tesi es presenten conjuntament al final del document en estil APA.

CHAPTER TWO

Exploring the relationship between doctoral students' experiences and research community positioning

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Exploring the relationship between doctoral students' experiences and research community positioning

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ABSTRACT

Despite the growing number of studies exploring PhD students' experiences and their social relationships with other researchers, there is a lack of research on the interaction between the type of experiences and the social agents involved, especially in relation to not only problems and challenges, but also to positive emotions and experiences. In this study, we addressed this gap exploring the relationship between four ecology doctoral students' most significant experiences and their perceived position in the research community. Additionally, we aimed at exploring the utility of a methodological device with two instruments, *Journey Plot* and *Community Plot*. Results showed, in one hand, that both positive and negative experiences were significant in students' trajectories, but the proportion varied greatly across participants. Supervisors were related to negative experiences, whereas the broader community was mostly source of positive experiences. Research writing and communication experiences were significant in relation to all the social agents, while other contents of experience were restricted to the smallest social layers (e.g. research motives were confined to the individual layer, and research organization to the individual and supervisor layers). Relationships between the type of experiences and participants' position in the community were found and implications for doctoral education discussed.

Introduction

Research on doctoral education has increased exponentially in the last decade (Boud and Lee 2009; Gardner 2010; Lovitts 2005; Neumann and Rodwell 2009), due to the need to appropriately respond to students' diverse backgrounds and to reduce the high drop-out rates among doctoral students (Martinsuo and Turkulainen 2011). As these studies have emphasized, a PhD is essentially a process of training to become an autonomous researcher in a disciplinary research community (Lovitts 2005).

Traditionally, socialization into the community has been considered as a route by which a newcomer is made a part of a community; in the case of doctoral students, the community of researchers in a particular discipline (Golde 1998), that is, the process of

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assimilation of its rules, culture and procedures. Nevertheless, more recent studies adopt different perspectives that stress newcomers' active role in the socialization process, and their efforts to move from periphery to more central positions by engaging in an increasing number of prototypical activities and relationships (Lave and Wegner 1991; McAlpine et al. 2012; Pyhältö and Keskinen 2012; Weidman, Twale, and Stein 2001). From these perspectives, being a researcher involves agentive participation in many of the prototypical activities that define a particular community of practice, and establishing relationships with other members. Thus, they refer to socialization as a two-way process (McDaniels 2010), in which individuals intentionally and constantly negotiate their position in the community and, at the same time, contribute to the evolution of its practices (Castelló and Iñesta 2012; Prior 1995, 2001). Ultimately, this implies individuals should become and act as *active relational agents* (Pyhältö and Keskinen 2012).

Conceived this way, socialization has largely proved to be a complex and difficult process (Castelló, Iñesta, and Corcelles 2013; Gardner 2009; Lovitts 2005). Therefore, research in this field has focused on understanding problems and emotional challenges doctoral students face when dealing with it. Some large-scale studies in different disciplines found problems related to domain-specific expertise, self-regulation and motivation to be the most typical ones (Pyhältö, Toom, et al. 2012). Other small-scale studies reported problems associated to specific areas of PhD students' experience. These areas refer to challenges students face when dealing with academic writing (Caffarella and Barnett 2000; Castelló, Iñesta, and Corcelles 2013) and in the relationship with supervisors and other members of research institutions (Johansson et al. 2014). The need to have a clear representation of the meaning and usefulness of research (McAlpine and Amundsen 2015) and finding support and companionship (Janta, Lugosi, and Brown 2014) have also been stressed as central for students' development. Finally, other studies have repeatedly shown students' difficulties in the construction of a researcher identity and the management of negative emotions related to the aforementioned challenges (Aitchison et al. 2012).

Guidance and support from supervisors are critical to overcome the challenges involved in the process of becoming a researcher (Austin 2002; Hasrati 2005; Johansson et al. 2014), and to help students develop a role as *active relational agents* in the disciplinary community (Pyhältö and Keskinen 2012) in order for them to acquire increasing levels of independence. Cultures and practices promoted in broader contexts, such as university departments and institutions and, especially, students' agency in their relation with these contexts are also fundamental in the socialization process (Gardner 2008, 2010; McAlpine et al. 2012). Overall, these studies point out the need to move beyond the supervisory relationship to also take into account those experiences linked to smaller (individual experiences) and broader social contexts in order to fully understand students' socialization processes and trajectories (Martinsuo and Turkulainen 2011; McAlpine 2013).

Despite the growing number of studies exploring PhD students' problems and challenges as well as their social relationships with other researchers, to our knowledge there is a lack of research on the interaction between the type of experiences and the social agents involved, especially in relation to positive emotions and experiences. This area remains largely unexplored, with only some exceptions in the study of undergraduates' experiences (Beard, Humberstone, and Clayton 2014; Shaw et al. 2008). Exploring this interaction is of high interest since each type of experience may involve different

agents and impact differently PhD students' development as researchers, thus explaining variations in their socialization process.

Consequently, we assume that there might be a complex interplay in the relationship between the type and amount of experiences and students' positioning in the community at the end of their studies. Not only the content of experiences, but also the affective value students attribute to these experiences as well as the social agents involved in each of them, may influence students' position in the community; at the same time, their position at the end of the studies may influence the retrospective interpretation of their journey.

Based on these assumptions, we developed a mixed-method multiple case study (Hall and Ryan 2011; Stake 2013) aimed at extensively describing the most significant experiences of four ecology doctoral students during the PhD journey, and exploring the relationship between these experiences and participants' perceived position in the research community.

Specific objectives were:

(1) To identify and analyse the most significant experiences in relation to:
    (a) Content of experiences.
    (b) Social agents involved.
    (c) Affective value of experiences.
(2) To describe students' perceived position in the community at the end of their studies.
(3) To explore the relationship between participants' most significant experiences and their position in the community.

To these objectives, we added another one with a methodological focus; we aimed at exploring the utility of specific instruments designed to elicit participants' memories and discourse about their most significant experiences along the journey, both positive and negative, and their current position in the community. When using retrospective accounts, such as interviews, problems in recalling past experiences are frequent due to memory changes or defects, especially when responders have an emotional attachment to these memories (Golden 1992). In this study, we designed and conducted a mixed-method interview aimed at minimizing these limitations by adding visual representations as complementary means of reflecting and talking about past experiences. We expected that this tools might serve as a guide and, at the same time, provide a structure for the experience narrative, thus helping students visualize their journey and be more precise and focused in their recall.

Methods

Context

The study was set in a three-month online academic writing workshop (January–April 2014) conducted by the authors. Its aim was to help PhD students improve their scientific texts and see them as artefacts-in-activity (Castelló and Iñesta 2012; Prior 2006) and tools to think and develop their knowledge.

Two months after the end of the workshop, individual semi-structured interviews were conducted to capture students' most significant experiences faced during their studies, and

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their current perceived position in the community, when they were about to finish their doctoral studies. This study is based on data collected through these interviews (further description is provided in the procedure section).

Participants

The on-line workshop was offered as an elective module to all the doctoral students in the ecology department of a research-intensive university in Barcelona. Eight students enrolled the workshop, and four were included in the present study. They were selected on the basis of the following criteria:

(1) They had to be full-time students, since we assume they have access to a wider range of activities, resources and professional relationships than part-time students (Deem and Brehony 2000; Neumann and Rodwell 2009).
(2) At the time of the interview, they had to be near to completion, thus allowing us to explore their experiences along the whole doctoral journey.

They were all Catalan and had been studying in the same faculty at least one year before to starting the doctorate; therefore, differences related to their knowledge about the institutional and national culture were not expected. Lucia and Nuria[1] were in the fifth year of doctorate; Lucia defended her dissertation in June 2014 (right after the end of the workshop), and Nuria did it four months after. Andreas was in his fourth year, and expected to complete the doctorate in the following year (early 2015), and Alex was finishing the eighth year and defended his dissertation one month after the interview. Although working in the same department, none of them shared research group nor supervisor(s).

Instruments

A methodological device was specifically designed to delve into participants' doctoral experiences and perceived positioning in the community. Two instruments were developed and used in in-depth interviews:

(1) *Journey Plot*. This is an instrument created to retrospectively capture information about participants' positive and negative experiences over time (Shaw et al. 2008; Turner 2015). Participants were given a graphic with two axes, time and emotional intensity of the experience, and were asked to: 'draw a line for the evolution of your doctoral experience, representing the high and low moments, from the beginning until now, and label the experiences represented in the graphic'. Simultaneously, we requested them to describe and explain their graphics, which allowed us to collect problems, difficulties, challenges and also positive experiences, as well as information about the transitions (steep lines and plateaus) between them. *Journey Plot* also worked as a prompt to talk about other experiences that were not labelled in the graphic.
(2) *Communities Plot*. This instrument was designed to explore how students concurrently interpret their research network and position in it. It is a visual representation of the relationships between the interviewee and the most significant groups and

individuals in his/her doctoral experience. We gave participants 10 circles of different sizes and asked them to: 'represent your position in the community, the groups and individuals that are or have been important in your doctoral experience, and the connection among them and with you'. They could use as many circles as needed and were asked to name each circle, explain the composition and whether they were satisfied with their position in the network.

Procedure

During the interview, each participant completed one *Journey Plot* and one *Communities Plot*. Interviews lasted between 40 and 75 minutes and were audio recorded and transcribed. All interviews were gathered according to the research ethics clearance procedures[2] and students voluntarily agreed to participate. Both graphic representations were collected and then digitalized for further analysis. Analysis was conducted in three phases, each related to different objectives of the study.

In the first phase, we analysed participants' discourse to identify the experiences they faced during their doctorate (objective 1). First, after reading the interviews several times to obtain a general picture of the data, we segmented participants' discourse into quotations that referred to a specific experience, which constituted the basic unit of analysis. In this study, a *significant experience* is defined as any event or situation referred by the interviewees as having a significant impact in their doctoral journey. Journey Plot graphics were used as a complement to discourse analysis to help characterize and classify the experiences mentioned by participants in the interview. It is important to note that we took into account all the experiences participants described as having an impact on their journey, not only those directly linked to 'research'. Therefore, we also included 'personal life' experiences whenever they were mentioned by students. As research has demonstrated, individuals' personal relationships and lives greatly influence their academic careers (Johansson et al. 2014; McAlpine and Amundsen 2015; McAlpine, Amundsen, and Turner 2014).

We established three dimensions of analysis: *content*, *social agents* and *affective value* of the experience. *Content* of the experience referred to areas of participants' experience, such as research planning, data collection or attending conferences; whereas *social agents* referred to individuals, groups and communities directly involved in the experience and *affective value* alluded to the emotional tone of experiences. Following the principles of Grounded Theory (Glaser and Strauss 1967), we coded every quotation according to the three dimensions using Atlas.ti qualitative software. For the *content* dimension, we grouped codes in thematic categories to reduce the complexity of the analysis. Regarding the *affective value* of the experience, codes were assigned based on participants' description of feelings and thoughts associated to each experience and on the Journey Plot graphic. Finally, we used Atlas.ti code co-occurrence table to analyse the incidence of each type of experience and the interaction of the dimensions in each case.

In the second phase, in order to describe students' perceived position in the community (objective 2), we focused on participants' *Communities Plot* graphic and discourse. We read and summarized participants' explanation in light of the final composition to describe their perceived position in the research community. Ethnographic interpretation

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of discourse was conducted, based on meanings expressed by participants. In both phases, authors discussed codes, categories and interpretation of compositions iteratively until consensus was reached.

The third phase consisted of analysing each participant's data looking for relationships between the three dimensions of experiences and with his/her position in the community (objective 3). In phases 1 and 2 each individual constituted a separate case in order to fully understand the complexity of their journey, whereas in phase 3 we also conducted cross-case comparisons to identify shared and specific relationships based in our theoretical assumptions.

Results

According to our two first objectives, we start by describing and presenting results of the *content*, *social agents* and *affective value* of participants' experiences and the communities they mentioned. This will be done by means of (a) presenting the categories emerged, and (b) describing each participant's experiences and perceived position in the community. We provide the Journey Plot and Communities Plot graphics of each participant to illustrate the results. Finally, regarding our third objective, we present the relationships between participants' most significant experiences and their position in the community through within- and cross-case analysis.

Categories regarding participants' experiences

Regarding *content*, diversity of participants' experiences was grouped into six categories: *motives* to engage in research, issues regarding *organization of research* and *research procedures*, *writing and communication*, *roles and responsibilities*, and all those aspects linked to *personal life* students mentioned as influencing their doctoral trajectory. Definitions and examples are displayed in Table 1.

Regarding the *social agents* dimension, the analysis revealed that students' experiences were better described in relation to different *types* of social contexts, in terms of their proximity-distance from the students, rather than in relation to specific individuals. Thus, the emerging codes referred to five social layers, ranging from smaller (individual) to broader social contexts (disciplinary community): individual, supervisory relationship, research group, (inter)national researchers and broader community (see Table 2).

Finally, the dimension *affective value* of the experience included both *positive* ('I think that everything was very good at the beginning […] I was motivated to do the thesis'; Nuria) and *negative* experiences ('I had already written the first paper, and here, well, my supervisor took four months or so to read it […] I want to quit science forever!'; Andreas).

Describing each participant experiences and perceived position in the community

For each participant, we first explain experiences based on students' discourse around the *Journey Plot*, and second the positioning into the community based on the *Communities Plot* created in each case.

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Table 1. Categories, definitions and examples of dimension *content of the experience.*

Categories	Definition	Example
Research motives	Meaning of research, participants' motivations to do research and study a PhD, and expectations about the future.	'I liked going to New Zealand, it was scientific motivation because it was truly applied science (…) "maybe another type of science exists, out of university", motivation!' (Andreas)
Research organization	Issues of planning (such as defining thesis objectives or designing experiments), distribution or lack of time and also physical, human or economic resources (getting funding for a project and obtaining a PhD scholarship).	'I was stressed, I think, because I had many things, monthly samplings and I was still doing the masters and we also went two weeks to Alicante, one week to Valencia' (Lucia)
Research procedures	Experiences related to specific data collection and analysis procedures (mostly field sampling and lab work and analysis).	'I finished defining the data I would have because I took all the pictures' (Alex)
Research writing and communication	Experiences related to any phase of the writing process and any type of text, as well as those related to communication of research, mostly conferences and congresses.	'[…] I also wrote an article at that time, it was rejected' (Nuria)
Roles and responsibilities	Experiences related to differentiation of tasks and roles in the relationship with others, including guidance and help (or lack of) from members of their communities and mismatches and disagreements in perceptions and expectations of their position and roles.	'[My supervisor] always works alone, it works for him (…) but when you work with other people, you need to discuss a plan, a way to address a topic' (Nuria)
Personal life	Experiences that were not related to their research and academic tasks, but reported as important in their doctoral journey, such as starting or ending a relationship or moving to a new apartment.	'My girlfriend dumped me, she dumped me (…) It was important' (Alex)

Lucia

Experiences. Lucia is the only participant that described more positive than negative experiences. Most of her most significant experiences involved only the *individual layer*, both in a *positive* and *negative* sense, followed by those related to the *broader community* and the *research group*, which were mostly positive (see Figure 1).

Table 2. Codes, definitions and examples of the dimension *social agents.*

Codes	Definition	Example
Individual	Experiences involving only the student.	'I started writing the first chapter (by myself)' (Andreas)
Student–supervisor relationship	Experiences involving the student and his/her supervisor.	'I thought: fantastic because this will be the occasion to really talk about what we will do, right? And I got quite disappointed because I saw that he (supervisor) didn't plan anything for me' (Nuria)
Research group	Experiences involving other colleagues in their department or research group.	'My scholarship was linked to a project with a different main researcher, so we often consult him and after the research stay we went to talk to him and he said "no, no, not this"' (Alex)
(Inter)national researchers	Experiences involving groups and other agents that had a direct relationship with the participants in a national or international context, such as people or groups of their research stays.	'In the research stay there were very positive things, very positive, that I saw in my thesis comparing to theirs' (Andreas)
Broader community	Experiences related to or directed towards poorly defined or large audience(s) and communities, or even the whole disciplinary area.	'In February my paper got accepted' (Lucia)

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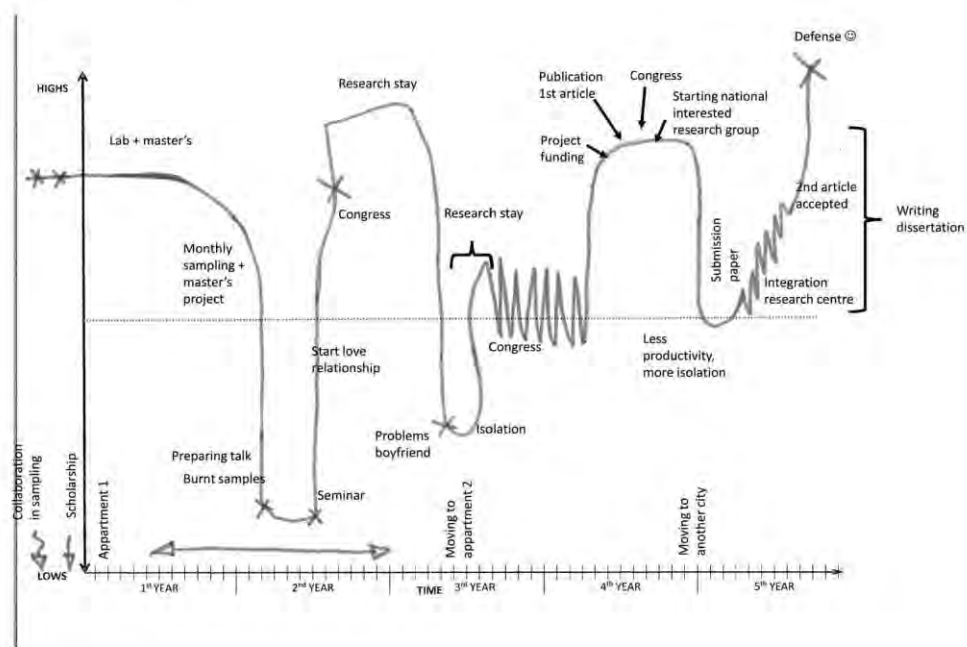
Figure 1. Lucia's representation of her journey.

Scientific writing and communication experiences, especially when the *broader community* was involved, were also an important source of *positive* experiences as this excerpt illustrates: '[Congress A] was very cool, so I came back very motivated [...] and I also met people I would work with in the United States'. She also reported *positive* experiences related to *roles,* mainly involving the *research group* and the *broader community;* and to *organization of research,* which were concentrated on the *individual level. Personal life* had a great impact in her journey too, with both positive and negative experiences. Instead, *research procedures* were not source of significant experiences for her, and she did not mention any experience, *positive* or *negative,* related to *research motives.* She was very engaged on her research all along the journey, despite the highs and lows of the experience. Finally, she mentioned very few experiences with her *supervisor,* and most of them were related to *scientific communication.*

Position in the community. As displayed in Figure 2, she positioned herself as being part of the broader community as well as of the *University Department, Another Research Centre* and the *Sub-discipline National Association* because she had responsibilities in each of them. At the beginning of the workshop she said her position was 'limited' but after completing the PhD she admitted not feeling that way anymore, although she did not have any contract linking her to the university department.

Andreas

Experiences. Andreas mentioned more *negative* than *positive* experiences, especially related to *roles* and *writing and communication* (see Figure 3). This last category, along with issues of *research motives,* was also an important source of *positive* experiences for
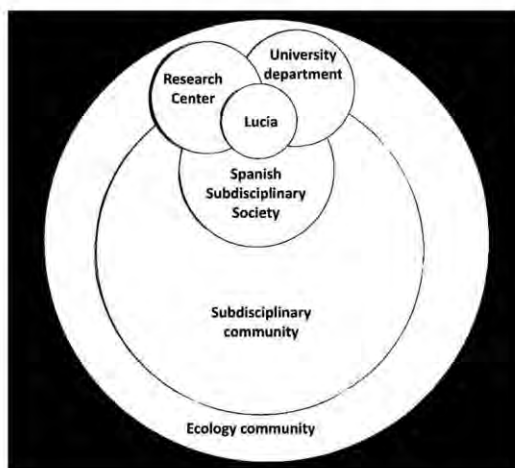
Figure 2. Lucia's representation of her position in the research community.

him: 'two days ago I corrected it, I read it again and […] now I think no, now I am going to send it and it will be much better, I am proud, I would publish it'. He did not mention any personal experience that influenced his doctoral work throughout the journey.

Regarding the *social dimension*, Andreas mentioned fewer experiences with *(inter)national researchers* and the *broader community*. It seems that for him much of the experience developed in an *individual* layer, and to a lesser extent, in the *research group* and in the *relationship with his supervisors*. Interestingly, while Andreas' *individual experiences*
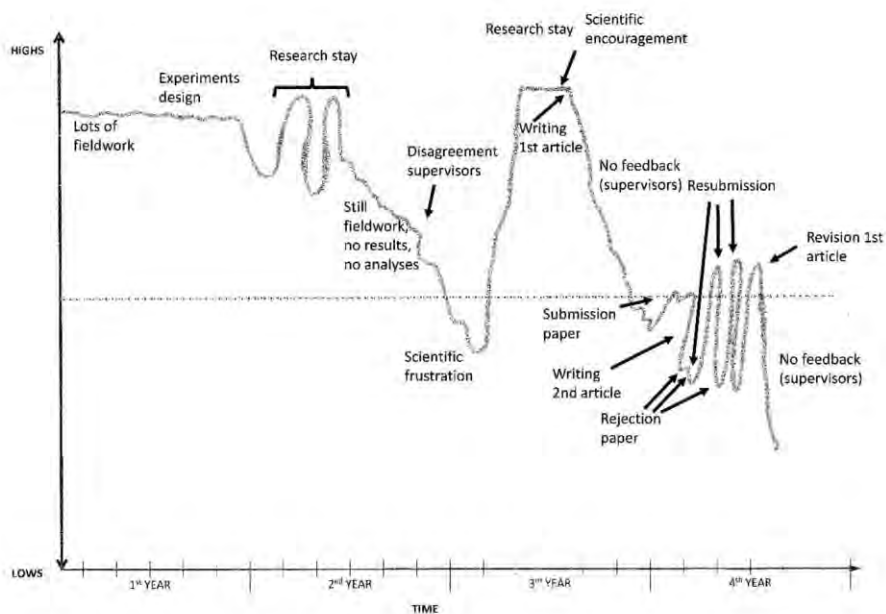
Figure 3. Andreas' representation of his journey.

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were both *positive* and *negative*, the other two social layers were always associated to *negative* experiences, especially in relation to the *negotiation of roles*.

Position in the community. Although he had a good insight on the broader communities in his field, Andreas defined himself as an outsider: 'I'm not here, in the centre, I'm in one side […] I'm like an independent entity'. As Figure 4 shows, he placed his position in the periphery of his group because he did not share most of the group's connections with other research groups and communities. He also felt part of groups with whom he had done his research stays (relationships that he did not share with his group either). His position and relationships with the community were quite independent of his group, and he was not satisfied with it.

Alex

Experiences. Alex was the only participant that mentioned all types of experiences (see Figure 5). They were mostly centred in the *individual* layer, being *negative* more prevalent than *positive* experiences. Although fewer experiences involved the *broader community*, they had a positive effect in the perception of *research motives*: 'it was a chance to know [American authors] and they also had another way to look at things … for me it was a discovery to see that interesting things could be done'. Also important both in a *positive* and *negative* sense were relationships with the *(inter)national researchers* and his *supervisor*, the latter especially in relation to research planning.

Indeed, *research organization* problems were the most frequent in Alex's case ('my father asked me "what hypothesis do you have?" and I said "I don't know, I don't know if we have any"'), followed by *personal* experiences and issues related to *data collection*.

On the contrary, *positive* experiences were more distributed, being *scientific writing and communication* the most prevalent ('we just published it, in 2014 […] I'm very happy'), followed by issues regarding *motives*, *roles* and *organization of research*.

Position in the community. As a result of this diversity of experiences, he represented his position in the community as an outsider (see Figure 6). He knew it, he talked about it but he looked at it from the outside. His participation was limited and mainly aimed at contradicting the major trend in the *European community*, his
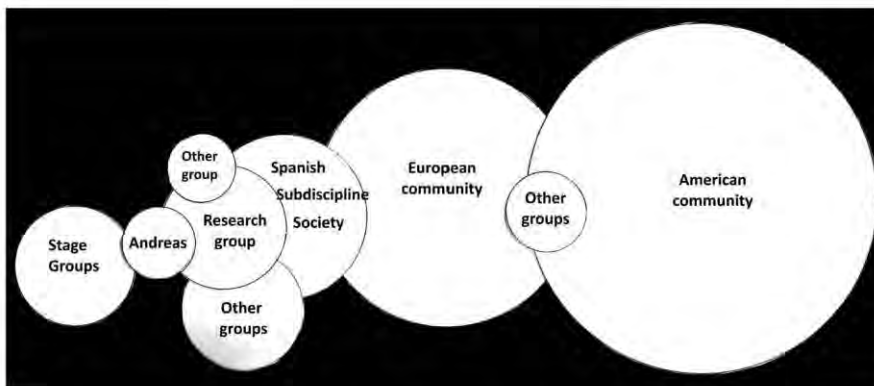
Figure 4. Andreas' representation of his position in the research community.
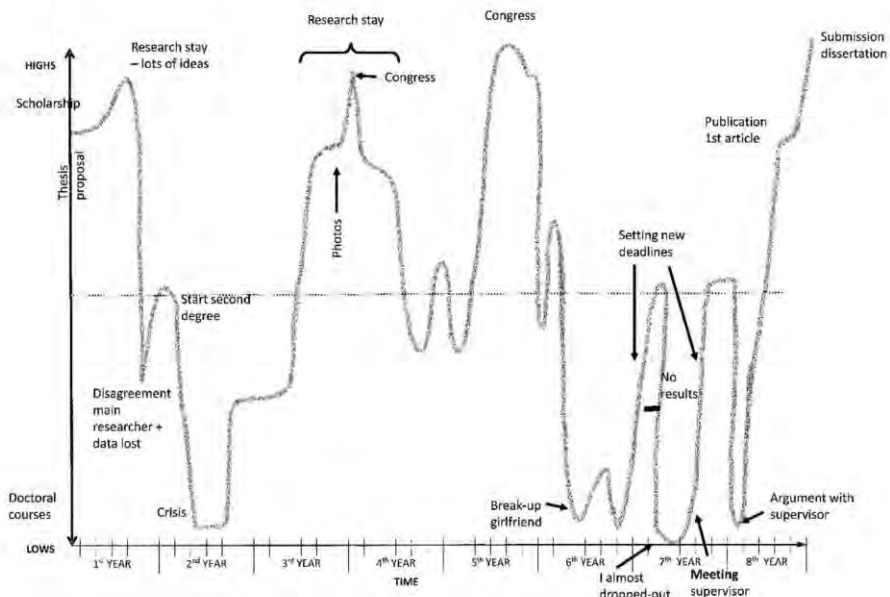
Figure 5. Alex's representation of his journey.

community of reference. Although he enjoyed research, he did not agree with the community's values (research pace and driving motivations) and thus felt proud about being out of the community: 'When a new [technique] is released, it makes a very high impact publication, even if it isn't relevant for ecology. They want to follow the trend, and I don't like it. [...] we go too fast, no! Slow down, people!' Although much of his journey happened in the individual sphere, he represented his position together with his *supervisor*.
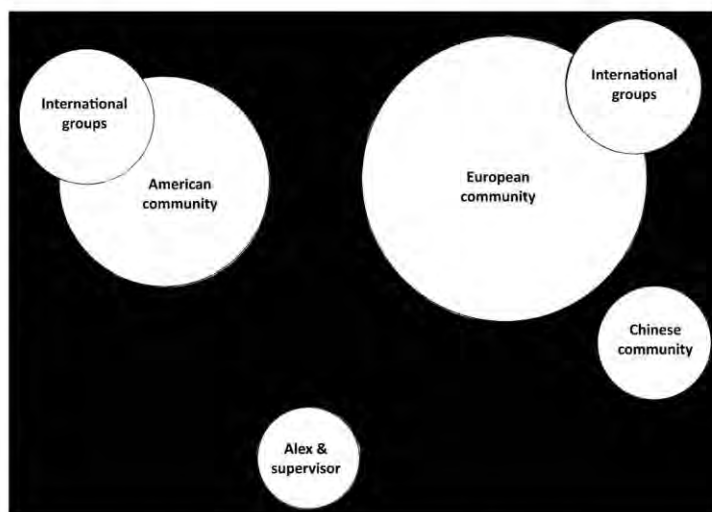
Figure 6. Alex's representation of his position in the research community.

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Nuria

Experiences. Nuria described over five times more *negative* than *positive* experiences (see Figure 7). The very few *positive* experiences she explained were mostly *individual* experiences related to *scientific writing and communication*, such as 'publishing an article [...] the only work that has resulted in a paper'. Nevertheless, this area was mainly a source of *negative* experiences, along with *roles*, *motives* and *organization of research*. In her case, *personal life* and *research procedures* issues did not appear when explaining her journey.

As for the *social* dimension, the *individual layer* had a high significance but, in Nuria's experience, issues related to her *supervisor* were equally important and were a source of only *negative* experiences. She mentioned many problems, especially related to *roles and responsibilities* concerning the lack of guidance and mismatches in expectations: 'He tells me things he wants me to change, but he never tells me why nor how this helps me to achieve the objectives'. Instead, experiences related to *motives to do research* and *scientific communication* happened mostly in the *individual* layer.

Finally, the *broader social* layer was not relevant to understand her doctoral journey, although she had participated in conferences and had done a research stay ('Here I went on a research stay. It went well but it was not useful for my thesis').

Position in the community. Nuria did not work in a team, she felt she was 'doing a very isolated thing' and even her *supervisor* was far from her in the network (see Figure 8). She felt part of the *university department* and the *PhD students group*, but she saw them more as 'social clubs' than professional communities.

Accordingly, she felt completely out of the community and she thought that the few interactions she had with the *broader community* had not had any impact and she did not value them at all: 'Every once in a while we go to a congress but it's a thing that …
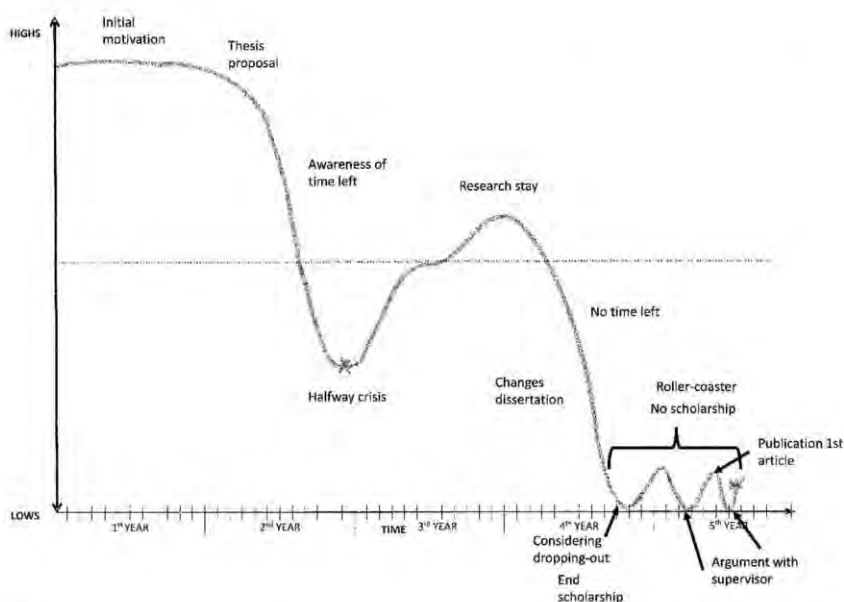
Figure 7. Nuria's representation of her journey.

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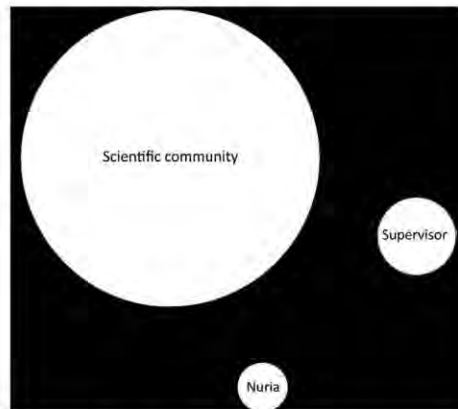
Figure 8. Nuria's representation of her position in the research community.

you go there, you have fifteen minutes to talk, you talk and leave [...] you don't feel like you have any impact'. She was very unhappy with her position.

Relationships between participants' most significant experiences and their position in the community

As seen, students' journey and perceived position in the community greatly varied from one another. For the cross-case comparison, we looked at those emergent trends that account for particular relationships between the experiences and network of each individual.

Lucia was the only participant that perceived herself as a member of the research community and other smaller communities, maybe due to the fact that she was the only one that reported having more *positive* experiences along the journey, especially in relation to the *community layer*. Lucia's interaction with broader communities involved the communication of her research (e.g. publishing or presenting a paper). Interestingly, her perception of her position changed during the last months of the doctorate and this change might have also promoted a reinterpretation of the journey, especially in relation to negative experiences.

On the other hand, Alex perceived himself as an outsider. But, surprisingly, he was happy with it. His position was far from all the communities he included in the graphic due to disagreements with their values and the pace of research, too fast for him. Accordingly, most of his journey happened in the *individual* and *supervisory* relationship layers. He mentioned many positive experiences, although negative ones were more frequent in his narrative, especially in relation to the organization of research, explaining why it took him eight years to finish the thesis.

Despite the significant differences between these two participants, both are characterized by a feeling of satisfaction with their position in the community (however different these positions are). In this sense, what they both have in common is not the amount of interactions with the *broader community* (Lucia reported many more experiences in congresses and publications) but the *positive* affective value of these interactions, which boosted their motivation to do research.

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Andreas' and Nuria's stories are different. Their journey is characterized by a higher proportion of *negative* experiences, especially in their relationship with supervisors regarding the negotiation of *roles and responsibilities,* and in the *communication of research.* Relationships with the broader community were scarce and mostly negative. These problems probably led to a high dissatisfaction with their position in the community at the end of their studies. In their networks, we can observe a perceived lack of support from their supervisors and research groups: Nuria represented her *supervisor* and herself far from the community and from each other, and Andreas perceived himself in the periphery of his research group because he felt he did not receive any help to establish and maintain professional relationships and he did not participate in his group's relationships with other researchers.

Discussion and conclusions

The objective of this study was to identify and describe the most significant experiences that doctoral students have during the PhD journey and to relate them to their perceived position in the research community. Additionally, we aimed at exploring the utility of two specific instruments designed to elicit participants' memories and discourse through graphic representation. We expected to find complex interactions between types of experiences and social agents, as well as differences in their importance across the four participants; differences that should help us explain variations in their perceived position in the research community.

As seen, our participants mentioned having many different significant experiences during their journeys. In contrast to previous studies' findings (Pyhältö, Toom, et al. 2012), they mentioned fewer problems regarding disciplinary expertise, such as research procedures. Instead, they expressed facing more problems and challenges in relation to research communication (e.g. writing papers, presenting their research in a conference) and the differentiation and fulfilment of roles and responsibilities (e.g. lack of help or guidance, disagreements in expectations of duties). A possible explanation for these differences could be that, while previous studies explored the most *typical* challenges of doctoral students at different stages, we analysed the most *significant* experiences of advanced students. Domain-specific problems may be frequent but also more easily solved by asking for specific support or help, while problems related to research writing and communication and role negotiation tend to be more ill-defined and, most importantly, sometimes related to participants' identity and position in the community (Aitchison et al. 2012; Caffarella and Barnett 2000; Castelló, Iñesta, and Corcelles 2013). Their solution is more complex and they are more likely to have a greater impact on the experience. In line of previous research (Johansson et al. 2014; McAlpine, Amundsen, and Turner 2014), personal life was also important for some of our participants, who experienced significant downs in their perception of the doctoral journey as a result of personal problems that, from their own perspective, had an impact in their emerging researcher identities.

Regarding the affective value of the experience, it is important to note that even the journey of the apparently most successful student (Lucia) was not unproblematic, as evidenced by the large number of problems she reported. This fact, together with the other

participants' struggles with their socialization into the community, support the claims of the complexity of this process, specially when considered as a two-way process (McDaniels 2010), in which individual act as active relational agents and intentionally negotiate their position with the community (Castelló, Iñesta, and Corcelles 2013; Gardner 2009; Lovitts 2005; Pyhältö and Keskinen 2012). However, positive experiences were also important and quite frequent in the doctoral journey and thus worth analysing in order to fully understand participants' experience, as Beard, Humberstone, and Clayton (2014) also proposed.

In relation to the *social dimension*, participants' experiences were characterized in gradually increasing layers that had a differential impact on students' journey. For our participants, individual experiences (i.e. experiences that did not directly involve any other person but the student), both negative and positive, were the most frequent in the doctoral journey, probably due to students' attempts to increase their levels of autonomy (Gardner 2008; McAlpine et al. 2012). Although rarer, the amount and, more importantly, the affective value of experiences involving broader social layers appeared to be crucial to promote their socialization and position in the community (Martinsuo and Turkulainen 2011; McAlpine 2013). Positive experiences, especially when they involved other social agents, appeared to be related to participants' feeling of belonging in the research community.

In our study, only one participant, Lucia, was able to become agentive enough to overcome the challenges and move to less peripheral positions, thus becoming a *legitimate participant* (Lave and Wegner 1991). It seems that students' satisfaction with their position in the community is not related to having less negative experiences, but to the success in overcoming and solving the problems.

Moreover, only those who successfully negotiated their role and responsibilities in the relationship with their supervisors and research group were satisfied with their participation and experiences involving the broader disciplinary community. For the other two participants, experiences involving supervisors were very frequent but mostly negative. In those cases, students had problems experiencing a sense of belonging with the immediate research context and thus they may have seen relationships with other more distant researchers and communities as challenging rather than stimulating. In turn, their supervisors often failed in helping them become *active relational agents* (Pyhältö and Keskinen 2012). The scarcity of relationships with national and international researchers and groups may also be related to the challenges of becoming active relational agents and, ultimately, to students' feelings of isolation from the disciplinary community.

In this regard, Alex's situation was unexpected due to the apparent contradiction between his feelings and position, which can be described as *happy outsider*. His process was also problematic but, in this case, not due to the perceived lack of support and agreement with his supervisor, like in Andreas' and Nuria's case. Instead, he showed resistance to certain rules and ways of doing of the research community (Prior 1995), and tried to transform some practices from his outsider positon. He chose to play an active role, not only in assimilating certain procedures, but also, and more interestingly, in not accommodating to some rules of the community. He strategically chose when and where to interact with it, and that may explain why he had fewer but positive experiences related to the broader community. It could be argued that taking this active role was related to the satisfaction with his position. Moreover, Alex case shows that there might not be one single successful socialization process and outcome, but many and less conventional paths.

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On the other hand, while most of the contents of experience were restricted to the smallest social layers (e.g. research motives were confined to the individual layer, and research organization to the individual and supervisor layers), research writing and communication experiences were distributed among all the social layers. Research on academic writing has stressed its dual nature, as being both an individual cognitive process and a social activity of a highly situated nature (Castelló, Iñesta, and Corcelles 2013; Prior 2006). Moreover, the fact that our participants described a similar number of positive and negative experiences of these type emphasizes the importance and the affective intensity involved in writing and communication for an unknown audience.

Regarding our methodological objective, the instruments designed were useful to elicit discourse about experiences and communities. *Journey Plot* helped us to retrospectively capture the most significant experiences in the doctoral studies of our participants, place them in time and get a sense of their trajectory. In turn, the *Communities Plot* instrument promoted students' reflection and detailed description of their scientific network and their relationships with the different significant agents. Moreover, they are valuable tools for raising students' awareness about their PhD experience, and for overcoming some interviews limitations (Golden 1992) by facilitating the recall of past experiences and the assessment of their intensity.

We are aware that our study also has some limitations. First, we do not claim our findings to be representative of all the doctoral students due to the small sample size of our study and to the many characteristics shared by the participants regarding their research conditions (e.g. same affiliation, same type of enrolment, same discipline). Differences are likely to appear in other groups of students, as well as in other disciplines and contexts different than the one presented here. Moreover, the relationships found should also be explored and expanded in larger samples in order to contrast present findings.

Second, we did not collect longitudinal data of the evolution of the experience and the position in the community, which would have helped to understand how students' perceptions change. However, this is a first attempt to explore relationships between significant experiences and position in the community, by means of two non-traditional instruments. These instruments showed a promising potential for the characterization of the complex process of becoming a researcher, and could also be used to examine other topics and fields. Future research might use them to explore students' stories about the evolution of their experiences and deepen in the relationship between these experiences and students' position in the community.

This study has implications for doctoral education. Since problems and challenges are frequent even for the most successful students, it seems necessary to develop institutional resources to promote students' awareness and learning about how to be agentive in anticipating and overcoming the difficulties. Although this can be accomplished by several means, we consider that sharing some common experiences and their affective value with peers and reflecting on how these experiences are related with students' position in the researcher community might be quite effective, especially if reflection is supported by visual and interactive tools similar to the two instruments used in this study. Moreover, explicit negotiation of the terms, roles and responsibilities, not only with the supervisor but also with other significant agents, may help prevent and solve some of the identified challenges of the doctoral work.

On the other hand, as our results suggest, creating and expanding a research network is critical for students' engagement in the doctorate and, more importantly, for their future careers in academia. Students might benefit from actively seeking to improve their position and expand their network by establishing relationships with other researchers in their field and strategically selecting when, where and how to participate in the community, for example by participating in conferences, associations and research projects. In doing this, they may also increase their knowledge about the practices of the disciplinary community, and thus will be more prepared and well positioned to transform it.

In turn, it is suggested that institutions, supervisors and research groups provide students with resources and opportunities to develop as active agents in the community, both in preparing publications and communications and in establishing and maintaining relationships with other national and international researchers in their field of study. They could also support the communication of results not only by assessing the number of outcomes, but also by offering spaces and resources to discuss early findings and drafts, and courses aimed at helping students improve their communicative and writing competence.

Overall, results stress the need to avoid the *culture of institutional neglect* (McAlpine et al. 2012*)* by promoting students' agency in solving challenges and networking, and by raising awareness of the role that social layers and experiences can have in future career directions and opportunities.

We hope the conceptual and methodological issues raised in this study contribute to better understanding complex interactions between experiences and socialization in order to benefit harmonic doctoral students' development.

Notes

1. All participants are referred to by pseudonyms.
2. Study design, procedure and tools were approved by the ethics committee of the Faculty of Psychology, Education, Sciences and Sport Blanquerna on 19th May 2014 registration number 241012/DP.

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No potential conflict of interest was reported by the authors.

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CHAPTER THREE

Doctoral students' research writing perceptions profiles: A cross-national study

Doctoral students' research writing perceptions profiles: A cross-national study[9]

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Abstract

Research writing perceptions play an essential role in doctoral students' effectiveness as writers and therefore as researchers. However, despite some studies on this topic, evidence on the individual variation among doctoral students in regards to their research writing perceptions, and their relationship with different sources of social support and their actual productivity as research writers is scarce. The present study aimed to explore individual variation in doctoral students' research writing perceptions across three countries (Spain, Finland and UK) and the relationship with doctoral students' research conditions and social support by employing person-centred approach. Altogether 1,463 doctoral students responded to *Doctoral Experience* survey. After corroborating the factor structure of the research writing scale (through EFA and CFA), research writing profiles were identified by employing cluster analysis and compared regarding research conditions and experience and social support. The three distinctive writing profiles were identified including *Productive*, *Reduced productivity* and *Struggler* profiles. The profiles differed from each other in terms of experienced researcher community and supervisory support and number of publications. No differences were found in relation to participants' country or language of the dissertation. It is argued that, while research writing perceptions are related to social support and doctoral students' participation in the community, students still lack opportunities to write and learn to write with and from other researchers.

Keywords: doctoral students; doctoral writing; writing perceptions; social support; research writing; cross-national study

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Introduction

Research writing is a key factor for successful doctoral degree completion. Not only are the most important outputs (e.g. dissertations, research papers, conference abstracts) written products, but writing is also an essential tool for PhD candidates to develop their thinking and understanding about the research topic and their identity as researchers (Paré 2017; Starke-Meyerring 2011).

Writing perceptions play a central role in their effective research reporting. Previous studies, such as Cerrato-Lara, Castelló, García-Velázquez, and Lonka (2017) and Lonka et al. (2014), have explored the relationships among doctoral students' writing perceptions, and between writing perceptions and students' well-being and sociodemographic characteristics. However, they did not look at the individual variation in relation to doctoral students' writing perceptions. Moreover, the relationships between doctoral students' writing perceptions and social support and experience are not explored nor do they contrast the findings with their actual productivity. Doctoral students may have very different research writing perceptions and their research contexts may also be different and promote or hinder the development of their writing expertise in many diverse ways. The aim of this study is, therefore, to explore individual doctoral students' research writing perceptions across three countries (Spain, Finland and UK) and the relationship with doctoral students' research conditions and social support. Looking at individual differences among doctoral students' writing perceptions could help us better understand the development of writing perceptions and their role in the doctoral experience. Ultimately, results should guide the design of effective and individualised writing support and resources.

Doctoral students' perceptions about research writing

Writing perceptions have been defined as mental representations, practices and habits about research writing and themselves as writers (Castelló,

McAlpine, and Pyhältö 2017; Lonka et al. 2014). Previous research has shown that doctoral students' *maladaptive perceptions* (e.g. *blocks, procrastination, perfectionism* and *seeing writing as an innate ability*) hinder students' writing and research process (*maladaptive perceptions*), while others are beneficial for their progress (*adaptive perceptions*), especially those related to seeing writing as *knowledge transforming* tool and *productivity*. Regarding *maladaptive* perceptions, blocks are the inability to produce text (Rose 1980), while procrastination is the action of delaying or postponing important tasks (Onwuegbuzie 2000). Research has shown that both types of perceptions are related to lower productivity, but also to reduced well-being and drop-out intentions (Castelló et al. 2017; Lonka et al. 2014).

Perfectionism has been defined as the constant seek of a perfect product and the establishment of unrealistic standards, and thus the endless revision and inability to finish texts (Boice 1993; Kearns, Forbes, Gardiner, and Marshall 2008). Perfectionism has been traditionally conceived as a maladaptive perception because it can hinder or completely paralyse the writing process when reaching very high levels. Nevertheless, it could be argued that average levels of perfectionism are desirable when writing highly complex, specific and demanding texts such as research articles and doctoral thesis. Previous studies have shown that perfectionism is related to seeing writing as a knowledge-transforming tool but, at the same time, to lower productivity and reduced well-being (Cerrato-Lara et al. 2017; Castelló et al. 2017; Lonka et al. 2014). Other *maladaptive* perceptions are those related to *seeing writing as an innate ability*, that is, as an ability that cannot be learnt but a skill or gift that individuals have or do not have (Sawyer 2009). These beliefs are particularly incapacitating for students who perceive themselves as poor writers or experience frequent blocks and procrastination, and have been related to doctoral students' lack of interest (Lonka et al. 2014).

In turn, *adaptive* perceptions of writing involve, on one hand, seeing writing as a *knowledge-transforming* tool, which means using writing as a way to

create new knowledge, rather than use it to reproduce what is already known (Bereiter and Scardamalia 1987). It involves using writing and texts as tools to learn about oneself as a writer, about the research topic and about the text at hand (Castelló, Iñesta, and Corcelles 2013; Prior 2006). On the other hand, *productivity* represents perceptions of being a productive and active writer. Both types of *adaptive* perceptions promote engagement and research productivity and are negatively related to blocks and procrastination and a better well-being (Cerrato-Lara et al. 2017; Castelló et al. 2017; Lonka et al. 2014).

Research writing as a socio-culturally embedded activity

Research writing is a socially situated activity that is embedded in the research community and evolves through the interaction with other researchers, authors, writers and texts (Aitchison and Lee 2006; Cotterall 2011; Prior 2006). Thus, research writing perceptions are not static and innate but learnt and modified throughout doctoral students' trajectory as they enter and interact with the communities[10] (Bazerman 2013; Caffarella and Barnett 2000; Castelló et al. 2013; Starke-Meyerring 2011). Doctoral students can participate in different layers of their communities, from the close relationships PhD students establish with, for instance, peers and supervisors, to their participation in the broader community, as well as the discipline and the broader cultural and national contexts (Sala-Bubaré & Castelló 2017). Previous research highlights the crucial role supervisors have in supporting and promoting students' learning and research development (Hasrati 2005; Kamler and Thomson 2006; Martinsuo and Turkulainen 2011; Pyhältö, Vekkaila, and Keskinen 2015). Yet, interaction with other individuals and groups, such as research team and peers, can also contribute significantly to PhD students' socialization and development as researchers (McAlpine, Paulson, Gonsalves, and Jazvac-Martek 2012; Sala-Bubaré

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[10] We use the terms communities and research communities throughtout the paper to refer to all the disciplinary research, academic and professional communities with whom doctoral students interact and participate, directly or indirectly, during their doctoral trajectory.

& Castelló 2017). Their relationship with and participation in the research institutions, and arguably in broader social and cultural contexts, are other important factors in understanding doctoral students' progress and socialization (Gardner 2008, 2010).

More specifically, previous studies suggest that the availability and provision of resources to facilitate research progress and an effective and increasing participation in the communities is crucial for early career researchers' development (Gardner 2007; Pyhältö, McAlpine, Peltonen, and Castelló 2017). Social support is defined here as the resources in the social environment that doctoral students both perceive to be available and use for their research work (Vekkaila, Virtanen, Taina, and Pyhältö 2016). Social support can come from different formal and informal relationships within and outside the research communities and work environment. Previous research shows that social support, both from the supervisor and the research community, promotes early career researchers' well-being, research productivity, positive and engaging experiences and overall satisfaction with the PhD (Gardner 2010; Jairam, and Kahl 2012; Peltonen, Vekkaila, Rautio, Haverinen, and Pyhältö 2017; Pyhältö et al. 2017; Pyhältö, Vekkaila, and Keskinen 2012; Sala-Bubaré & Castelló 2017). Yet, the role of different sources of social support on doctoral students' writing perceptions has remained largely unexplored (Aitchison, Catterall, Ross, and Burgin 2012).

In this study, we aimed at analysing individual variation in doctoral students' research writing perceptions across three countries (Spain, Finland and UK) and how these perceptions relate individuals' research conditions and social support in order to gain a complete understanding of the role of writing perceptions in the PhD students' experience.

The specific objectives were:

1. Identify different research writing perceptions profiles among doctoral students.

2. Analyse association between profiles and variables related to research conditions and experience (thesis format, thesis language, enrollment modality, phase of the doctorate, research productivity and study abandonment intentions).

3. Analyse association between profiles and perceived social support from supervisors and research community, participation in a research team and country.

Methods

Participants

Altogether, 1463 doctoral students (64% women; 36% men) from research-intensive universities in Spain (n = 1129), Finland (n = 236) and UK (n = 98) from social sciences participated in the study. While 41.8% of the participants were between 30 and 39 years old, 25% were less than 30, 21% were between 40 and 49, and 12.2% were older than 50. Regarding the format of the dissertation, 58.4% conducted their doctoral thesis in the form of a monograph, 26.5% as article compilation and 15.2% did not know the format of their dissertation yet. Regarding enrollment modality, full-time students represented a 46.6% of the participants and part-time doctoral students the remaining 53.4%. They were typically either salaried by the university, or by a research project (14.3%), holding personal grants (37.5%), working outside the university (34.4%), while 13.8% did not have any funding for their studies at the time of the survey. At the time of data collection, 10% were at the first third of their doctoral studies, while 38.1% were at the second and 51.9% were at the last third of their studies. Hence, the majority of the participants had extensive experience of doctoral studies. Most of them (78.1%) reported working primarily alone, 16.4% reported working both alone and within a group, whereas a much smaller group of the participants reported working in a research group (5.6%).

Data collection

Doctoral students from Finland, Spain and UK were contacted via e-mail in 2015 and invited to respond the online *Doctoral Experience* - survey (Castelló et al. 2018; McAlpine, Pyhältö, and Castelló 2017; Pyhältö et al. 2017). The survey was available in Finnish, Swedish, Spanish, Catalan and English. In this study, we utilize data from the *academic writing –scale,* including six factors (22 items): *blocks* (six items), *procrastination* (four items), *knowledge creation* (three items), *productivity* (four items), *perfectionism* (three items), and *innate ability* (two items) (adapted from 'The Writing Process Questionnaire' developed by Lonka et al. 2014; Cerrato-Lara et al. 2017), and *researcher community* (6 items) and *supervisory support -scales* (5 items) (Peltonen et al. 2017; Pyhältö et al. 2015; 2017; Vekkaila et al. 2016). All the scales were measured using a 7-point scale (1 = strongly disagree, 7 = fully agree).

In addition, *drop-out intentions* (one item: yes/no), *research groups status* (alone/in a group/both), *thesis format* (monograph/compilation of articles/don't know yet)*, research productivity* in terms of number of publications in peer-reviewed journals a) as first author and b) as a co-author/not first author were also explored and thesis language. The latter question was different in each country and participants could select among all the official languages in their country, in addition to English as an international language, and 'others'. The diversity of responses was later recoded into English as L1, English as an International Language and other L1 languages (including Spanish, Finnish, Catalan, Swedish, among others). It took 15 to 20 minutes to complete the survey. All the participants received written information about the project and gave their consent to participate according to the research ethics clearance procedures in the respective jurisdictions.

Analysis

We performed a series of Exploratory (EFA) and Confirmatory Factor Analyses (CFA) to determine the factor structure of the writing scale items. At first, EFAs were carried out with Maximum Likelihood extraction and both orthogonal and oblique rotations. The decision about the number of factors to retain was based on both the eigenvalues of the factors and the theoretical salience of the rotated factors. The five-factor solution suggested by the results of EFAs was further confirmed with CFAs conducted using IBM SPSS Amos Version 22. Both maximum likelihood and asymptotically distribution free estimation methods were used. Fit indexes used were Comparative Fit Index (CFI), Goodness of Fit Index (GFI) (good fit considered with values over .95, and acceptable over .90) and Root Mean Square Error of Approximation (RMSEAvalues under .05 are good, between .05 and .08 are acceptable and over .10 indicate questionable fit) (Byrne 2010; Kline 2005; Steiger 2007).

K-means cluster analysis was used to identify research writing profiles among the doctoral students. Cluster solutions with two, three and four clusters were tested. The three-cluster solution was the most theoretically sound and provided the most homogeneous and distinctive profiles. Differences among the three profiles were explored. Kruskal-Wallis and ANOVA tests were conducted to explore associations between profiles and perceived supervisory and community support. Mann Whitney U and Bonferroni's post hoc tests were performed to explore differences among profiles. The association between profiles and the other variables, namely age, gender, thesis format, researcher group status, abandonment intentions and first-author and not first-author publications, was assessed by means of Chi-square tests and adjusted residuals. To reduce the heterogeneity among the participants in relation to their publication experience, the variable was recoded and publication experience of four or more articles was grouped into the same category. We used three articles as a threshold since in Finland, UK and Spain, a minimum of three publications is needed for an article

compilation thesis and, therefore, having four or more publications can be considered as high productivity among the doctoral students.

Results

Table 1 shows that doctoral students in our study held high levels of knowledge transforming perceptions and medium levels of perfectionism. They scored medium-low in productivity, as well as in blocks and procrastination, and they did not see writing as an innate ability. Regarding social support, the perceived support from supervisors was slightly higher (M = 5.40, SD = 1.51) than perceived community support (M = 5.02; SD = 1.32). 31% of the participants had considered dropping out of their PhD studies.

Table 1. Means and standard deviation of the scales of writing perceptions.

	Mean	Std. Deviation
Blocks_Procrastination	3,5339	1,19382
Innate_Ability	2,0609	1,24899
Knowledge_transforming	6,0318	,88991
Productivity	3,7784	1,26762
Perfectionism	4,1051	1,39372

As for publication experience, most of the sample had no publications, especially as co-author (66.7%) (see Table 2). Experience as co-authors was lower than as first authors in regards to all the levels, except for the highest, four articles or more.

Table 2. Publication experience as first author and co-authors of the participants.

	As first authors	As co-authors
No publications	780 (55.8%)	932 (66.7%)
1 article	241 (17.3%)	160 (11.5%)
2 articles	164 (11.7%)	110 (7.9%)
3 articles	87 (6.2%)	59 (4.2%)
4+ articles	125 (8.9%)	136 (9.7%)

Writing scale structure and writing profiles among doctoral students

The EFAs performed with the Writing scale variables suggested that five factors (Blocks & procrastination, Perfectionism, Innate ability, Knowledge transforming and Productivity), explaining 44.04% of the variance, should be retained (see Table 3). Blocks and Procrastination were two different factors in the original scale, but the results of the EFA suggested one common factor should be retained. Although they can be conceptualised as two different perceptions, blocks and procrastination can be two sides of one common problem, in that procrastination behaviours might be a form of *early* blocks or ways for writers to avoid struggles. Moreover, two items (*I only write when the situation is peaceful enough* and *Writing is difficult because the ideas seem stupid*), initially included in the Blocks and Perfectionism factors, were excluded from the analysis based on their eigenvalues. They also presented some theoretical problems: the need for a peaceful atmosphere could be related to issues other than blocks, for instance, perhaps doctoral students are often forced to work in noisy and crowded places and therefore feel they need a peaceful situation to write. Moreover, saying one's own ideas seem stupid was initially in the perfectionism factor, but it could also be interpreted as an expression of writers' self-efficacy and self-esteem, which is not an aspect included in the survey. Previous studies have also found these two items to behave differently than expected (Cerrato-Lara et al. 2017). The remaining factors (Perfectionism, Innate ability, Knowledge transforming and Productivity) had the same structure than the in the original *Doctoral experience* – survey (Castelló et al. 2018; McAlpine, et al. 2017; Pyhältö et al. 2017).

Table 3. Factors and items of the writing scale as result of the exploratory factor analysis.

Academic writing subscales	Items
Blocks & procrastination (alpha = .827)	I start writing only if it is absolutely necessary. I find it easier to express myself in other ways than writing. I hate writing. My previous writing experiences are mostly negative. I often postpone writing tasks until the last moment. Without deadlines, I would not produce anything. I sometimes get completely stuck if I have to produce texts. I find it difficult to start writing.
Perfectionism (alpha = .627)	I find it difficult to write, because I am too critical. I find it difficult to hand over my texts because they never seem complete. I could revise my texts endlessly.
Innate ability (alpha = .770)	The skill of writing is something we are born with; it is not possible for all of us to learn it. Writing is a skill which cannot be taught.
Knowledge transforming (alpha = .0658)	Writing is a creative activity. Writing often means new creating new ideas and ways of expressing oneself. Writing develops thinking.
Productivity (alpha = .771)	I write regularly regardless of the mood I am in. I produce a large number of finished texts. I am a regular and productive writer. I write whenever I have the chance.

This result was further supported by the results of the testing of a 5-factor Confirmatory Factor Analysis model (CFI = .916, GFI = .936, RMSEA = .061). Figure 1 shows the factorial model of the writing scale resulted from the CFA. Following CFA, we calculated the means of each subscale to be used as composite variables in K-means cluster analysis.
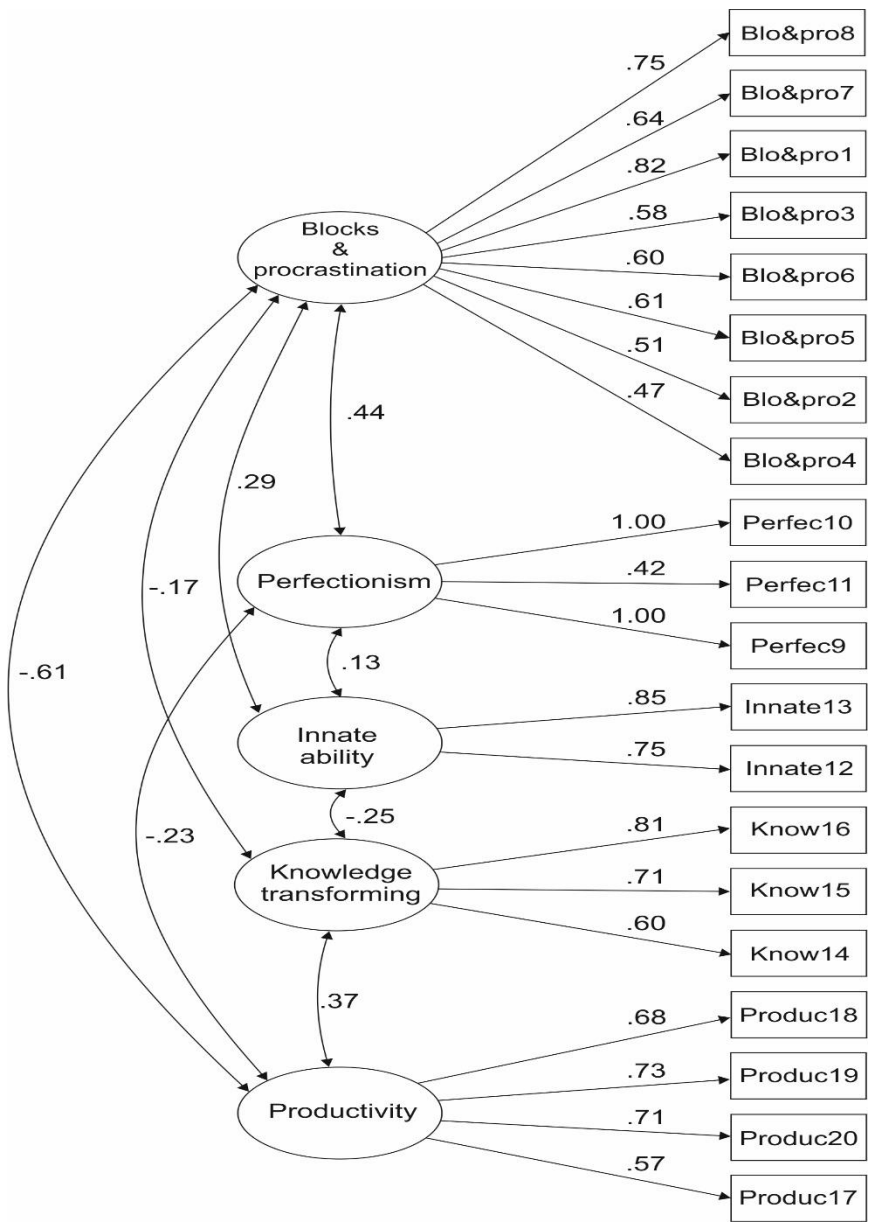
Figure 1. Five-factors model of the writing scale.

Three distinctive research writing profiles were detected. The first cluster culled from our analysis was *Struggler* profile. This was the most common profile (37.6%) (n = 547) among the doctoral students. Doctoral students employing the *Struggler* profile showed high levels of perfectionism, suffered from blocks and procrastination, but at the same time reported average levels of productivity. They were also the most likely to perceive writing as an innate ability.

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The second profile was *Reduced productivity* representing 34.8% (*n* = 506) of the doctoral students in the sample. The *Reduced productivity* holders showed average levels of blocks, procrastination and perfectionism and combined with slightly reduced levels of productivity. Compared to other profiles *Reduced productivity* holders least often perceived writing as an innate ability.

The third cluster culled from our analysis was *Productive profile*. It was the least common profile among the doctoral students, representing 27.5% (*n* =400) of our sample. The doctoral students displaying this profile reported high levels of productivity, perceived writing as knowledge transformation, and reported the lowest levels of perfectionism, and did not suffer from blocks and procrastination.
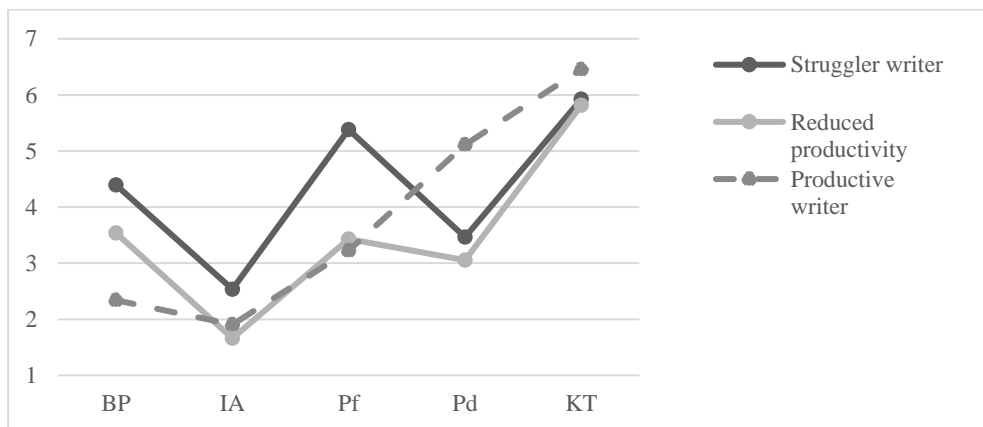
Figure 2. Doctoral students' research writing profiles.

Differences between the writing profiles entertained by women and men were detected. Women were more likely to employ *struggler* profile (68.8%), while men were more likely to belong in the *productive* profile (41.7%) (χ^2 (2) = 8.926, p < .05). *Productive* writers were also more likely to be older (28.1% of them were between 40 and 49 years old, and 59.5% were younger than 40), whereas *Reduced productivity* profile holders were more likely to be younger than 40 (72.3%) (χ^2 (6) = 22.084, p = .001).

Variation in the research conditions and experience among profiles.

The *productive* profile holders were more likely to conduct monograph (62.8%) dissertation whereas those doctoral students employing a *Reduced productivity* profile were more likely to not yet know the format of their thesis (18.8%) than struggler (13.3%) and productive profile holders (13.4%) (χ^2 (4) = 10.256, p< .05). Although not significant (p = .067), doctoral students in the *Reduced productivity* profile were slightly more likely to be part-time students (57.6%) than *Productive* (51.5%) and *Struggler* profiles (50.6%). There were no differences among profiles regarding the phase of the doctorate (p = .330).

Further investigation showed that *Reduced productivity* profile holders reported the lowest number of publications as first authors: 60.4% of these doctoral students had no publications yet, and only 22.5% had more than one paper as first authors (see Table 4) (χ^2 (8) = 26.996, p < .001). On the contrary, *Productive* writers had the highest number of papers published as first authors: only 50.9% of them had not yet published as first authors, and 13.7% had four or more papers published. *Productive* writers also had more experience as co-authors than the other profile holders did (χ^2 (8) = 15.546, p < .05).

Table 4. Publication experience as first-authors and co-authors in peer-reviewed journals of participants in the three writing profiles.

		Publications as first-authors			Publications as co-authors		
		Struggler	Reduced product	Productive	Struggler	Reduced product	Productive
No publi-cations	N	290	290	200	351	329	252
	%	55,3%	60,4%	50,9%	67,0%	68,5%	64,1%
	z		2,5	-2,3			
1 article	N	93	82	66	60	62	38
	%	17,7%	17,1%	16,8%	11,5%	12,9%	9,7%
	Z						
2 articles	N	76	41	47	44	37	29
	%	14,5%	8,5%	12,0%	8,4%	7,7%	7,4%
	z	2,5	-2,7				
3 articles	N	27	34	26	23	18	18
	%	5,2%	7,1%	6,6%	4,4%	3,8%	4,6%
	Z						
4+ articles	N	38	33	54	46	34	56
	%	7,3%	6,9%	13,7%	8,8%	7,1%	14,2%
	Z		-2,0	3,9		-2,4	3,6

Note: only significant adjusted standarized residuals are retained (z < -1.9; z > 1.9).

Regarding the language of the thesis, we did not find significant differences among the profiles on the basis of whether they wrote their thesis in English as an L1, in English as an L2 or in a different L1 (mostly Spanish and Finnish) (p = 0.91).

Last, S*truggler* profile writers were most likely to have considered dropping out of their studies (38.9%) than *Reduced productivity* (30.9%), and *Productive profile* (20.5%) ($\chi2$ (2) = 33.939, p< .001).

Variation in the social and contextual dimensions among profiles.

As displayed in Table 5, doctoral students' profiles were also different in regards to the perceived support from the supervisor ($\chi2$ (2) = 33.547, p < .001) and the researcher community (F(2, 1417) = 10.760, p < .001). *Productive* profile reported greater support from the supervisor than doctoral students in the

Struggler (U = 81,575.5, p<.001) and *Reduced productivity* profile (U = 82,164.5, p<.001), while the former profile also reported higher levels of supervisory support than doctoral students in the *Struggler* profile (U = 122,399, p<.05). Doctoral students with *Productive profile* also experienced more researcher community than their counter partners with *Strugglers* and *Reduced productivity* profiles.

Table 5. Profiles' perceived social support means, standard deviations and post-hoc comparisons.

	Struggler	Reduced productivity	Productive	Post-hoc tests
Supervisor support	5,20 (1,56)	5,38 (1,50)	5,72 (1,40)	Prod > Strug** > RedProd*
Community support	4,86 (1,36)	5,00 (1,30)	5,27 (1,28)	Prod > Strug**, RedProd**

*p<.05, **p<.01 1

No statistically significant differences were detected in writing –profiles held by Spanish, Finnish and UK doctoral students, nor by students conducting their dissertations on their own, in the research group or both alone and in the group.

Discussion

The aim of this study was to explore individual doctoral students' research writing perceptions across three countries and how these perceptions relate individuals' research conditions and social support. Our analysis revealed three profiles in relation to participants' writing perceptions. Although they were quite balanced in number, the most common profile was that of *Struggler* writers, which may be quite natural since doctoral students are novice writers in their research communities and learning about research writing is a complex and challenging process (Aitchison et al 2012; Kamler and Thomson 2006). These doctoral students held less transformative writing conceptions and experienced more problems when writing. Despite these problems, their levels of productivity were medium, which indicates they managed to deal with their writing problems

and survive in a high demanding publishing scenario. The second most common profile was *Productive* writers. They hold transformative writing conceptions and experienced fewer problems when writing. Moreover, they had more publication experience.

Finally, the less common profile was *Reduced productivity* writers. This was an unexpected profile in that these participants held transformative writing conceptions and experienced fewer problems in writing than *Struggler* writers. Nevertheless, they were the least productive among the three profiles, both in relation to their perceptions and the number of publications. These doctoral students were also more likely to not have decided the format of their dissertation. One explanation for the low productivity of these doctoral students, despite their adaptive perceptions, could be that they do not have many opportunities or they do not write often, but instead, they focused on other research-related tasks, such as data collection and analysis. Further studies should be conducted to explore this issue.

In general, the three profiles show that the majority of participants held relatively high transformative conceptions of writing: innate ability conceptions were below the medium point even for struggler writers, and the three profiles showed high levels of writing as a knowledge transforming tool, as some previous studies also have shown (Castelló et al. 2017; 2018; Lonka et al. 2014). However, all the doctoral students in our study also experienced blocks and procrastination to a certain extent. Although differences among the profiles were significant (ranging from low to medium-high levels), these results confirm that even productive and adaptive writers struggle with writing sometimes (Aitchison et al. 2012). In contrast, perfectionism levels showed a different pattern. Perfectionism seemed to be the most salient problem experienced by *struggler* writers and even *productive* writers reported medium levels of perfectionism. These results suggest that perfectionism perceptions might not be as *maladaptive* as those of blocks and procrastination. While high levels of perfectionism may relate to unreasonable expectations and standards regarding one's own writing,

medium levels of perfectionism may be desirable to succeed in a highly demanding and competitive context such as the academia (Kearns et al. 2008).

Results also showed that *productive* writers experienced the highest levels of social support, both from the supervisor and the research community. In turn, they also had more publications in collaboration with other researchers. Results point at writing as a social activity, with social support acting as a support for the development of more transformative and facilitating perceptions of writing. Previous studies argue for the importance of socializing doctoral students into the written practices and genres of the research community by means of close collaboration with other researchers (Aitchison and Lee 2006; Caffarella and Barnett 2000; Paré 2017; Prior 2006. The nature of this relationship could be bidirectional, since adaptive research writing perceptions may act as facilitators of a positive experience in the research community. The greater likelihood of *struggler* writers of dropping out of the doctorate also seems to suggest a protecting function of transformative/adaptive research writing perceptions.

Our results also indicated that having a research group had no relationship with doctoral students' writing profile, which suggests that research groups may not have been acting as socializing agents and that working in a group not necessarily means feeling appreciated and supported by them. Thus, promoting adaptive research writing perceptions is not only a matter of having the opportunity to interact with other researchers but also of the quality of these interactions and explicit and specific writing supports (Castelló et al. 2017; Cotterall 2011; Kamler and Thomson 2006; Starke-Meyerring 2011).

Despite its potential facilitator function, doctoral students in our study seemed to have few opportunities to publish, especially in collaboration with other researchers. More than half of the overall participants had no experience as first authors in peer-review journals, and two-thirds had no experience as co-authors. This implies that collaboration with other researchers (or participation in projects different from their thesis) is not so frequent (Cotterall 2011; Sala-

Bubaré & Castelló 2017), at least regarding joint publications. The fact that students still perceived medium-high levels of support might indicate low awareness of the potential ways in which this collaboration can be instantiated or a lack of interest in this type of collaboration with the community (Gopaul 2015).

On the other hand, the language in which they wrote their thesis had no relationship with doctoral students' research writing perceptions profiles. Although we acknowledge there might be differences in the writing process and challenges among writers of different languages and L1 and L2 writers, our results suggest, as Hyland (2016) argued, that other factors are responsible for doctoral students' perceptions about academic writing and their writing processes, such as the doctoral students' identity as researcher and author, genre knowledge, awareness and knowledge of the expected audience (Castelló et al. 2013; Cotterall 2011; Paré 2017; Starke-Meyerring 2011). Moreover, these profiles seemed to be also independent of the national context, since no differences among the three countries were identified. Thus, the profiles identified in this study can be generalised across those European countries. Further studies should verify the scope and persistence of this generalisation.

This study has some limitations. We cannot claim this sample to be representative of all the doctoral students in the three countries because participation in the study was voluntary, especially in relation to UK doctoral students. These participants were underrepresented compared to Spain and Finland in regards to the total number of doctoral students. The cross-national comparison was a first attempt to assess differences among doctoral students' research writing perceptions in the three countries included in the study. However, further analysis should be conducted in order to explore similarities and differences in the way doctoral students approach and perceive research writing in relation to their national context. Moreover, the development of research writing perceptions is a complex process that might be affected by many and diverse factors, some of which might not have been taken into account in this

study. Further research could expand the scope to explore the influence of other factors, such as engagement, interest in research and critical incidents.

The study has also some implications for doctoral education. Supervisors and doctoral schools need to be aware of difficulties involved in writing at the PhD level and plan support and assistance for all, not only those for those writing in a second language. Resources to support students' writing should also challenge and transform their writing perceptions of writing to promote the development of transformative conceptions that facilitate productivity. Research teams are also suggested to reflect on the writing support and opportunities they offer to doctoral students. Finally, PhD students need to actively seek collaboration with researchers outside the supervisory relationship. Institutions and supervisors should promote students' agency and provide support and structures to facilitate such collaborations.

Acknowledgements

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CHAPTER FOUR

Writing regulation processes in Higher Education: A review of two decades of empirical research

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Writing regulation processes in higher education: a review of two decades of empirical research

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Abstract In Higher Education (HE), writers need to regulate their writing processes in order to achieve their communicative goals. Although critical for academic success and knowledge construction, writing regulation processes have been mainly researched in compulsory education rather than in HE, with no systematic review focused on this context. The purpose of this article was to build a comprehensive picture of the state of writing regulation research in HE by conducting a systematic analysis of the studies on this topic in the last two decades. Studies' characteristics were analysed in light of both their theoretical perspective and objectives. Results indicated the three theoretical perspectives and diversity of objectives were equally represented. Some methodological characteristics, such as context of study, were significantly related to theoretical perspectives, while the selection of instruments depended on their objectives. A qualitative analysis of the studies showed that cognitive studies methods' varied in relation to their objectives, while sociocognitive studies used heterogeneous methods, and sociocultural studies used similar methods regardless their objective. Writing regulation in HE is a growing field with great variety of topics and objectives, yet there are still some underdeveloped issues and research challenges such as integrating emotions in the analysis, looking for more comprehensive methods that account for regulation in situated HE writing contexts, and clarifying the conceptual underpinnings of the perspective of writing regulation adopted in each study.

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Introduction

In Higher Education (HE), academic writing plays a central role in students' professional development and the construction of knowledge within the disciplines. Research has repeatedly demonstrated that academic writing is a complex activity and that students struggle to successfully fulfil the variety of writing tasks they have to solve (Bazerman, 2013; Lea & Stierer, 2000; Prior, 2006). Problems are related to their ability to manage the processes involved in writing in relation to the specific demands and characteristics of the task and its discipline. That is, writers have difficulties with the regulation processes involved in writing (Caffarella & Barnett, 2000; Iñesta & Castelló, 2012; Walker, 2007). Increasing our understanding of how these processes function and develop is essential if we want to help students to succeed in their professional development.

Writing regulation processes are considered individual cognitive activities that are influenced by the social context. Theoretical perspectives can be distinguished in relation to the extent to which they tend to focus on the individual, the social, or both characteristics to formulate their theoretical models and conduct empirical research. The most active approaches in the field of writing regulation can be grouped in cognitive, sociocognitive and sociocultural perspectives, although it is worth noting that frontiers and limits among the three perspectives are dynamic and attempts have been made to bring them closer together (Castelló, Bañales, & Vega, 2010; Järvelä, Volet, & Järvenoja, 2010).

Cognitive traditions are based on Hayes and Flower's (1980) seminal work, which conceives writing as a problem-solving process comprised of a set of complex planning, translating and reviewing processes, with regulation being a key factor to monitor one's own cognitive writing behaviour (Flower & Hayes, 1981; Hayes, 2012). The role of long-term and working memory are critical to understanding writers' knowledge (e.g. about the topic, audience and genre), and their capacity to process and use this information. Task environment is another important component of the initial model, and it has been further developed in revised versions, which also introduced the role of motivation and affective factors (Hayes, 2012). In this perspective, the focus remains on individual writers' conscious monitoring over the processes and its role and function along the writing activity, especially in terms of differences between expert and novice writers (Bereiter & Scardamalia, 1987); while the social dimension is explored in regards to its effects on the organization of the writing processes (MacArthur & Graham, 2016).

The sociocognitive perspective expands the initial cognitive models by adding emotional and contextual factors, such as motivation, task objectives and type of instruction (Zimmerman & Schunk, 1989). In contrast with the cognitive perspective, the emphasis here is not only on the cognitive processes but also on

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writers' behaviour, environment and personal characteristics. Writing regulation is conceived as writers' self-initiated thoughts, feelings and actions aimed at achieving writing objectives (Graham & Harris, 2000; Zimmerman & Risemberg, 1997). The three types of self-regulatory processes, namely environmental, behavioural and personal, interact with each other in a feedback loop by which writers adapt their output and modify their writing self-efficacy beliefs. The main focus of sociocognitive studies has been on the development and learning of writing abilities and strategies, an issue somehow disregarded by cognitive researchers (MacArthur & Graham, 2016). Thus, much of the research within this perspective has been devoted to the assessment of interventions on self-regulation skills, such as the well-known Self-Regulated Strategies Development (SRSD) programme (Graham, McKeown, Kiuhara, & Harris, 2012). In subsequent theoretical revisions, Zimmerman and Schunk formulated a model of the development of self-regulation to describe the phases or levels writers go through to improve their writing self-regulation skills: observation, emulation, self-control and self-regulation (Schunk & Zimmerman, 2007; Zimmerman, 2000). Despite their differences, both perspectives have a common focus on the individual processes involved in writing (Graham & Harris, 2012).

In contrast, sociocultural approaches emphasize the importance of the broad sociocultural context and disciplinary discourses. Sociocultural perspectives switched the focus away from the individual cognitive processes to explore and understand the situated cognition, that is, the socially mediated processes by which meanings are constructed, revised and transformed (Allal, 2000; Prior, 2006). In writing, the emphasis is on the written outputs and genres and their relationship with the social practices and activities where texts are produced. The role they play in the way individuals learn to write is also a critical issue for sociocultural scholars (Bazerman, 2013). Writing is defined as a socially and historically situated activity, where each writing event is different and unique, and texts are mediating and collaborative artefacts of the activity (Prior, 2006). Thus, writing regulation is not only conceived individually but also as social processes: participation in communities of practice and co-regulation, that is, the process by which a novice writing acquires and internalizes writing regulation skills while working with a more skilled writer (Allal, 2000; Englert, Mariage, & Dunsmore, 2006; McCaslin & Hickey, 2001; Prior & Shipka, 2003).

Altogether, these perspectives have been crucial to enhancing our knowledge about writing regulation processes, since each of them highlights different dimensions of the processes and prioritize diverse methodologies and methods (Castelló et al., 2010a, b; Hyland, 2016). Nevertheless, historically there has been little dialogue between them (Hadwin & Oshige, 2011; Järvelä et al., 2010). This review aims to contribute to this dialogue.

Several reviews and meta-analyses on writing regulation in primary and secondary school have been conducted (see, for instance, Bangert-Drowns, Hurley, & Wilkinson, 2004; Graham, 2006; Graham et al., 2012); however, in the context of HE, we only found reviews on self-regulation of learning (de Bruijn-Smolders, Timmers, Gawke, Schoonman, & Born, 2016; Roth, Ogrin, & Schmitz, 2016). Yet, to our knowledge, there are no systematic reviews exploring the field of writing

regulation in HE writers. A review of the empirical research will allow us to assess the relevance and prevalence of each perspective, identify similarities and differences across them, and draw some methodological gaps. Ultimately, it will advance our understanding about writing regulation processes at university, and contribute to designing better writing interventions aimed at promoting students' learning and success.

Thus, we conducted a systematic review of empirical studies aimed at building a comprehensive picture of the state of writing regulation research in the context of HE. Specifically, our objectives were:

- To map the general characteristics of research on writing regulation in HE.
- To identify and analyse relationships between objectives and theoretical and methodological options of research on writing regulation in HE.
- To identify and explain groups within each theoretical perspective on the basis of their objectives.

HE writing processes are highly specific and complex (Hyland, 2013), and thus different from the processes that may emerge in other contexts and tasks and with other populations. Therefore, we assume that in order for research to understand HE students' processes and better inform evidence-based trainings, writing regulation needs to be explored in the context of authentic activities and situations that account for the specificity and complexity of these processes; authentic activities in terms of those that are relevant in each discipline, that is, those activities that prepare students for their (future) professional careers. Our position, however, does not necessarily favour one perspective over the others; writing regulation processes happening in real contexts and with authentic tasks can be explored from any of the theoretical perspectives and using any methodology (Hyland, 2016).

Method

Criteria of inclusion

- Social Sciences studies published in the last 22 years were included. We wanted to set a timeframe long enough to provide an extensive overview of the empirical writing regulation research. Moreover, the first publication that addresses the specific issue of writing regulation did not appear until 1994 (Zimmerman & Bandura, 1994), although previously many studies had been conducted in the field of self-regulated learning.
- Only empirical research was included since the focus of this review is on the relationship between theoretical and methodological options. Furthermore, theoretical papers are more likely to present general models of writing processes and were included in the introduction of the article (e.g. Castelló et al., 2010a, b; Zimmerman & Risemberg, 1997).
- Only peer-reviewed journal articles were considered.

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- We included papers published in English, Spanish, French and Italian. We broadened the scope to languages other than English to include different research cultures.

Search terms and databases

The most relevant online databases in the educational field, that is, Thomson Reuters Web of Science, Scopus and ERIC were used. We defined five primary keywords, related to writing regulation, and 12 secondary keywords, related to the educational level and type of writing at which we aimed. Primary keywords were: writing regulation, writing coregulation, writing monitoring, writing process and writing processes. Secondary keywords were: higher education, university, college, academic writing, undergraduate, graduate, Ph.D., doctoral, doctorate, Writing in the Disciplines, Writing Across the Curriculum and scientific writing. Each primary keyword was separately combined with each of the secondary keywords, which resulted in 60 independent searches in each database. Results were integrated into one database. After removing duplicates, 840 articles remained.

After reviewing all abstracts, we excluded a large pool of papers (n = 508) not related to the topic of writing regulation processes. The polysemy of some keywords (e.g. 'regulation' in Law and Medicine, or 'monitoring' in Technology and ICT), the common use of the word 'writing' in abstracts and titles, and the frequent appearance of authors' affiliation and publishers in the abstracts (and therefore the use of 'university' and 'college'), led to a great number of articles (n = 232) related to other topics and disciplines, such as Medicine, Law, ICT or Literature Studies topics. Even within Education and Social Sciences, the search resulted in many studies focused in a great variety of topics not related to writing regulation processes (e.g. learning regulation, assessment instruments, educational policy or genre studies) (n = 276). From those with a focus on writing regulation processes, we also excluded non-empirical articles (n = 116, including theoretical papers, revisions, descriptions of interventions and programmes and reports), and those whose only aim was to explore descriptive questions about participants' sociodemographic features (such as gender, race or disabilities) in relation to writing regulation (n = 161). From the remaining articles, four were excluded due to weak or insufficiently described methods. Finally, 51 articles met the criteria for inclusion and were included in this review.

Procedure of analysis

The analysis was conducted in four phases. First, after carefully reading all the selected articles, we summarized them in a descriptive table. Second, an iterative process of data categorization was followed for all the dimensions related to research objectives, that is, theoretical background, research objectives and methods. Initial dimensions and codes were discussed and redefined.

Theoretical backgrounds were classified into *perspectives*, whereas the variety of research *objectives* and questions was reduced by grouping studies on whether they

explored writing regulation processes of specific texts (hereafter referred to as *writing processes*), they assessed the effects of an intervention (hereafter referred to as *intervention effects*), or they explored writers' beliefs and perceptions about writing regulation (hereafter referred to as *perceptions and beliefs*). Due to the prevalence of studies conducted with undergraduate students, type of participants was only divided into undergraduate and graduate, the latter group including master's and PhD students, as well as professors in one case. Regarding the method, *designs* were divided into observational and (quasi)experimental; *research settings* were grouped in natural contexts (regular classroom and courses) and lab (specifically designed by researchers). As for *instruments*, we grouped codes in five groups, similar to Hyland's (2016) classification, in relation to the type of data they collected: retrospective self-reports (e.g. questionnaires, interviews and process logs), online activity recordings (e.g. time measures, keystroke logging, screen-captures and eye-movement devices), self-reported on-line processes (different methods of think-aloud protocols), concurrent tasks (reaction time tasks), and interaction (recordings of peer or expert feedback and discussion).[1] The type of writing task used -when appropriate- was included as a separate dimension, and divided into disciplinary and non-disciplinary texts, based on whether they were authentic tasks and genres in the professional future—or current activity—of the participants in each study. This classification was considered the most suitable for our purpose of informing HE teaching practices. Moreover, *text analysis* was included as another dimension, where studies were divided into those that did not analyse texts, those that assessed only final texts, and those that analysed their evolution through drafts of the same text. The final code included studies tracking the changes incorporated in the text as a result of peer- or expert-feedback.

Finally, we included a dimension for the *emotions* involved in the writing process, because the affective dimension of writing is seen as a differential element among theoretical perspectives: while some perspectives, like the self-regulation theory, highlight emotions as a central factor, others, such as Hayes and Flower's (1980) model, do not include an affective dimension (Castelló et al., 2010a, b; Mackiewicz & Thompson, 2014; Zimmerman & Risemberg, 1997). Moreover, traditionally educational and self-regulation research have focused on the cognitive processes, and has neglected the study of emotions (Pekrun & Linnenbrink-Garcia, 2014; Schutz & DeCuir, 2002), despite their critical role in students' and teachers' learning and experiences. Thus, it is worth exploring whether studies on writing regulation processes follow the same trend or if, conversely, they include emotions in the analysis of the processes. Studies were coded into only one category of each dimension, with the only exception of *instruments*, where multicoding was done when appropriate.

In the third phase, we analysed the relationship between studies' theoretical perspectives and objectives, and between the objectives and the theoretical and methodological options, using *Pearson's Chi square test*. Cramer's V was used to

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[1] Stimulated recall interviews were classified as on-line activity recordings or retrospective self-reports depending on whether the study analysed the on-line processes recorded, or only interview data.

measure the strength of the association between the variables. All the quantitative analyses were conducted using SPSS (v19) package.

Finally, in order to provide more detail on studies' characteristics, and on how studies' objectives differ depending on their perspective, we conducted a qualitative analysis of the nine subgroups emerged from the intersection between perspectives and objectives.

Results

General characteristics of research on writing regulation in HE

Most of the articles in our sample were published in the last 5 years (n = 36). Six articles were published between 1994 and 1999, and 2005 and 2009, and only three between 2000 and 2004. Studies in this review were from the United States of America (n = 15), Taiwan (n = 7), Spain (n = 6), United Kingdom (n = 5), China (n = 4) and France (n = 4). Researchers from New Zealand and Sweden conducted two articles each and the rest of the studies were from Belgium, Canada, Germany, Mexico, Portugal and Puerto Rico.[2] Regardless the country, most articles (n = 47) were written in English. Only three papers were written in Spanish, and one in French.

Table 1 shows the distribution of studies' characteristics. There were no big differences in the distribution of the studies in relation to their *perspectives* and *objectives*, with studies using sociocultural approaches (n = 19) and exploring writing processes (n = 21) being a little more prevalent in the sample. As mentioned in the previous section, the *level of participants* was not so well-balanced, with 38 of the 51 studies focused on undergraduate students. As for the *designs*, observational methods (n = 32) were far more used than experimental ones (n = 18), and even larger differences were observed regarding the *context*, with natural settings representing 72.55% of the sample. Nevertheless, only 49.02% of the *tasks* used were disciplinary. Regarding the *instruments*, retrospective self-reports were the most used (n = 35), followed by recordings of participants' online writing activity (n = 10) (e.g. screen capture and keystroke logging) and interactions with others (n = 8) (e.g. peer and mentoring conversations). Think-aloud protocols (n = 5) and reaction time tasks (n = 3) were rarely used.

In relation to the data analysis, most of the papers of the sample (82.35%) did not analyse the *emotions* involved in the writing. Finally, 18 did not analyse the *texts* written by students, and those that did it mainly focused on the analysis of the final text (n = 20).

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[2] Country of the studies was identified using first authors' affiliation.

Table 1 Frequencies and percentages of the studies' characteristics

Dimensions	Codes	Frequency	%
Perspective	Cognitive	17	33.33
	Sociocognitive	15	29.41
	Sociocultural	19	37.25
Objectives	Writing processes	21	41.18
	Intervention	16	31.37
	Perceptions and beliefs	14	27.45
Level	Undergraduate	38	74.51
	Graduate	13	25.49
Design	Experimental	18	35.29
	Observational	32	62.75
Context	Lab	14	27.45
	Real	37	72.55
Tasks	Disciplinary	25	49.02
	Not disciplinary	20	39.22
Instruments	Retrospective self-reports	35	68.63
	Activity recordings	10	19.61
	Self-reported on-line processes	5	9.80
	Concurrent tasks	3	5.88
	Interaction	8	15.69
Emotions	Yes	9	17.65
	No	42	82.35
Texts	No analysis	18	35.29
	Final text	20	39.22
	Evolution	13	25.49

One study (MacArthur, Philippakos, & Ianetta, 2015) could not be classified in the dimension *design*, due to their use of a design based research approach. Likewise, six studies (Ho, 2015; Guzmán-Simón & García-Jiménez 2015; MacArthur et al., 2015; Morrison, 2014; Wisker, 2015; Zimmerman & Bandura, 1994) did not provide information of the text used in the research and therefore were not included in the frequencies of the dimension *tasks*

Relationships between studies' theoretical perspectives, objectives and methodology

Comparisons among and between theoretical perspectives and objectives revealed some interesting results (tables with the characteristics of the studies included in the review are available in the Supplementary online materials).

First, in relation to our second objective, we present the distribution of the studies within each perspective in relation to their objectives. As shown in Table 2, both cognitive and sociocultural perspectives were mostly focused on exploring writing processes, although to a different extent: in the latter perspective, these studies represented more than half of the sample (11/19), whereas in the former the three objectives were more balanced. Within the sociocognitive perspective, half of the

Table 2 Distribution of the studies in relation to their theoretical perspective and objectives

	Objectives			
	Processes	Intervention	Perceptions	Total
Perspectives				
Cognitive				
Count	7	6	4	17
% within perspectives	41.2	35.3	23.5%	100.0
Socio-cognitive				
Count	3	5	7	15
% within perspectives	20.0	33.3	46.7	100.0
Socio-cultural				
Count	11	5	3	19
% within perspectives	57.9	26.3	15.8	100.0
Total				
Count	21	16	14	51
% within perspectives	41.2	31.4	27.5	100.0

studies were focused on exploring writers' perceptions and beliefs about writing regulation. Nevertheless, the relationship between theoretical perspectives and objectives was not statistically significant ($p = .182$).

In relation to the methodology, significant differences among the three theoretical perspectives were found. Regarding *participants' level*, sociocognitive studies focused significantly more on undergraduate students (93.3%) than sociocultural studies (52.6%) ($\chi^2(2) = 7.17$, $p = .028$, Cramer's $V = .375$). A strong relationship was found in relation to their *design* ($\chi^2(2) = 22.77$, $p = .000$, Cramer's $V = .675$), with all the sociocultural studies using observational approaches, and cognitive studies using significantly more experimental and quasiexperimental designs (76.5%). Similarly, regarding the research *context* ($\chi^2(2) = 15.60$, $p = .000$, Cramer's $V = .553$), all sociocultural studies were conducted in natural contexts whereas cognitive studies were set in lab settings significantly more often (58.8%), the latter being also the perspective using concurrent task *instruments* more frequently (17.6%) ($\chi^2(2) = 6.38$, $p = .041$, Cramer's $V = .354$). Finally, both perspectives were also significantly different in relation to the *analysis of texts*, with cognitive studies mostly analysing final texts and sociocultural mostly analysing drafts evolution ($\chi^2(4) = 21.36$, $p = .000$, Cramer's $V = .647$).

Homogeneous distributions across perspectives were observed in relation to the other four types of instruments, namely retrospective self-reports, online activity recordings, online self-reported processes and interaction recordings, although a tendency was observed in the latter with cognitive studies using them less than the other perspectives ($\chi^2(2) = 5.00$, $p = .082$, Cramer's $V = .313$). Likewise, studies in this perspective tended to explore emotions involved in writing significantly less ($\chi^2(2) = 5.47$, $p = .065$, Cramer's $V = .327$). In fact, none of the cognitive studies

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included both methodological options (interaction recordings and emotions). Interestingly, no significant differences were observed in the type of tasks used within each perspective.

A different picture emerges when we look at the relationships between studies' objectives and methods. Studies focused on the analysis of writers' perceptions and beliefs used observational designs to a greater extent (92.9%) ($\chi^2(2) = 7,45$, $p = .024$, Cramer's $V = .386$). Likewise, they used retrospective self-reports significantly more than the others ($\chi^2(2) = 8.83$, $p = .012$, Cramer's $V = .416$): all the studies on writers' perceptions and beliefs employed these instruments, whereas only 57.1% of the studies exploring the writing processes and 56.3% of the interventions studies used them. In contrast, interaction recordings were significantly more utilized by studies assessing interventions effects (37.5%) ($\chi^2(2) = 8.96$, $p = .011$, Cramer's $V = .419$), and self-reported on-line processes instruments were more frequently employed by studies focused on the analysis of writing processes (23.8%) ($\chi^2(2) = 7.92$, $p = .019$, Cramer's $V = .394$). The analysis of the evolution of the drafts was mostly used to assess the effects of interventions (43.8%), and those studies exploring perceptions and beliefs did not analyse texts frequently (64.3%) ($\chi^2(4) = 10.71$, $p = .030$, Cramer's $V = .458$).

It is important to mention that, although not significant, some tendencies were observed in the other *instruments*. On-line activity recordings were more frequently used by studies exploring writing processes (n = 7) than by those focusing on students' perceptions and beliefs, that did not use these instruments at all ($\chi^2(2) = 5.68$, $p = .058$, Cramer's $V = .334$). Finally, homogeneous distribution across objectives was observed in relation to the *level of participants, use of concurrent tasks instruments, type of task* written by students, *research contexts* and the analysis of *emotions*.

Detailed analysis of interactions between theoretical perspective and objectives

Qualitative analysis of studies' characteristics, in relation to both their perspective and objectives, is presented in this section to highlight differences and similarities within subgroups in order to draw a more precise picture of research developed in each perspective.

Analysis of the cognitive studies' objectives and related characteristics

For those studies that share a cognitive background (n = 17), writing regulation is mostly understood as a set of strategies that writers organize and distribute along writing in order to efficiently manage and control recursive writing processes (normally planning, translating and revising) and achieve a communicative goal. Furthermore, the organization of the writing processes of each individual writer is thought to be fairly stable across tasks and contexts.

The first group of studies (n = 7) is aimed at exploring *writing processes*. More precisely, they explored differences and relationships between specific aspects of writing regulation processes and other variables, such as the relationship between:

working memory, as a measure of cognitive effort, and the distribution of the writing processes (Alamargot, Caporossi, Chesnet, & Ros, 2011; Alves, Castro, & Olive, 2008; Olive, Kellogg, & Piolat, 2008; Ransdell, Levy, & Kellogg, 2002); students' learning styles and processes distribution (Van Waes, Van Weijen, & Leijten, 2014); strategy use and goal approach (He, Chang, & Chen, 2011); and differences in time allocation of the writing subprocesses between two languages (Mikulski & Elola, 2011). They focused on undergraduate students, with only one exception (Alamargot et al., 2011), and were mostly conducted in laboratory settings, where participants wrote non-disciplinary writing tasks. Although different in genre, tasks used were similar in text length and time constraints. Only van Waes et al. (2014) used a disciplinary and longer writing task. They collected information about the online writing processes using thinking-aloud protocols and working memory testing tasks; or less intrusive instruments, such as eye-movement tracking devices, keystroke logging and screen recorder devices. Moreover, two studies used questionnaires, one about learning approaches (van Waes et al., 2014) and the other about goal approaches (He et al., 2011), to assess differences across groups in relation to the management of the writing processes. They all analysed the quality of the final text.

A second group of studies (n = 6) was aimed at exploring the *effects* on the writing process and product of *interventions* about academic writing and regulation (Kolb, Longest, & Jensen, 2012; Proske, Narciss, & McNamara, 2012), metacognitive self-regulation strategies instruction (De Silva & Graham, 2015; Nguyen & Gu, 2013) and the use of specific writing supports (Butcher & Kintsch, 2001; Reynolds & Bonk, 1996). Groups of undergraduate students were compared in quasi-experimental designs to assess the intervention effects in the type and distribution of writing activities and phases, in learners' autonomy and self-regulation skills. Instruments ranged from time recorders and keystroke logging to questionnaires, interviews and stimulated recall interviews. Although some used disciplinary tasks (Kolb et al., 2012; Proske et al., 2012), the majority did not. Moreover, they analysed the final text, with only two exceptions (De Silva & Graham, 2015; Kolb et al. 2012).

Finally, four studies were focused on students' *perceptions and beliefs* about their writing strategies and regulation. Despite sharing the broad assumptions of cognitive approaches, they were observational, conducted in natural settings, and mostly used disciplinary tasks (Lavelle & Bushrow, 2007; Torrance, Thomas, & Robinson, 1994, 2000; Yang & Plakans, 2012). They all used questionnaires to explore undergraduate or graduate processes, and most of them analysed the quality of the final text composed by students.

Analysis of the sociocognitive studies' objectives and related characteristics

Studies sharing a sociocognitive approach (n = 15) define writing regulation as the ability to monitor and direct one's cognitive, motivational, affective and social aspects of intellectual functioning while writing to achieve a communicative goal. Nevertheless, it should be noted that some studies in this group were not explicit regarding their definition of regulation (Cho & MacArthur, 2010; Cumming & So,

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1996; Ferris, Liu, Sinha, & Senna, 2013; Ho, 2015; MacArthur et al., 2015; Yeh, 2014a, b).

Almost half of the studies (n = 7) in this group focused on the identification and analysis of undergraduate students' *perceptions and beliefs* about their self-regulation ability or some of its components (as defined by the social cognitive theory; see Zimmerman & Schunk, 1989), that is, self-efficacy (Ekholm, Zumbrunn, & Conklin 2015; Prat-Sala & Redford, 2012; Zimmerman & Bandura, 1994), metacognition (Escorcia, 2010; Escorcia & Fenouillet, 2011; Negretti, 2012), and task representation and goals (Negretti, 2012; Nicolás-Conesa, Roca de Larios, & Coyle, 2014). In one case, they related these components with students' success and feedback perceptions (Ekholm et al., 2015). They all used observational designs and interviews, logs and questionnaires to explore students' self-regulation abilities for academic writing in general or for specific disciplinary tasks. Almost half of them explored students' emotions (Negretti, 2012; Ekholm et al., 2015; Nicolás-Conesa et al., 2014). When used, tasks were mostly disciplinary and authentic, although they were only analysed in three studies (Escorcia & Fenouillet, 2011; Nicolás-Conesa et al., 2014; Prat-Sala & Redford, 2012). None of them analysed texts' evolution.

Five studies aimed at exploring *intervention effects* on undergraduate students' writing processes and products. More specifically, one study assessed a self-regulated strategy instruction (MacArthur et al., 2015), another explored the utility of written corrective (teacher) feedback (Ferris et al., 2013), and three analysed the impact of types of tutor and peer feedback (Cho & MacArthur, 2010; Cumming & So, 1996; Ho, 2015). Except for Ferris et al. (2013), these studies had quasi-experimental designs, and they all collected students' discourse, either via feedback and revision comments, or interviews, about the process of writing disciplinary or non-disciplinary tasks. Most of them analysed texts, either in terms of changes performed after the peer-feedback, or the quality of the final text and only one (Ferris et al., 2013) explored students' emotions.

Finally, three studies were devoted to the description and analysis of undergraduate students' *writing processes* in a specific task (Franklin & Hermsen, 2014; Stapleton, 2010), in one case focusing on the differences between good and poor writers (Ferrari, Bouffard, & Rainville, 1998). Two of them were quasi-experimental studies, conducted in laboratory settings. They both used non-disciplinary and short writing tasks, but they differed in the data collection instruments: whereas Franklin and Hermsen (2014) employed keystroke loggings to observe the evolution of the text, Ferrari et al. (1998) collected data through direct observation and writers' self-reports to assess students' writing processes and self-regulation, and their relationships with final texts' quality. Writing tasks were non-disciplinary and short in both cases. In contrast, Stapleton (2010) used a longitudinal single case-study design to describe one graduate student's composing processes and their time allocation. To this end, logs and interviews were collected during the process of writing a long and disciplinary essay. The task was specifically designed for the research and it was not included in the analysis of the processes. None of the three studies explored the emotions involved in these processes.

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Analysis of the sociocultural studies' objectives and related characteristics

All the studies included in this group (n = 19) conceptualize writing regulation as a result of the social mediation, that is, they understand writing regulation as intrinsically related to the processes of internalisation of cultural activities, discourses and actions. As it also happened in the previous group, some studies did not provide any clear definition or conceptualization of this core concept (e.g. Alvarez, Espasa, & Guasch, 2012; Li, 2013; Morrison, 2014).

Most of the studies in this group (n = 11) were aimed at analysing the *processes* involved in writing and revising a specific text. More specifically, they focused on analysing the problems faced by writers and the solutions and strategies implemented (Lei, 2008; Li, 2013; Castelló, Iñesta, & Corcelles, 2013; Castelló, Iñesta, & Monereo, 2009; Castelló, González, & Iñesta, 2010; Zanotto, Monereo, & Castelló, 2011); the understanding and use of sources and their impact on writing practices (Zhao & Hirvela, 2015); the use of corpus and dictionaries during writing (Lai & Chen, 2015); one writer's interaction with teacher's feedback (Kumar & Kumar, 2012) and the importance of the relationship teacher-student on the writing process (Eriksson & Makitalo, 2015; Lee & Schallert, 2008). All these studies adopted observational designs and took place in authentic settings, although some (Kumar & Kumar, 2012; Lei, 2008; Lai & Chen, 2015) used non-disciplinary tasks. As for the type of participants, five studies focused on undergraduate students, two on master's, three on Ph.D. students, and one on senior professors. Instruments were diverse: some studies were based on interviews and questionnaires, and others also included writing logs or teacher-student conversations. Think-aloud protocols, sometimes combined with interviews were also used, as well as stimulated recall interviews. Finally, one study was based on peer-revision conversations. Only three studies included the analysis of the emotions involved in the process (Castelló et al., 2009, 2013; Lee & Schallert, 2008), and, except in one case (Lei, 2008), all of them included the evolution of the text in the analysis.

Five studies were aimed at exploring the *effects of an intervention* on writers' regulation. More specifically, some analysed the impact of peer (Villamil & De Guerrero, 1998; Yang, 2011) and teacher feedback (Alvarez et al., 2012), and collaborative dialogues (Yeh, 2014a) on text improvement, whereas another assessed the effect of an online writing system on writers' metacognitive processes (Yeh, 2014b). Again, all the studies were observational, conducted in authentic settings and used disciplinary tasks, either with undergraduate or master's students. Data collected included peers' conversations, questionnaires, writing logs and activity in the online system, and interviews, and all analysed the evolution of drafts.

In the sociocultural perspective, only three studies were found which focused on writers' *perceptions and beliefs* about their regulation processes, problems and strategies (Morrison, 2014; Guzmán-Simón & García-Jiménez, 2015; Wisker, 2015). They were also observational studies, conducted in real settings. Two of them explored undergraduate students' writing processes (practices, problems and strategies) by means of interviews (Morrison, 2014; Guzmán-Simón & García-Jiménez, 2015), while the other also used interviews to explore the role of literature

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reviews in Ph.D. students' writing processes (Wisker, 2015). Texts were not included in the analyses, and only the former study explored the emotions involved.

Discussion

The aim of this paper was to build a comprehensive picture of the state of writing regulation research in the context of HE in order to gain a better understanding of the relationships between objectives and theoretical and methodological options of research on this area and identifying gaps for further research development on writing regulation in HE.

Regarding objective 1, to describe the characteristics of research on writing regulation in HE, results showed a great increase in the number of studies in the last few years, especially within the sociocognitive and sociocultural perspectives, in line with the rise experienced in HE research in other fields (Roth et al., 2016). In the whole sample, the three perspectives were equally represented, although differences were observed among studies in regards to their identification with a specific theoretical perspective. While many studies were explicit about their framework, differentiation among perspectives was in some cases challenging either because studies lacked a clear theoretical definition or because they presented theoretical developments that soften the limits among theoretical perspectives.

Within the whole sample, three broad objectives were identified. A greater number of studies focused on the analysis of the writing regulation processes, arguably the core of the topic and a necessary objective for an emerging field such as this one; followed by studies assessing the effects of interventions aimed at helping students develop and improve their writing regulation abilities, as it is a primary concern of sociocognitive and sociocultural perspectives (Graham & Harris, 2000; Prior, 2006).

We also sought to identify and analyse relationships between objectives and theoretical and methodological options (objective 2) and to explain groups within each theoretical perspective on the basis of their objectives (objective 3). As expected, the choice of perspective was related to some studies' characteristics (Castelló et al., 2010a, b), while other features depended on studies' objectives or on both.

On the one hand, the theoretical perspective was related to the level of participants and the context of the study, as well as the analysis of emotions. Regarding the level of participants, sociocultural studies were more frequently focused on experienced writers, probably due to their interest in the role genres play in specific communities of practice, such as the relationship between PhD and master's students' participation in the community by means of writing scientific articles (Caffarella & Barnett, 2000). Regarding the context, more cognitive studies were conducted in lab settings, whereas sociocultural studies were all conducted in natural contexts, what seems to indicate that the decision on the setting might depend on the importance attributed to the situated dimension of writing. The analysis also showed that cognitive studies did not include emotions in their analysis, while some studies in the other perspectives did. However, like in other

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education fields (Pekrun & Linnenbrink-Garcia, 2014; Schutz & DeCuir, 2002), emotions were neglected by most of the studies of our sample, despite being an essential factor in most theoretical models of writing regulation (Graham & Harris, 2000; Roth et al., 2016; Zimmerman & Risemberg, 1997). Therefore, this is a clear gap for future research. All the perspectives should either reconsider or explore the role emotions play in the writing regulation processes and the learning of writing regulation abilities.

On the other hand, the selection of instruments was related to studies' objectives rather than to their theoretical perspective, suggesting that while all instruments are available to any perspective, some might be better than others to explore certain issues (the only exception being concurrent tasks instruments, used by cognitive studies to explore writers' working memory). Retrospective self-reports, such as interviews and questionnaires, were the most used instruments because they allow researchers to access important writing regulation components which are not accessible otherwise, such as metacognition, strategy use, objectives and perceptions (Roth et al., 2016). Moreover, they are suitable instruments to preserve the natural conditions and development of the writing process. Nevertheless, it has been argued that these instruments may not give information about the actual behaviour (Roth et al., 2016), particularly in relation to the micro-processes involved in writing regulation, since they are highly recursive (Zimmerman & Risemberg, 1997) and partially implicit (Iñesta & Castelló, 2012), especially when writing complex and authentic tasks.

Other studies, mostly focused on the analysis of the writing processes, used instruments aimed at capturing the unfolding of the processes as they occurred (e.g. think-aloud protocols, RTs tasks, keystroke logging and video recordings) in order to avoid the limitations mentioned above and to design specific tools to approach the object of analysis. However, some of these instruments set artificial conditions that may alter the natural development of writing regulation in HE thus informing about processes different than those happening in authentic contexts (Hadwin & Oshige, 2011). Studies based on perspectives that highlight the social nature of writing regulation processes collected information about writers' interactions as part of those processes, which in some cases result in alternative units of analysis and methods, such as *episode* (Alvarez et al., 2012), *transaction* (Cumming & So, 1996) and *troublesources* (Villamil & De Guerrero, 1998).

The combination of different types of instruments has been frequently aimed at helping researchers address the complexity of writing (Hyland, 2016), and enriching the analysis by taking into account the thoughts and actions, goals, emotions, as well as writers' interpretation and the relationship with significant others (Allal, 2000; Bereiter & Scardamalia, 1987; Flower & Hayes, 1981; Graham & Harris, 2000; McCaslin & Hickey, 2001; Zimmerman & Risemberg, 1997). However, only a few studies in our review employed more than one type of instruments, in most cases combining retrospective self-reports with measures of time devoted to writing phases. Despite that, it is worth mentioning that the analysis of the instruments revealed some attempts to overcome the limits among perspectives. Think-aloud and activity recording instruments, which have most typically been employed in cognitive studies (MacArthur & Graham, 2016), were also used in our sample by

some sociocognitive and sociocultural studies, in some cases after adapting the procedure to the theoretical assumptions of the study (Ferrari et al., 1998; Franklin & Hermsen, 2014; Kumar & Kumar, 2012; Lee & Schallert, 2008; Zhao & Hirvela, 2015; Zanotto et al., 2011). This also emerges as a challenge for future research, which might want to combine these and other types of instruments in order to provide a more comprehensive picture of writing regulation in line with the complex and multidimensional definitions provided by each perspective.

Both studies' perspective and objectives were also related to the choice of the design, and whether and how texts were included in the analysis. Cognitive studies were more concerned about the quality of the final text, which is consistent with their interest in how writing regulation processes impact the quality of the product (Hayes & Flower, 1980). Sociocultural studies included multiple drafts in the analysis, like those sociocognitive studies aimed at assessing the effects of peer-review and feedback interventions. However, many studies within these two perspectives did not analyse the text produced by participants, although the conceptualization of writing as a process, with texts being both epistemic processes and their final product, is also central to both theoretical perspectives (Castelló et al., 2010a, b). If the ultimate purpose of writing interventions and research is to help students regulate their writing process and write better texts, understanding how the process is impacting the text at different moments seems crucial, since it could help increase our understanding on how and why texts unfold and evolve.

Interestingly, neither the theoretical perspective nor the objectives were related to the type of tasks used in the studies. In a surprisingly high number of cognitive but also sociocognitive and sociocultural studies, the tasks to be written by participants were not aligned to their discipline and needs for professional development: the tasks' genre, topic, length or time limits were different and, in most cases, easier and shorter than those that students write at university and will find in their professional career (Castelló & Mateos, 2015; Gardner & Nesi, 2012). It has been argued that easy and non-disciplinary tasks may not be a real challenge or a communicative problem for students (Eklundh & Kollberg, 2003), which may hinder the emergence of the recursivity of the writing regulation processes, also highlighted by all the theoretical perspectives.

The few studies addressing the affective dimension of writing were precisely studies that were conducted in natural contexts and used disciplinary tasks. It might be that studies concerned about preserving the natural context of occurrence of the processes are also concerned about the effect of emotions, or that emotions are more likely to emerge in the context of meaningful, complex and open writing tasks because students have to face several challenges and problems and can relate these tasks to their personal goals (Järvelä et al., 2010). The question is whether writing regulation, which involves analysing how writers deal with cognitive and emotional challenges and difficulties, can be appropriately understood without considering disciplinary or at least challenging tasks, especially with advanced HE writers.

The qualitative analysis of the studies' characteristics also provided some insights on the interaction between perspectives and objectives. Both the general and the detailed analysis suggested a greater stability and similarity among all the sociocultural studies. In contrast, cognitive studies' methods seemed to depend

more on their objectives, with lab settings and quasi-experimental designs used when exploring the writing processes and a tendency towards ecological methods when focused on the analysis of interventions. In turn, sociocognitive studies' methods were the most heterogeneous, also within the different objectives, with the only exception being the common use of retrospective self-reports, which suggests that studies in this perspective employ designs and methods typically used by either cognitive and sociocultural perspective depending on the specific aims of each study.

Finally, we want to acknowledge some limitations of this study. First, we only selected peer-reviewed articles and did not include other documents such as volume series of research or proceedings. Although most of the contributions in these publications do not usually include new empirical research, the selection criteria may not cover all the existing literature on writing regulation processes. Second, the complexity of the topic of study and our intention to include studies from different fields and perspectives, which use different terms and labels to refer to similar objects, makes the review especially challenging. For this reason, we opened the scope with a wide variety of keywords though, at the same time, we applied strict criteria for inclusion.

Conclusions

Writing regulation in HE is a growing field with a great variety of topics and objectives and large distribution of studies into different theoretical and methodological perspectives. However, it is quite a new research field and more dialogue among perspectives is needed in order to identify overlapping or underdeveloped issues and shared challenges. Integrating emotions in the analysis of writing regulation is one of them. Looking for more comprehensive methods that account for regulation in situated HE writing contexts is another challenge this review has identified. Moreover, there is still a need to clarify the conceptual underpinnings of the perspective on writing regulation adopted in each study since several studies lacked this definition. Ultimately, clarification and subsequent reflection on writing regulation theoretical approaches would help researchers to be more aware of the strengths and limitations of each perspective and to move towards integrated and more comprehensive ways to study writing regulation.

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SUPPLEMENTARY ON-LINE MATERIAL

Table 1. Studies with a cognitive background

Studies	Objectives			Level		Design		Context		Tasks		Instruments					Emotions	Texts		
	Processes	Intervention	Perceptions	Undergraduate	Graduate	Experimental	Observational	Lab	Natural	Disciplinary	Not disciplinary	Self-reports	Activity recordings	Self-reported on-line processes	Concurrent tasks	Interaction	Emotions	No	Final text	Evolution
Alamargot, Caporossi, Chesnet & Ros (2011)	1				1	1		1			1		1						1	
Alves, Castro & Olive (2008)	1			1		1		1			1			1	1				1	
He, Chang & Chen (2011)	1			1		1		1			1	1		1					1	
Mikulski & Elola (2011)	1			1		1			1		1		1						1	
Olive, Kellogg & Piolat (2008)	1			1		1		1			1				1				1	
Ransdell, Levy & Kellogg (2002)	1			1		1		1			1				1				1	
van Waes, van Weijen & Leijten (2014)	1			1		1		1		1		1	1						1	
Total subgroup	7	0	0	6	1	7	0	6	1	1	6	2	3	2	3	0	0	0	7	0
Butcher & Kintsch (2001)		1		1		1		1			1	1	1						1	
de Silva & Graham(2015)		1		1		1		1		1		1						1		
kolb, longest, jensen (2012)		1		1		1			1	1		1						1		
Nguyen & Gu (2013)		1		1		1			1	1		1							1	
Proske, Narciss &McNamara (2012)		1		1		1		1			1	1	1						1	

Study																		
Reynolds & Bonk (1996)	0	1		1		1		1	1	1	1	1						1
Total subgroup	**0**	**6**	**0**	**6**	**0**	**6**	**0**	**3**	**3**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**4**
Lavelle & Bushrow (2007)	1		1		1		1	1	1	1	1							1
Torrance, Thomas & Robinson (1994)	1		1		1		1	1	1	1						1		
torrance, thomas & robinson (2000)	1	1		1		1		1	1	1	1							1
Yang & Plakans (2012)	1	1		1			1		1	1	1							1
Total subgroup	**4**	**4**	**3**	**4**	**1**	**3**	**3**	**3**	**1**	**4**	**0**	**2**	**3**	**0**	**0**	**1**	**3**	
Total cognitive group	**4**	**4**	**13**	**4**	**10**	**7**	**7**	**10**	**10**	**6**	**2**	**3**	**0**	**0**	**3**	**14**	**0**	

Table 2. Studies with a sociocognitive background

Studies	Objectives			Level		Design		Context		Tasks		Instruments						Texts		
	Processes	Intervention	Perceptions	Undergraduate	Graduate	Experimental	Observational	Lab	Natural	Disciplinary	Not disciplinary	Self-reports	Activity recordings	Self-reported on-line processes	Concurrent tasks	Interaction	Emotions	No	Final text	Evolution
Ekholm, Zumbrum & Conklin (2015)			1	1			1		1	1		1						1		
Escorcia (2010)			1	1			1		1	1		1						1		
Escorcia & Fenouillet (2011)			1	1			1	1			1	1							1	
Negretti (2012)			1	1			1		1	1		1					1	1		
Nicolás-Conesa, Roca de Larios & Coyle (2014)			1	1		1			1	1		1					1		1	
Prat-Sala & Redford (2012)			1	1			1		1	1		1							1	
Zimmerman & Bandura (1994)			1	1			1		1	No description provided		1						1		
Total subgroup	**0**	**0**	**7**	**7**	**0**	**1**	**6**	**1**	**6**	**5**	**1**	**7**	**0**	**0**	**0**	**0**	**2**	**4**	**3**	**0**
Cho & MacArthur (2010)		1		1		1			1	1						1				1
Cumming & So (1996)		1		1		1		1			1					1		1		
Ferris, Liu, Sinha & Senna (2013)		1		1			1		1		1	1					1			1
Ho (2015)		1		1			1		1	No description provided						1				1

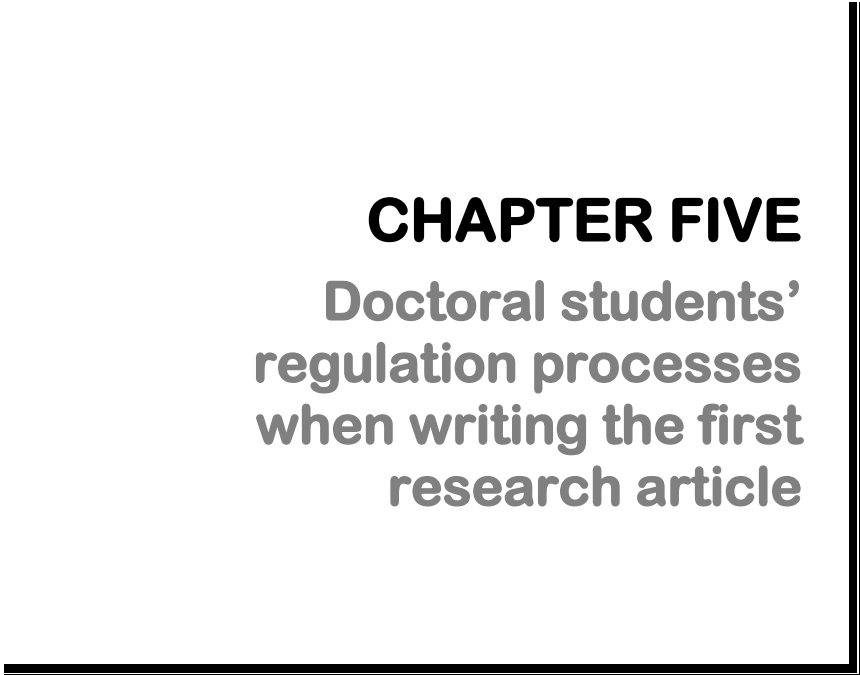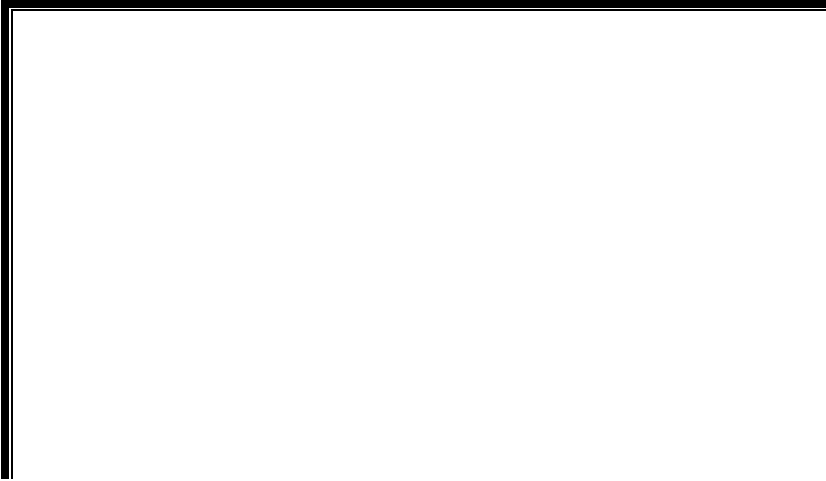|									Design based research				No description provided							
MacArthur, Philippakos & Ianetta (2015)	0	1	0	1	0	2	2	1	4	1	2	1	0	0	3	1	1	1	1	3
Total subgroup	3	0	0	2	1	2	1	2	1	1	2	2	2	0	0	0	0	1	1	1
Ferrari, Bouffard & Rainville (1998)	1			1		1		1			1	1	1					1	1	
Franklin & Hermsen (2014)	1			1		1		1			1	1								1
Stapleton (2010)	1				1		1		1	1		1					1			
Total subgroup	3	0	0	2	1	2	1	2	1	1	2	2	2	0	0	0	0	1	1	1
Total sociocognitive group	3	5	7	14	1	5	9	4	11	7	5	11	2	0	0	3	4	6	5	4

Table 3. Studies with a sociocultural background

Studies	Objectives			Level		Design		Context		Tasks		Instruments						Texts		
	Processes	Intervention	Perceptions	Undergraduate	Graduate	Experimental	Observational	Lab	Natural	Disciplinary	Not disciplinary	Self-reports	Activity recordings	Self-reported on-line processes	Concurrent tasks	Interaction	Emotions	No	Final text	Evolution
Castelló, González & Iñesta (2010)	1				1		1		1	1						1				1
Castelló, Iñesta & Corcelles (2013)	1				1		1		1	1		1					1			1
Castelló, Iñesta & Monereo (2009)	1				1		1		1	1		1					1			1
Eriksson & Makitalo (2015)	1				1		1		1	1						1		1		
Kumar & Kumar (2012)	1				1		1		1		1			1						1
Lai & Chen (2015)	1			1			1		1		1	1						1		
Lee & Schallert (2008)	1			1			1		1	1		1	1				1			1
Lei (2008)	1			1			1		1		1	1						1		
Li (2013)	1			1			1		1	1		1						1		
Zhao & Hirvela (2015)	1			1			1		1	1		1		1			1		1	
Zanotto, Monereo & Castelló (2011)	1				1		1		1	1		1		1				1		
Total subgroup	**11**	**0**	**0**	**5**	**5**	**0**	**11**	**0**	**11**	**8**	**3**	**8**	**1**	**3**	**0**	**2**	**4**	**5**	**1**	**5**
Alvarez, Espasa & Guasch (2012)		1			1		1		1	1		1				1	1			1

Study	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
Villamil & de Guerrero (1998)	0	1				1	1		1			1		1		1				1
Yang (2011)	1	1	1			1	1		1	1		1		1		1				1
Yeh (2014a)	1	1	1			1	1		1	1		1	1			1			1	
Yeh (2014b)	1			1	1	1	1		1	1	1	1	1							1
Total subgroup	0	5	3	2	2	5	5	0	5	3	3	3	3	1	0	3	0	0	1	4
Guzmán-Simon & García-Jiménez (2015)	1	1	1			1	1		1	1	1		1					1		
Morrison (2014)	1	1	1		No description provided	1	1		1	No description provided	1		1					1		
Wisker (2015)	1	1	1	1	No description provided	1	1		1	No description provided			1	1			1	1		
Total subgroup	3	3	3	2	1	3	3	0	3	3	0	0	3	2	0	0	1	3	0	0
Total sociocultural group	11	5	5	10	8	19	19	0	19	11	5	14	3	3	0	5	1	8	2	9

CHAPTER FIVE

Doctoral students' regulation processes when writing the first research article

Doctoral students' regulation processes when writing the first research article[11]

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Abstract
Doctoral students face many challenges when writing research articles. However, little is known about how PhD students regulate their on-line writing process in a natural context. To address this gap, this study analysed two doctoral students' regulation processes when starting to write their first scientific article and how these processes are modified by feedback. Participants wrote an extended abstract of their research article under natural conditions. After two weeks, they received feedback and revised their texts under the same conditions. Screen-recorder and keystroke logging software, writing logs and an open-ended questionnaire were used to collect data. The analysis of their activity revealed two types of episodes: production and regulation episodes, and six subtypes of regulation episodes. All the episodes were characterised in relation to the section of the text and the challenges addressed. Writing an extended abstract was a challenging task for the two writers. Writers relied on their own sources to write the first draft. After feedback, they showed more strategic and flexible regulation processes. Results also revealed great variation between and within writers regarding the challenges they identified and faced and the regulation episodes performed to address them. Results suggest writing regulation is a fundamentally social process.
Keywords: doctoral students; doctoral writing; regulation processes; writing regulation; research articles

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Introduction

Research articles (RA) constitute a specific genre constraint by rules and conventions that define, among others, audience, structure and tone (Lee, 2001). They are aimed at reporting research results but they are not merely descriptive or 'tell it as it happened' texts (Swales, 1990). RA are persuasive endeavours (Hyland, 2001); they establish a dialogue between the author(s) and the reader, and between the authors' and others' voices that are invoked in the text (Prior, 2001). Thus, writing RA is a highly rhetorical activity that involves the presence of the research community but also the authors' identity work. Moreover, writing RA are epistemic activities, a tool for knowledge construction and transformation both for individual writers and for the whole disciplinary field (Castelló & Iñesta, 2012). Writers learn about their research topic, the genre and about themselves as they write (Bazerman, 2009), and the result of this learning process (published articles) moves the research community's knowledge forward. Thus, RA are a means for doctoral students to participate and become full members of the research community (Lave & Wenger, 1991).

These characteristics pose many challenges to doctoral students. Some of them are related to the need to learn a new genre and the disciplinary discourse (Simpson, 2009; Swales & Feak, 2004), such as the organization of information and the use of terminology and concepts; while others concern the management of the recursivity and complexity of the cognitive processes involved in writing (Castelló, Iñesta, & Corcelles, 2013; Lonka, et al., 2014); and doctoral students' development of their voice and identity as authors and researchers (Castelló & Iñesta, 2012; Chang & Schleppegrell, 2016; Hyland, 2008; Kamler & Thomson, 2006; Maher, et al., 2008; Paré, 2011; Pedrazzini, Bautista, Scheuer, & Monereo, 2014). Taking and defending a stance, making original contributions while incorporating other voices, and discussing their point of view in relation to those of other more experienced and established voices and researchers are issues related to doctoral students' identity development. Finally, obtaining and managing support and feedback from supervisors and other researchers are also

potential sources of challenge (Aitchison, Catterall, Ross, & Burgin, 2012; Caffarella & Barnett, 2000; Cotterall, 2013).

These challenges do not only affect the design and planning of RA but also have a significant impact on the writing process and at different textual levels, from word level to the whole text. Thus, doctoral students need to regulate their activity to try to overcome these challenges and succeed in their writing objectives. Writing regulation has been defined as a highly recursive and dynamic socially situated activity that takes places at all the textual levels and all along the writing process (Ferrari, Bouffard, & Rainville, 1998; Hadwin & Oshige, 2011; van den Bergh, Rijlaarsdam, & van Steendam, 2016). It is composed of explicit decision-making processes, but also implicit adjustments (Iñesta & Castelló, 2012).

In other writing research contexts, studies show the great potential on-line data collection tools can have in capturing the complexity of the writing regulation processes (Baaijen, Galbraith, & de Glopper, 2012; Franklin & Hermsen, 2014; Leijten & van Waes, 2013; Sullivan & Lindgren, 2006; van den Bergh & Rijlaarsdam, 2001; van den Bergh, et al., 2016). Specifically in Higher Education, studies analysed undergraduates' on-line writing regulation processes and strategies and their relationship with text quality and task characteristics (e.g. genre, language or writing conditions). Through on-line data collection instruments, such as keystroke logging, think-aloud protocols and reaction time tasks, studies identified sets of strategies and behaviours students used to complete the tasks (He, Chang & Chen, 2011; Lei, 2008; Zhao & Hirvela, 2015). Moreover, they show how these strategies and behaviours change during the writing process, and also in relation to different factors, such as learning style (van Waes, van Weijen, & Leijten, 2014), text length (Baaijen, et al., 2012), cognitive demands (Alves, Castro, & Olive, 2008; Kellogg, 2001), task complexity (Eklundh & Kollberg, 2003), genre (Beauvais, Olive, & Passerault, 2011) and task language (Mikulski & Elola, 2011; van Weijen, van den Bergh, Rijlaarsdam, & Sanders, 2008)*. Fewer studies explored graduate students' (Alamargot, Caporossi, Chesnet, & Ros, 2011; van Waes & Schellens, 2003) and faculty's

processes (Iñesta & Castelló, 2012; van Waes & Schellens, 2003; Zanotto, Monereo, & Castelló, 2011). Like in the undergraduate research, their results revealed different patterns and approaches to writing and their impact on the text.

Overall, studies using on-line processes provided crucial insight into the advancement of the understanding of writing process and regulation. However, as seen, very few studies focused specifically on doctoral students' writing processes, and to our knowledge, none explored their processes when writing authentic and situated tasks in natural settings (Sala-Bubaré & Castelló, in press). That is, those writing tasks that are relevant, characteristic and frequent for doctoral students (thesis monographs and research articles), and those situations that preserve the conditions of the settings where writing normally occurs. In turn, previous studies on doctoral writing mostly use participants' self-reports and their textual production (Sala-Bubaré & Castelló, in press), but they rarely observe the on-line writing processes and how challenges impact these processes. A better understanding of the challenges faced by PhD students along the process of writing authentic texts, how these challenges change and evolve, and how writers regulate their activity to overcome them could inform the design of more effective writing support, resources and training.

Context: Academic writing course

The study took place in an elective academic writing workshop offered to all second- and third-year doctoral students in a Social Sciences faculty of a Catalan university. The aim of the workshop was to support PhD students write their first research article and learn to use writing as an epistemic tool. To enrol the course, doctoral students were required to have at least partially analysed the data for the article they wanted to write in the workshop. Six doctoral students enrolled the course. They met fortnightly in three-hour sessions.

As part of the course, in the first session, participants were presented the objectives and syllabus of the course and the characteristics of an extended

abstract, and were asked to write an extended abstract (around 1,000 words) of the research article they wanted to complete in the workshop. In the next workshop session, participants commented on each other's text and in the following session, they revised the first draft of the extended abstract based on the feedback they received. This methodology was used throughout the workshop[i].

The extended abstract served as an outline of their article since it contains all the sections of a paper. In terms of research, it was considered appropriate because it was a relatively long text and challenging enough for doctoral students, so regulation processes were likely to appear. The more extended writing process and the multi-authored nature of doctoral students' articles make it impossible for researchers to monitor the writing process of the whole article.

To address the gaps mentioned above, this study aimed at characterizing doctoral students' on-line regulation processes in a natural setting, and whether and how these processes are modified by text discussion and feedback. In this context, specific objectives were:

- To identify the regulation episodes which take place along two writing sessions.
- To identify differences and similarities between the two writers.
- To identify differences and similarities between the two writing sessions.
- To explore the evolution of the texts produced and its relationship with the regulation processes.

Method

We designed a mixed-method multiple case study in which we recorded the writing process of two doctoral students when writing and revising an authentic text (an extended abstract of their first research article) in a natural context. The study was designed to include data of different nature to explore both the writing process and its products, and both participants' actions and their perceptions

about these actions. It was done by means of the four methods described by Hyland (2016): elicitation (initial questionnaire and group discussion about the feedback), introspection (authors' writing logs), observation (keystroke logging and screen-recorder software), and text data (drafts).

Participants

Two of the six doctoral students that initially enrolled the workshop, participated in the study, Natalia and Emma[ii]. They attended all the sessions, completed the tasks, their activity recordings were complete and gave their consent to participate in the study. Moreover, they exemplify two different approaches to the doctorate and research writing.

Natalia was a 26 years-old full-time student enrolled in the second year of the doctorate in education. She liked writing and saw herself as a writer and a researcher-member of a research group. She anticipated difficulties in 'improvising' and using her own words, as she did in her personal writing, due to feelings of insecurity. Her motives to write a research article related to fulfilling the requirement of the doctoral program, but also to disseminate her research and learn how to write better articles. She was oriented towards an academic career.

Emma was a 32 years-old part-time student enrolled in the third year of the doctorate in sports sciences. She did not like writing and thought she was not good at it. Emma anticipated that writing a research article would be a big challenge that would require a lot of effort. She was scared and unsure about her success because she felt she had not received proper training. Her motives to write a research article related to the requirement of the doctoral program only. She was oriented towards research outside academia.

None of them had published a research paper before, although both had presented partial results of their studies in conferences, and therefore, they had some partial texts of the article they wanted to write. Both Emma and Natalia saw

writing as essential in the research process, but only related to the products and communication of results.

Instruments

Various instruments and procedures were used to capture both the writing processes and products, and participants' perceptions and actions.

- *Initial questionnaire "Certainties and doubts"* (adapted from Castelló, et al., 2013): fourteen open-ended questions exploring participants' conceptions and feelings about academic writing and RA, and their perceptions of themselves as research writers.
- *Pre- and post-writing log*: semi-structured questions about participants' objectives and expectations about each session (pre-); and about the challenges they faced, the attempted solutions, the resources used and the level of satisfaction with their work at the end of each session (post-).
- *'Inputlog'* (Leijten & van Waes, 2013): Inputlog is a keystroke logging software used in writing research to capture keystrokes and mouse movement. It is a non-intrusive instrument that allows writers to work in a Microsoft Word processor, starting from either with a new or a pre-existing document. Inputlog collects fine-grained data about all the key and mouse actions, as well as the shifts between windows (e.g. browser, computer folders, etc.). It also features other modules and options to refine, analyse and integrate data.
- *'SnagIt'®* (*Techsmith*®): *Snagit* is a screen capture and video recording software that can be used to non-intrusively record writers' computer screen while they are composing their texts. Screen recordings allowed us to better understand and interpret the huge amount of data in the keystroke logging and to collect additional information about their writing process (e.g. content of the sources).

Data collection

In the first session (*first writing session*), participants fill out the pre-writing log and then wrote a first draft of the extended abstract of the article they wanted to write in the course. Inputlog and Snagit software were activated on each computer to record their writing activity. Two in-class hours were allocated to writing this text, but participants could ask for more time if they needed. Some field notes were taken during the sessions about participants' "off-line" activity (e.g. use of printed materials). Participants were able to access any resources they needed, including internet. When they finished, the software was stopped, and participants completed the post-writing log and the initial questionnaire "Certainties and doubts".

After two days, participants received a peer's text and were asked to read and comment it. In the second session of the workshop (*feedback session*), two weeks later, peers, as well as workshop facilitators, discussed and commented each participant's text. Participants' comments and discussion were audio recorded.

Finally, participants revised their texts with the support of the feedback in the *second writing session*. The procedure for this writing session similar to the first writing session: participants completed the pre- and post-writing log, and keystroke logging and screen recording software were used to gather information about their writing processes.

Data analysis

We used the Inputlog's *general output* as the basis for our analysis. The *general output* is one of the many outputs and analysis featured by Inputlog. It contains all information about the writing session in a .csv extension that can be easily exported to Excel, where each row contains a log event (including the output, position in the document, start and end time, pause before and so on).

Initially, to get a deeper sense of the participants' writing process and to better understand Inputlog's output, we watched the screen recordings several

times in parallel to the corresponding Inputlog output. Then, we coded participants' writing activity in two hierarchical levels: actions and, most importantly for this particular study, regulation episodes, following an emergent and iterative coding process in three steps.

In the first step, strings of log events were grouped into actions. Actions were defined on the basis of participants' observable behaviour (e.g. source shifting, pasting text or looking for a document).

In the second step, strings of actions addressing the same aim or challenge were grouped into *Regulation Episodes* (Iñesta & Castelló, 2012; Zanotto et al., 2011). A *Regulation Episode* is defined as the actions that writers implement with the objective of solving a difficulty or challenge identified during the writing process. Its main contribution is that it attempts to address the complex, recursive and socially situated nature of the regulation processes (Hadwin & Oshige, 2011) and the focus on the problem-solving process (Flower & Hayes, 1981). Each episode was coded for two dimensions: a) *type*, that is, what participants aimed in each episode; and b) *section of the text* (that is, RA' sections) involved in each episode.

In the third step, all discursive data (initial questionnaire, writing logs and feedback discussion) was gathered in a participant file and coded to identify each writer's problems and challenges. Challenges and problems were then linked to the episodes identified in their writing activity.

Finally, both drafts were analysed and compared to identify the changes introduced in the second writing session and assess whether and to what extent the issues rose by participants and the feedback had been addressed and solved.

During all the analysis, we maintained the longitudinal and process data, so all the coding steps were done in the context of the process as a whole. We created charts and graphics to visualize the writing process. For each step, the coding was discussed by two researchers until consensus was reached in regards to the identification and the definition of each category.

Results

The analysis revealed that two types of processes: there were instances of linear production and instances of regulation. Therefore, since our initial unit of analysis, the *Regulation Episodes*, could not account for the linear production processes, we distinguished two main categories of processes: *Production* and *Regulation Episodes*. Within the *Regulation Episodes*, six types were identified (see Table 1).

Table 1. Types of episodes and definition.

Types of Episodes	Description
1. PRODUCTION	Linear production, where no regulation processes can be observed.
2. REGULATION	Adjustments and changes in the activity (regulation) are observed.
2. 1 Sources	Looking for, searching within or reading sources (either own texts, others' papers, etc.).
2. 2 Editing	Surface-level revisions, such as correcting grammar and spelling mistakes and adjusting format.
2. 2 Revision	Meaning-level revisions that affect the meaning of a word, sentence or paragraph. They involve substitution and addition of information.
2. 4 Reading	Reading the text written so far.
2. 5 Deleting	Eliminating parts of the text (words, sentences, paragraphs) or undoing, without any addition of information. When writers delete and add new information, the episodes fall into the 'revision' category.
2. 6 Recursive reformulations of the intended text (RRIT)	Changing the text while it is been produced, that is, recursive revisions at the sentence being written.

In relation to the other dimension, sections of the text, episodes were divided into the prototypical sections of a research article *(title, introduction, objectives, method, results and discussion*). In addition, the episodes involving more than one section were coded as *text*, while those performed in the sources were coded as *source*.

Next, analyses of Natalia's and Emma's writing activity are introduced. For each participant, we present an overview of the episodes identified in each

session, the challenges they mentioned, the relationship between challenges and episodes, the description of the writing process in relation to the episodes identified, the feedback they received and the description of the second draft.

Natalia

First session

The first session of Natalia lasted 1 hour and 42 minutes. 92 episodes were identified. She started from a blank page and aimed at 'adapting' a previous partial draft and a conference presentation outline to the idea of this new article.

During the session, *regulation episodes* were more frequent but shorter than *production episodes*, accounting for 50% of the time each (see Table 2). In terms of regulation, frequency and total duration of *sources* episodes were much higher than for the other types of episodes because Natalia's text was heavily based on the previous drafts. Episodes of *revision* were quite frequent, but short, whereas *editing* episodes were rare. The other types of episodes (*RRIT*, *reading* and *deleting*) accounted for less than 2.3% of the session.

Regarding the sections, Natalia spent most of the time in the *method*. Episodes linked to the *objectives* were also frequent but shorter, and the other sections were far less frequently involved in the episodes.

Table 2. Frequency and duration of episodes by type and section of the text in Natalia's first session.

		N	%	Duration (h:mm:ss)	%
Types of episodes	PRODUCTION	35	38.0	50:21	50.1
	REGULATION	57	62.0	50:09	49.9
	Source	29	31.5	32:20	32.2
	Editing	6	6.5	06:34	6.5
	Revision	11	12.0	05:22	5.3
	Reading	2	2.2	01:37	1.6
	Deleting	7	7.6	02:05	2.1
	RRIT	2	2.2	02:11	2.2
	TOTAL	92	100	1:40:30	100
Sections of the text	Title	4	4.3	01:42	1.7
	Introduction	5	5.4	05:57	5.9
	Objectives	24	26.1	14:55	14.8
	Method	31	33.7	41:29	41.3
	Results	9	9.8	09:40	9.6
	Discussion	10	10.9	08:22	8.3
	Text	3	3.3	06:06	6.1
	Sources	6	6.5	12:19	12.3
	TOTAL	92	100	1:40:30	100

As Table 3 shows, Natalia's challenges were mostly related to the need to draw away from previous ideas and documents and define the new article (1, 2), and were visible in the extensive use of the sources and the focus on the method section. Natalia made few attempts to draw away from the sources, mostly by excluding some information from the sources and by writing original text in the results (1, 2). Except for the episodes of *sources* and *deleting*, each type of episode was linked to a particular challenge.

Table 3. Natalia's challenges in the first writing session and her attempts to solve them.

Challenges	Source	Regulation episodes aimed at solving the challenges
(1) Writing in her own words.	Questionnaire	RRIT • Creating new text.
(2) Adapting texts of her own to the concept she had of the article.	Log 1	Deleting / Sources • Excluding (omitting or deleting after inserting) information from the sources. Revision • Revising the text written so far.
(3) Synthesising the information.	Log 1	Deleting / Sources • Excluding (omitting or deleting after inserting) information from the sources.
(4) Writing in English.	Log 1	Editing • Correcting spelling mistakes

Natalia progressed quite linearly through the different sections of a prototypical research article, as shown by the grey line in Figure 1 (note that episodes related to *sources* are interspersed with the episodes in the different sections of the text). Three distinctive parts can be identified in the writing session. In the first part (until minute 37 approximately), Natalia started writing the *title*, *introduction* and *objectives*, by combining *production* and *sources* episodes, with minor *editing* and *revision* episodes in between (blue bars). She started *producing* text in the *method*, but in alternation with a few *revision* episodes in the *objectives*, and then stayed in the *objectives*, *producing*, *deleting* and especially *revising* the *objectives* she had previously written. This part of the session can be related to the challenge of adapting texts to the new article (2), and especially in relation to the objectives.

The second and longest part of the session lasted from minute 37 until 1h25min. Natalia heavily drew on the sources to compose the *method* and *discussion* of her paper. The activity in this part of the session was devoted to *production* episodes, often alternated with *regulation episodes* of *sources*; the only exception being four *deleting* episodes (two when writing the *method*, and two in the *discussion*). Regulation episodes (both *sources* and *deleting*) were aimed at deciding what information to include and exclude in the new paper(3).

The last part of the session (from 1h 25min until the end) differed from the other two in terms of recursivity and type of episodes. This part started when, after finishing the *discussion*, Natalia began writing the *results*. For this section, she could not rely on the sources so much, as she only had an outline of the main results and so, instead of *production* episodes, we find here two episodes of *recursive reformulation of the intended text (RRIT)*, the only two of this type in the whole session. This part of the session seemed to be related to the challenge of writing in her words, to create new text without the support of a previous draft (1). She then briefly went back to the *method* to add information about the analysis, and then *revised* the *results* in order to adapt the text in relation to the constructs and measures of the study. After this *revision*, she screened the text from the top to the bottom, making some minor *editing* for typos and spelling errors (4), and one significant change in the *method*, where she *deleted* a sentence about data analysis.
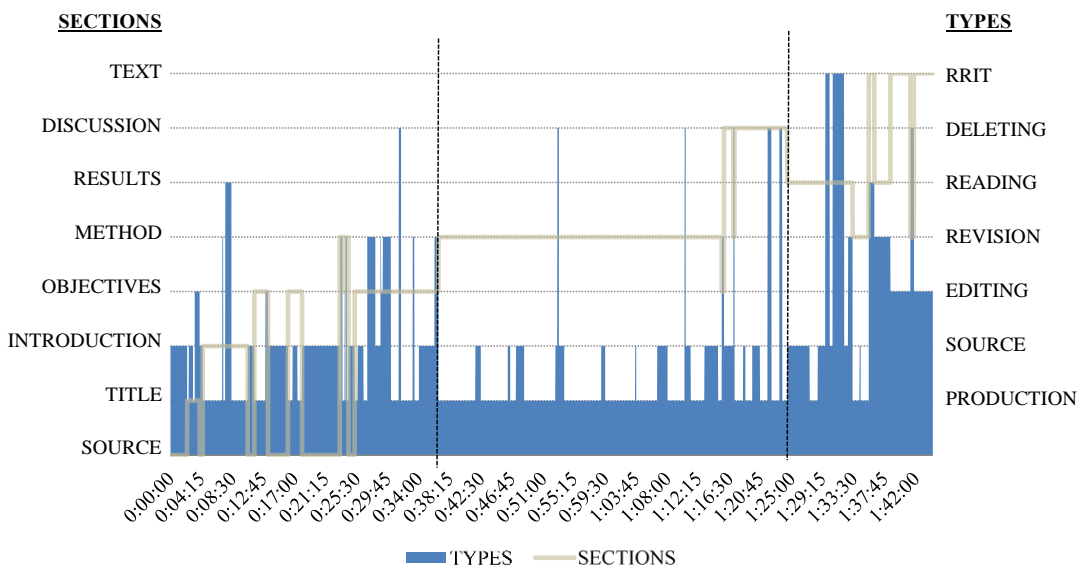
Figure 1. Natalia's writing process in the first session.

As shown in table 4, in the feedback session, some comments were connected to the challenges Natalia mentioned in the writing log and questionnaire, especially

those related to the length of the method. The challenge of the adapting texts to the new article (2) emerged in the feedback in connection to the unclear focus of the paper (6) and to the use of the theory (7). As Natalia explained in the feedback session, that particular theoretical approach was central in her thesis, but she was unsure whether and where to place it for this particular study. In the text, the use of the theory was inconsistent (7): while the introduction was only about this theory, it was barely mentioned or discussed any further in the following sections. Some feedback comments were not related to these challenges. Among others, these comments focused on the need to engage in a dialogue with other authors (gap; 10) and readers (justification; 11).

Table 4. Relationship between challenges mentioned by Natalia and the feedback comments.

Challenges	Feedback comments
(1) Writing in her own words.	(5) Making author's voice stronger in the text, especially by reducing method section.
(2) Adapting texts of her own to the concept she had of the article.	(6) Too many objectives, lack of clear focus. (7) Clarifying the role theory plays in the study.
(3) Synthesising the information.	(8) Reducing the description of the instrument.
(4) Writing in English.	(9) Correcting spelling and grammar mistakes.
No mention	(10) Lack of gap in the literature.
No mention	(11) Justifying the selection of the context and participants.
No mention	(12) Lack of necessary citations.
No mention	(13) Providing more information about the analysis.

Second session

The second writing session of Natalia lasted one hour and one minute and contained 47 episodes.

In this session, *regulation episodes* accounted for a much higher proportion of the session than *production episodes* (see Table 5). The most prevalent regulation episodes were those of *reading*, *editing* and *revision*, whereas *deleting* episodes were also frequent but shorter.

Regarding the sections, again most of the episodes were focused on the *method*, although less prevalent in relation to the total time. In contrast, episodes related to the *text* as a whole represented one-third of the writing session. She also spent some time working on the *title* and the *introduction*.

Table 5. Frequency and duration of episodes by type and section of the text in Natalia's second session.

		N	%	Duration (h:mm:ss)	%
Types of episodes	PRODUCTION	5	10.6	08:28	14.9
	REGULATION	42	89.4	48:17	85.1
	Source	3	6.4	05:27	9.6
	Editing	3	6.4	11:49	20.8
	Revision	15	31.9	10:36	18.7
	Reading	8	17.0	12:06	21.3
	Deleting	11	23.4	03:36	6.3
	RRIT	2	4.3	04:43	8.3
	TOTAL	47	100	56:45	100
Sections of the text	Title	2	4.3	00:21	0.6
	Introduction	9	19.1	09:15	16.3
	Objectives	7	14.9	04:46	8.4
	Method	17	36.2	10:32	18.6
	Results	2	4.3	00:45	1.3
	Discussion	3	6.4	02:36	4.6
	Text	4	8.5	23:03	40.6
	Sources	3	6.4	05:27	9.6
	TOTAL	47	100	0:56:45	100

Table 6 shows how Natalia addressed the challenges in the second writing session. As we can see, the variety of attempted solutions and the type of episodes linked to each problem, was higher after receiving the feedback than in the first session, especially in relation to the adaptation of the text (2). Moreover, in this session *revision* and *deleting* episodes were aimed at solving not just one but various challenges.

Table 6. Natalia's challenges in the second writing session and her attempts to solve them.

Challenges	Source	Regulation episodes aimed at solving the challenges
(1) Writing in her own words.	Questionnaire & Feedback	Deleting • Reducing description of the instrument. Revision • Including first-person pronouns. • Adding connectors to organize paragraphs.
(2) Adapting texts of her own to the concept she had of the article.	Log 1 & Feedback	Deleting • Reducing the number of objectives. Revision • Revising some of the existing objectives. • Adding the name of the theory in the title. RRIT • Rewriting the measures used in the study. Production • Adding information about the theory (contribution and relevant authors).
(3) Synthesising the information.	Log 1 & 2 & Feedback	Deleting • Deleting information about the instruments and the data collection procedure.
(4) Writing in English.	Log 1 & 2 & Feedback	Editing • Proofreading the text. Revision • Revising the use of synonyms.
(10) Lack of clear gap.	Feedback	Production • Adding a sentence about the lack of literature on the topic.
(11) Justifying the selection of the context and participants.	Feedback	Revision • Moving the implications to the introduction to serving as a justification of the context. • Adding information about the reasons for the selection.
(12) Lack of necessary citations.	Feedback	Revision • Adding citations in the introduction.
(13) Providing more informa-tion about the analysis.	Feedback	RRIT • Adding information about the analysis.

Figure 2 shows a tendency towards moving through text following the order of the sections like in the first session (grey line), although less linear and with far more attention paid at the global text level.

Again, Natalia's second writing process has three distinctive phases. In the first part (until minute 19), she spent some time in the *sources* (blue bars),

like in the previous writing session, and switched between the *text* level and the *introduction* mostly to *revise* her paper (grey line). She addressed the description and role of the theory (2) and included citations in the *introduction* (12), and *revised* the *text* to delete synonyms and use the same term consistently (4).
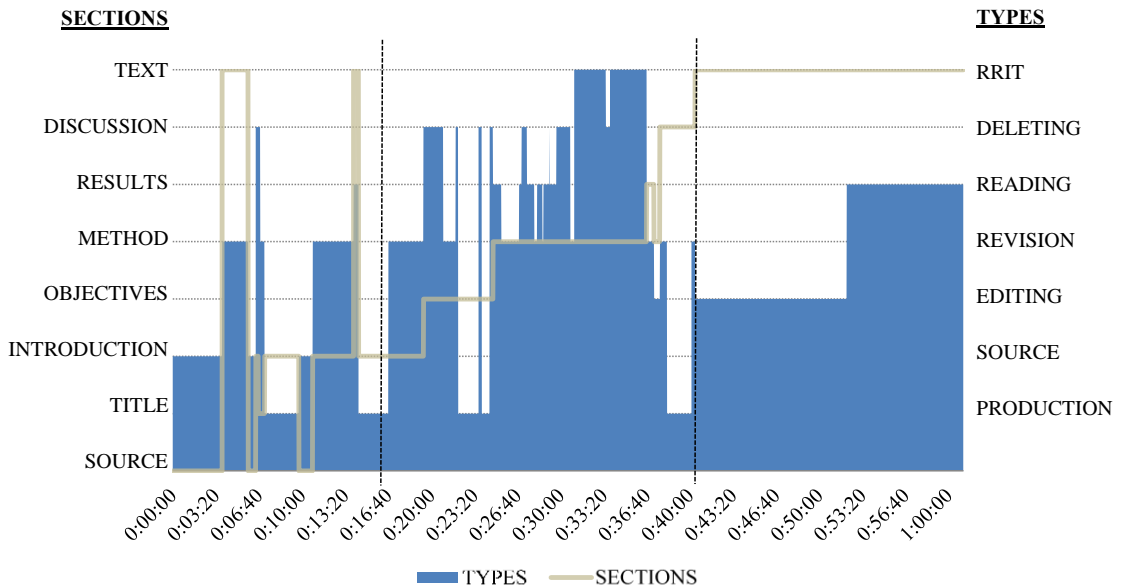
Figure 2. Natalia's writing process in the second session.

The second part (from minute 19 until minute 40), started when Natalia moved to the *objectives* and the *method*. *Revision* and *deleting* episodes were alternated frequently, first to reduce the number and scope of the *objectives* (2) and then the information about the instrument (3). At the end of this part, she also performed two episodes of *RRIT*, aimed at adapting the text (2) and including information about the data analysis (13), and one *production* episode to again provide some information about the theory in the *discussion* (2).

Finally, in the last phase of the session (from minute 40 until the end), Natalia *read* the *text* from the start to the end looking for and correcting spelling and grammar errors (4), and then *read* the whole *text* again before finishing. Overall, during this session, each episode addressed one of the issues raised in

the feedback session, with very few episodes aimed at further developing or revising other aspects of the text.

The second draft was 940 words long, 122 words shorter than the first draft. Natalia extended and revised the introduction to provide information and citations about the role of the theory, justify the study and define the gap of the study. These revisions improved the beginning of the text, where she made some general claims about the topic and the theory and the objectives by reducing and revising them, which provided a clear focus to the paper. However, the discussion on previous studies' findings and their weaknesses was still missing. The synthesis and revision of the instrument and procedure improved the clarity of the method and made authors' voice stronger. The voice was also introduced with the inclusion of the authors in the text through the use of the pronoun 'we'. Nevertheless, her voice was still missing with regard to the dialogue with other authors both in the introduction and the discussion, with the latter only reflecting about the contribution of the study and the theory. Despite her efforts, the role of the theory was still unclear due to the lack of connection with the method and results. Natalia addressed most of the challenges raised in the feedback, although some were just partially solved.

Emma

First session
The first writing session of Emma started from an existing text: a 290-word abstract of the same study and lasted 1 hour and 47 minutes in which we identified 64 episodes.

During the session, *regulation episodes* were more frequent but shorter in time than *production episodes* (see Table 7). In terms of regulation, *source* episodes were the most frequent, followed by *reading* and *revision* episodes. Regarding the sections, Emma spent most of her time among the *introduction*, the *discussion*, the *text*, and *sources*.

Table 7. Frequency and duration of episodes by type and section of the text in Emma's first session.

		N	%	Duration (h:mm:ss)	%
Types of episodes	PRODUCTION	13	20.3	22:16	22.2
	REGULATION	51	79.7	1:18:15	77.8
	Source	20	31.3	51:08	50.9
	Editing	5	7.8	04:52	4.8
	Revision	7	10.9	03:37	3.6
	Reading	11	17.2	10:48	10.7
	Deleting	5	7.8	01:52	1.9
	RRIT	3	4.7	05:58	5.9
	TOTAL	64	100	1:40:31	100
Sections of the text	Title	1	1.6	00:28	0.5
	Introduction	27	42.2	31:29	31.3
	Objectives	2	3.1	00:41	0.7
	Method	2	3.1	04:32	4.5
	Results	0	0	00:00	0.0
	Discussion	18	28.1	27:38	27.5
	Text	6	9.4	10:58	10.9
	Sources	8	12.5	24:45	24.6
	TOTAL	64	100	01:40:31	100

Emma's description of the problems she encountered during the session was very broad and, in general, seemed to relate to a low confidence in her writing abilities (see table 8). The episodes related to the use of *sources* -looking for documents and reading articles- were involved both in the manifestations of the problems and the attempted solutions. One of the challenges she mentioned in her writing log, about the equal distribution of the sections, could not be traced in her writing process.

Table 8. Emma's challenges in the first writing session and her attempts to solve them.

	Challenges	Source	Regulation episodes aimed at solving the challenges
(1)	Unfamiliarity with the language of RA.	Questionnaire	Sources • Reading other studies' limitations. Revision • Adding precision to the text.
(2)	Extending the previous text.	Log 1	Production & RRIT • Adding information to the text. Sources • Reading a variety of sources.
(3)	Distributing sections equally.	Log 1	No evidence
(4)	Finding information easily.	Log 1	Sources • Using an excel file with the summary of the articles.

These challenges are intertwined and present all along the writing session, and Emma's *regulation episodes* did not show any clear pattern, as displayed in Figure 3. Emma started extending her text in the *introduction* (grey line), and for the first 20 minutes she mostly *produced* and looked at *sources* (blue bars). The next 10 minutes she searched for articles, her research plan and other documents in the computer and mailbox, struggling to find the information she needed (4). Then she went back to the *introduction* before she moved briefly to the *method*, *edited* the *text*, and finally back to *produce* in the *introduction* (minute 42 to 51). At this point, she moved to the *discussion* after briefly *reading* parts of the *text* and *revising* one key concept in the *objectives* to add precision (1). In the *discussion*, in addition to some *source* episodes, Emma spent some time *producing* and *recursively reformulating the intended text* (2). When she finished the *discussion* (minute 89), she spent some time *reading* and *editing* the *introduction*, and went back to the *introduction* to *produce* two paragraphs about the context where the study took place (2). The writing session ended abruptly after she *deleted* the paragraphs she just produced.
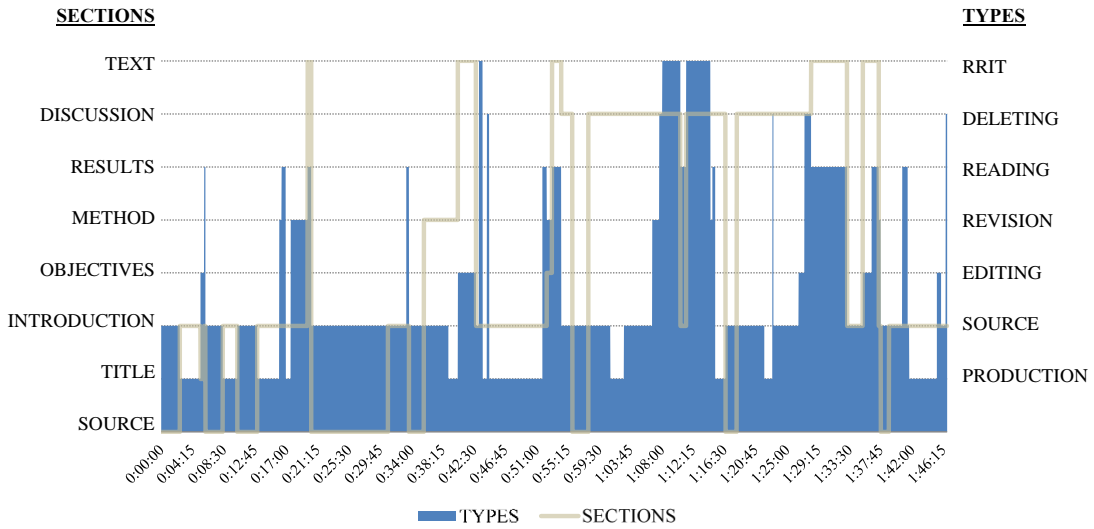
Figure 3. Emma's writing process in the first session.

In the feedback session, participants discussed fundamental aspects of her study, such as the need to discuss previous studies or establish a gap (11), and missing prototypical elements of RA, such as participants' description (8) and data analysis procedure (7) (see Table 9). During the discussion, Emma raised some doubts and challenges she had not expressed in the writing logs regarding, for instance, whether and how to report the differences between the complete questionnaire and the questions analysed in this particular study (5). None of the feedback comments related to the problems she mentioned in her writing logs.

Table 9. Relationship between challenges mentioned by Emma and the feedback comments.

Challenges	Feedback comments
(1) Unfamiliarity with the language of RA.	No evidence
(2) Extending previous text.	No evidence
(3) Distributing sections equally.	No evidence
(4) Finding information easily.	No evidence
No mention	(5) Describing the structure of the questionnaire and selecting the information that is relevant to this particular study.
No mention	(6) Identifying the objectives of the study.
No mention	(7) Clarifying analysis and tools.
No mention	(8) Describing participants.
No mention	(9) Making author's voice stronger in the text.
No mention	(10) Correcting some format and spelling mistakes.
No mention	(11) Discussing previous studies and establish a gap.
No mention	(12) Making abstraction from a case to a general concept.
No mention	(13) Interpreting negative results instead of dismissing them.

Second session

In the second session, Emma worked for 39 minutes. We identified 35 episodes; all but one were *regulation episodes* (see Table 10).

Within the regulation episodes, *RRIT* episodes were not frequent, but they accounted for one-third of the session duration. *Reading* episodes accounted for 24.4% of the time in nine episodes. *Revision* and *editing* were frequent and short, whereas *sources* episodes were rare but longer than the other types. Regarding the sections of the text, Emma spent relatively more time again in the *introduction*, the *discussion* and at the *text* level. Episodes in the *method* were quite frequent but shorter. Emma spent less than one minute (re)writing the *title*, *objectives* and *results*.

Table 10. Frequency and duration of episodes by type and section of the text in Emma's second session

		N	%	Duration (h:mm:ss)	%
Types of episodes	PRODUCTION	1	2.9	01:12	3.4
	REGULATION	34	97.1	33:37	96.6
	Source	2	5.7	05:07	14.7
	Editing	5	14.3	03:50	11.0
	Revision	8	22.9	04:34	13.1
	Reading	9	25.7	08:29	24.4
	Deleting	6	17.1	01:22	3.9
	RRIT	4	11.4	10:15	29.4
	TOTAL	35	100	34:49	100.0
Sections of the text	Title	1	2.9	00:07	0.3
	Introduction	5	14.3	09:48	28.1
	Objectives	1	2.9	00:06	0.3
	Method	10	28.6	06:02	17.3
	Results	2	5.7	00:50	2.4
	Discussion	7	20	07:20	21.1
	Text	7	20	05:29	15.7
	Sources	2	5.7	05:07	14.7
	TOTAL	35	100	34:49	100

During the session, Emma tried to address some of the feedback comments, such as those regarding the questionnaire (5) and the differentiation of the constructs and the case (12), in a variety of ways through different types of episodes (see Table 11). Some of the solutions involved *deleting* large chunks of text, while others involved *rewriting* and *revising*. Except for some episodes of *editing* and *reading*, each episode was connected to a comment raised in the feedback discussion. In contrast, there were also many comments that she did not address (8, 11) and we did not find attempts to solve the problems she mentioned in the first session (1-4).

Table 11. Emma's challenges in the second writing session and her attempts to solve them.

Challenges	Source	Regulation episodes aimed at solving the challenges
(1) Unfamiliarity with the language of RA.	Questionnaire	No evidence
(2) Extending previous text.	Log 1	No evidence
(3) Distributing sections equally.	Log 1	No evidence
(4) Finding information easily.	Log 1	No evidence
(5) Clarifying the structure of the questionnaire and the questions used in the study.	Feedback	Production • Adding information about the number of questions. Deleting • Deleting information about the questions of the questionnaire. Revision • Revising description of the structure.
(6) Identifying the objectives of the study.	Feedback	Revision • Adding the word objective.
(7) Clarifying data analysis conducted and tools.	Feedback	Deleting • Deleting information about the software.
(8) Describing the participants.	Feedback	No evidence
(9) Making author's voice stronger in the text.	Feedback	Deleting • Reducing description of the instrument. RRIT • Adding discussion of the results.
(10) Correcting spelling mistakes.	Feedback	Editing • Correcting some spelling and grammar mistakes.
(11) Discussing previous studies and establish a gap.	Feedback	No evidence
(12) Making abstraction from a case to a general concept.	Feedback	Deleting • Deleting the organization's name from the title. • Deleting conclusions. • Deleting keywords. RRIT • Rewriting the reminder of the aim of the study. • Making explicit the organization is a particular case. • Making explicit the conclusions are only valid for this particular case.
(13) Interpreting negative results instead of dismissing them.	Feedback	Revision • Revising text to interpret the negative results. RRIT • Adding conclusions.
(14) Not having all the results, which affected the conclusions.	Log 2	Revision and deleting • Making explicit they are preliminary results (but then deleting this information).

Similar to the first session, in the second session, Emma did not progress linearly through the different sections of the text. Her process shows high recursivity in terms of text (grey line) and regulation (blue bars). Figure 4 shows the process in this second session. Emma started to *revise* the text from the top, *deleting* a word from the *title* to make it more abstract (12), and then *reading* the *objectives* and *revising* superficially the *introduction* (minute 4:27). She then *revised* two sentences in the *objectives* and *method* to clarify the aim of the study (4). After that, she spent some time going through some *sources* (minute 7:09 until 11:42), to then go back to the *method* and *revise* to add the structure of the questionnaire and *delete* information about the questions included (5, 9). She then shifted to the problem of the negative results (13) (minute 17:25), first by *revising* one sentence in the *results* and then writing the *conclusions* (*RRIT*), with some episodes of *reading* the text inserted. In the same section, she *rewrote* (*RRIT*) the reminder of the objective and then *revised* a sentence in the *introduction* to address again the problem of differentiation between constructs and case (12), *editing* a citation between the two RRIT episodes (minute 25:31). Subsequently, she *revised* shortly the information about the structure of the questionnaire, formatted the *text* for a while and finished the session by rewriting (*RRIT*) the *discussion* about future studies to address the problem about differentiation (12). While at the beginning Emma started facing one comment at a time, about the end of the session she moved from one challenge to another quite fast.

SECTIONS **TYPES**
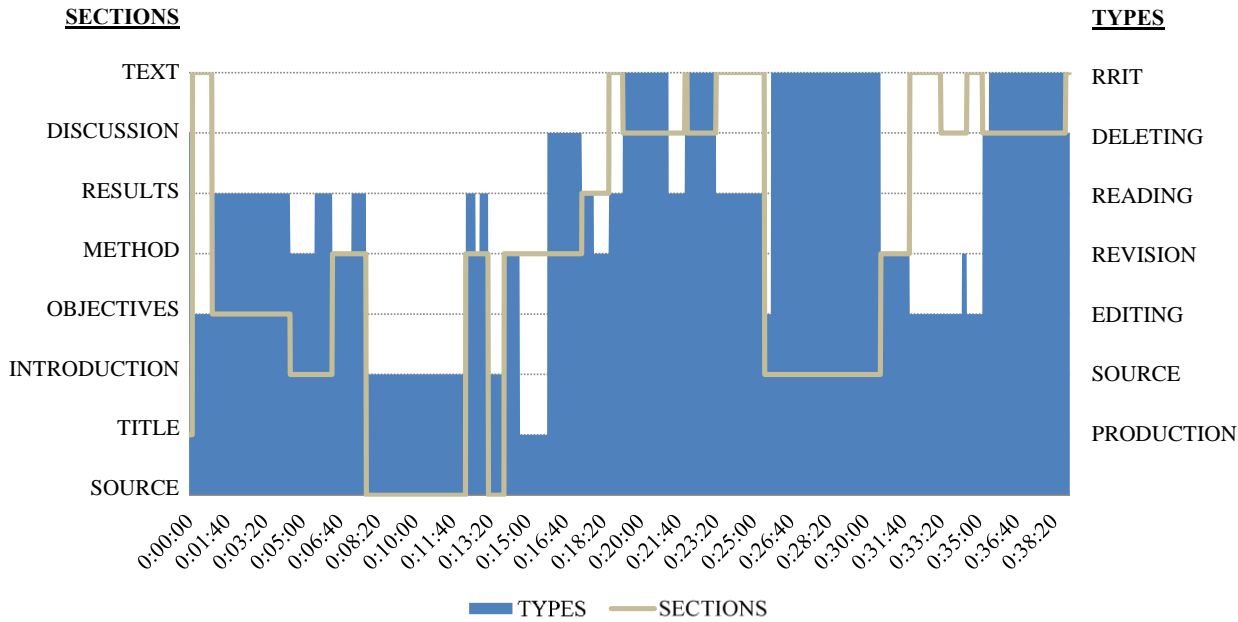
Figure 4. Emma's writing process in the second session.

Emma's second draft was 649 words long, 73 words shorter than the first draft. After the second session, the weaknesses in the introduction were still present, since she did not work on this section of the text, with the only exception being the explicit identification of the objectives. Therefore, the text was still missing the revision of previous findings and the establishment of the niche and gap. Regarding the method, the structure of the questionnaire and the tools used in the analysis were much clearer. However, the information about the participants was still missing, any other information about the data collection, such as measurement scales and administration procedure, was completely removed, and she did not provide any further information about the analysis conducted. The results and their discussion were improved by interpreting (instead of dismissing) the negative results and suggesting future lines of research to contrast these findings. Along the text, there was evidence of the attempts to differentiate between the particular case and context and the concepts underneath in that it was made explicit that the organization constituted a case.

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However, conceptualization and discussion of the main constructs were missing, and so was the voice of the author. Overall, the paper was closer to a survey report than a research article.

Discussion

The aim of this study was to characterize the on-line regulation processes of two doctoral students writing in a real and natural setting and analyse whether and whether and how these processes are modified by text discussion and feedback.

Our analysis revealed some similarities and differences between the two writers regarding the writing and regulation processes. In the first session, both participants organised their writing process with the goal of the text progression (text-driven), rather than in relation to the problems and challenges they anticipated (problem-solving). They both strongly relied on written sources to borrow large chunks of text. Thus, they initially approached the activity as a 'writing-from-sources' task. Remarkably, most of these sources were texts written by themselves (drafts, summaries etc.). Moreover, regulation took place at all the textual levels and all along the writing session (Ferrari, et al., 1998; Hadwin & Oshige, 2011; van den Bergh, et al., 2016).

Participants' regulation processes, however, were very different. Natalia followed a pattern of production-source-production for a large part of the session, regulating for about half of the time. She aimed at producing a rough first draft of the text, with special attention to the method, and she regulated her writing process especially to select information and revise the objectives of her paper. Her activity in this phase can be characterised as knowledge telling rather than knowledge transforming (Bereiter & Scardamalia, 1987; Lonka, et al., 2014), focusing on what she already knew and what was available in her sources about her study. In contrast, Emma's activity could be described as being oriented towards knowledge transforming from the very beginning. She regulated more often, in longer episodes, especially with regard to the use of a variety of sources. Apart from borrowing from her own texts, she also used sources to locate and

understand the information, and as models for her own writing. Her activity concentrated in writing the introduction and the discussion, which proved to be challenging especially due to her unfamiliarity with the genre. Following Schunk's terminology (2012), one could infer they have different goals: a performance goal (Natalia) *versus* a mastery goal (Emma).

The nature of the challenges they mentioned was also different. The challenges Natalia expressed were prototypical of the process of writing an RA (Cotterall, 2013; Pedrazzini, et al., 2014; Swales & Feak, 2004) and were traceable along her writing activity, which implies a certain level of awareness regarding the writing process (Iñesta & Castelló, 2012). Emma's mentioned challenges, however, were not visible in her writing activity and some (e.g. equal distribution of the sections) seemed to relate to misconceptions about the genre.

In the second session, both participants focused on addressing the feedback comments, rather than producing new text. Indeed, very few episodes were not directly related to the challenges rose in the feedback discussion, despite both writers spending more time evaluating and reading their text. They shifted from relying on the sources to depending on the feedback to advance and improve the text. As a result of their activity being oriented towards problem-solving, they regulated more and more often; each writer in a different way.

Feedback promoted changes not only in the text (Aitchison, et al., 2012; Castelló, et al., 2013) but also in the unfolding of writers' regulation processes. Once most of the text was produced and reflective work could start, feedback triggered more strategic, flexible regulation processes, promoting knowledge transforming approaches (Bereiter & Scardamalia, 1987; van den Bergh, et al., 2017), especially in the case of Natalia. In the second writing session, her regulation processes showed flexible relationships among goals and means: the same type of episode (e.g. deleting) served to solve different challenges, and different types of episodes were aimed at solving one challenge. In contrast, in this session, Emma's regulation processes showed a much greater balance among the types of episodes in the second session than in the first. She tried to solve some, but not all the challenges identified by the feedback and some solutions she

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implemented were quite local (e.g. deleting the organization's name to make abstraction). These results suggest that, when writing authentic and challenging tasks in natural settings, feedback might be more effective in promoting changes and text improvement for writers who, like Natalia, have some insight into their writing processes and the research community's discourse and genre.

However, neither of them mentioned or fully described all the challenges identified in their writing activity and in the feedback, suggesting participants were not fully aware of these problems (Iñesta & Castelló, 2012) or they did not know how to talk about them (Bazerman, 2009). In this sense, in line with previous studies (Caffarella & Barnett, 2000; Castelló, et al., 2013), feedback was useful for participants to talk about their texts and processes, define the problems properly and to advance in their solution. Therefore, feedback served as a guideline for both writers, but it also afforded and promoted diversity in its use, prioritization and order of aspects to improve, writing strategies and aims (Eklundh & Kollberg, 2003; Iñesta & Castelló, 2012; Lei, 2008; Zhao & Hirvela, 2015).

Accordingly, regulation can be understood as a fundamentally social process, which varies not only depending on the particular genre and writer (Beauvais, et al., 2011; Ferrari, et al., 1998; Sullivan & Lindgren, 2006; van den Bergh, et al., 2016), but also on the particular moment in which they take place and the characteristics of each social situation. Thus, each regulation process is unique and an ideal regulation approach cannot be established. At best, regulation processes could be analysed and assessed regarding the effectiveness of the observed processes in relation to the concrete communicative objectives determined by the writer and the genre.

Besides, our results hint a relationship between regulation processes and participants' position as researchers, understood both as the individual's attributes and conceptions about research, which may also be visible in the text through writers' voice; and as the place the individual occupies in relation to other researchers and research groups and communities (Lave & Wenger, 1991; Kamler & Thompson, 2006; Prior, 2001; Swales, & Feak, 2004). As seen, Natalia

and Emma's activity was also highly connected to their perceived strengths and weaknesses as writers (e.g. insecurity towards research writing): strong reliance on the sources and feedback, difficulties to establish a conversation with the voices of other authors and the readers (e.g. lack of gap), and their struggles to show their voice in the text. These issues were present along the two writing sessions of both participants and, along with participants' interactions with external voices (feedback), had a significant impact on their regulation processes. Previous studies also identified these challenges in relation to doctoral students' identity as researchers and position in the research community (Aitchison, et al., 2012; Castelló, et al., 2013; Chang & Schleppegrell, 2016; Hyland, 2008; Kamler & Thomson, 2006; Paré, 2011). Further research could explore the relationship between participants' position and identity and writing regulation processes.

Finally, the methodology used allowed us to contrast and complement the observation of doctoral students' processes and activities with the outcomes and, more importantly, with their perceptions about that. The comparisons not only provided validity to the interpretation of our observations but also rendered a better understanding of participants' needs, such as the need to raise awareness regarding some challenges they encountered. Furthermore, the microanalysis conducted provided a better insight into the complexity of the regulation processes (Baaijen, et al., 2012; Franklin & Hermsen, 2014; Leijten & van Waes, 2013; Sullivan & Lindgren, 2006; van den Bergh & Rijlaarsdam, 2001; van den Bergh, et al., 2016), and especially in relation to those challenges which were not observable in the text or in participants' discourse. Using the Regulation Episode as the unit of analysis allowed us to follow the evolution of the processes in relation to particular challenges and their attempted solutions and understand the relationships between episodes and their distribution along the session. Future studies could explore these issues and use the methodology presented here in addition to stimulated recall interviews to gather more information about this relationship and participants' awareness of the decisions they made during the writing process.

This study had some limitations. Despite being an authentic and challenging task, writing an extended abstract may not be representative of the process of writing a whole paper. Differences are likely to appear when looking at the whole process, regarding the problems, the organization of the regulation processes and the type and feedback received. Moreover, our study and participants are situated in a particular context and discipline, and we do not intend for the results to be generalized to doctoral students in other situations, contexts and disciplines. The in-depth analysis, although laborious, provided light into the unique and situated writing regulation processes. Such insight is crucial to help students better regulate their writing processes and improve their texts.

In this sense, our study shows the utility of providing feedback even at early stages of the writing process to raise awareness about the challenges through discussion, which ultimately can help writers regulate their writing processes and improve their text. It is suggested that doctoral supervisors and other agents involved in doctoral education take that into account designing assistance for novice research writers. Moreover, writing RA seems to be a "writing from students' previous texts" activity. Thus, doctoral students could benefit from early planning of the RA when they write their thesis plan or proposals, so as to define the specific objectives and procedures and thus have a much clear idea of the article when they start writing it later on.

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[i] For a more detailed description of the workshop, see Castelló et al. (2013).
[ii] Participants are referred to by pseudonyms.

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CHAPTER SIX

Conclusions. Theoretical, methodological and pedagogical contributions

This section is divided into three parts. In the first part, we summarize the conclusions of the four studies included in this thesis. In the second part, the main theoretical, methodological and pedagogical contributions of the thesis are presented. Finally, in the third part, we discuss some limitations and future lines of research.

Main conclusions of the studies included in the thesis

Study 1. Exploring the relationship between doctoral students' experiences and research community positioning

The results of this study suggest a complex interplay between types of experiences and social agents involved. Individual experiences were the most frequent for all the students, whereas, regarding the value of the experience, both positive and negative were frequent for all the doctoral students regardless their perception of success and satisfaction. Positive experiences, especially those involving the broad community, seemed to promote participants' sense of belonging to the research community. In turn, negative experiences, especially those related to the negotiation of roles and responsibilities with the supervisor, led to dissatisfaction with their position and alienation from the research community. These results highlight the role of the supervisor in supporting doctoral students' relational agency and networking and the consequences of the lack of such support.

Despite these relationships and similarities, participants' journey and perceived position in the community greatly varied from one another. As opposed to the expectations of doctoral education, all but one doctoral student did not see themselves as being part of the community. Two students were

struggling to become legitimate participants and extend their network and participation. A third (unexpected) profile emerged, as that of a student who resists the research communities' rules and trying to transform their practices from the outside. The diversity in doctoral students' perceived position and journey suggest different yet satisfactory and successful paths.

Finally, another finding that is particularly relevant in the context of this thesis is related to research writing experiences. Along the journey, participants had many experiences related to research writing and communication, not only in the individual layer, but in all the social layers identified in the analysis, offering empirical evidence of how the social dimension of writing is manifested through different particular actions. Research writing appeared as a highly challenged yet potentially gratifying social activity.

Study 2. Doctoral students' research writing perceptions profiles: A cross-national study

In this study, we identified three distinctive profiles in regards to research writing perceptions: productive writers, struggler writers and reduced productivity writers. Although the first group held very adaptive and transformative perceptions, many participants in the study held writing perceptions that can potentially hinder their success (such as blocks and procrastination) and expressed medium or low levels of productivity. Perfectionism perceptions emerged as neither completely maladaptive nor adaptive perception as the most adaptive and productive writers held medium levels of this type of perceptions.

Reduced productivity was an unexpected profile in that participants did not show high levels of maladaptive perceptions and yet they expressed low levels of productivity. The comparison with their actual productivity in terms of number of publications corroborated their perceptions: doctoral students in the reduced productivity profile had the smallest number of published peer-

reviewed articles both as first and co-authors. In general, doctoral students seemed to have few opportunities to publish outside their thesis (that is, as co-authors). In turn, productive writers experienced the highest amount of social support both from supervisors and research communities, but being part of a research group had no relationship with doctoral students' writing perceptions profile. Moreover, struggler writers had a higher risk of dropping out of the doctorate. These results point to the importance of the social dimension of research writing and the provision not only of group structures but especially of writing support and opportunities.

Finally, the fact that we did not find significant relationships between profiles and language of the thesis and doctoral students' country suggests that perceptions of research writing are related to deeper and universal issues such as genre knowledge and doctoral students' identity.

Study 3. Writing regulation processes in Higher Education: A review of two decades of empirical research

Results of this study showed that this is an emerging topic and confirmed that there are still very few studies specifically exploring doctoral students' writing regulation processes. The three major perspectives in writing regulation, namely cognitive, sociocognitive and sociocultural approaches, were equally represented in the literature, with a majority of them focused on the analysis of the processes. Others aimed at assessing the effects of writing regulation interventions and a third group focused on participants' perceptions about regulation processes.

The analysis of the relationships between theoretical perspective and objective, and among them and studies' methodological device revealed that the theoretical perspective conditioned the choices regarding participants, the context of the study and the inclusion of emotions as part of the analysis, whereas the choice of instruments was related to the studies' objectives. The use of the same instruments across theoretical perspectives suggests attempts to extend

bridges among them. Both studies' perspective and objective were related to the design, and whether and how texts were analysed. The type of task was not conditioned by either of them. Qualitative analyses suggest a greater stability among sociocultural studies in regards to the methods employed, while cognitive studies' methods presented significant variation depending on their objectives. Sociocognitive studies' methods were the most heterogeneous within and across different objectives.

We identified some gaps and limitations: very few studies explored the emotions involved in writing regulation, the use of authentic writing tasks in the analysis of writing regulation was surprisingly low, fewer studies used activity recordings to explore participants' processes on-line and the combination of different types of instruments was also scarce. We advocate for more dialogue among theoretical and methodological perspectives.

Study 4. Doctoral students' regulation processes when writing the first research article

The results of this study show that participants approached the task of writing an extended abstract as a *text-driven* and *writing from the sources of their own* activity but that their regulation processes were very different and were aimed at different general goals (*knowledge telling* vs *knowledge transforming*). In the second writing session, participants shifted from strongly relying on their own sources to depending on the feedback to correct their text, instead of revising and extending it. Feedback promoted changes in the text, but also in doctoral students' approach and amount and type of regulation processes in that it stimulated more flexible and strategies regulation processes. It also raised their awareness about the challenges they encountered and prompted them to talk about and define them in regards to the research article genre and discourse of their discipline. The extent and direction to which feedback promoted changes in the regulation processes varied between the two doctoral students. The

participant who had a greater insight into her writing processes and the genre and discourse of her community benefitted more from the feedback since she could develop more flexible ways to use regulation strategies and a greater diversity in solving the challenges raised by her peers. The other participant also improved her text by addressing some of the feedback comments, but some of the solutions implemented were quite local and did not fully solve the problems in the text.

The results point to writing regulation as a fundamentally social and situated process, which takes a distinctive and differential shape in each and every particular situation, context and writer. This process seems to also be related to doctoral students' position as researchers, and more specifically to their perception of themselves as writers and the way they interacted with the external voices of their peers.

Main contributions

Theoretical contributions

Some general theoretical conclusions and contributions can be drawn from this thesis. First, our results show that doctoral development and doctoral writing are complex and challenging activities that are related to multiple and simultaneous social layers. Each of them plays a different and important role in students' development. Effective resolution of challenges in the smaller layers seems to be necessary or, at least, desirable for a better and more satisfactory interaction with more distant social agents and communities. However, we found inconsistencies in the role research teams play in the doctoral trajectory, also pointed out by previous research. Although they were expected to be significant socialization agents, our results showed they had an inconsistent impact, at least for some of the participants.

Second, our results present multiple ways in which doctoral students' perceptions and feelings about research writing and themselves as writers can

affect their approach to writing, their process and therefore their productivity. This, in turn, suggests a relationship between doctoral students' identity and their writing approach, which has been argued in previous studies, but also between students' identity and the way they regulate the writing processes, the challenges they identify and choose to address, the solutions they implement and the way they use feedback. These issues could be further explored by future studies.

Third, this thesis contributed to map the field of writing regulation in Higher Education and rethink its theoretical definition from a socially situated perspective. This definition, we argue, allows us to take into account the social and cognitive dimensions of writing regulation and it represents an attempt to expand the definitions provided by previous studies and bridge the cognitive and sociocultural theoretical traditions.

Fourth, another contribution of this thesis is the use of the conceptualization of writing regulation in an empirical study, which represents a first attempt to analyse writing regulation from a situated perspective in a natural context and writing a complex and authentic genre at the doctoral level and using a micro-analytic procedure. The findings of this study provided empirical support for the situated, social and multivoiced nature of regulation processes and how multivoicedness can be used to promote changes in regulation processes and texts.

Fifth, this thesis presented a comprehensive theoretical framework that integrates all the studies (and therefore objectives and topics) from a socially situated and sociocultural perspective. Ultimately this will help us to build a robust framework to define early career researchers' development, writing and identity.

Methodological contributions

One of the general objectives of this thesis was to contribute new methodological tools and procedures to explore doctoral development and doctoral writing.

A first methodological contribution was the design of a multimodal interview that combined oral and visual elicitation and reflection of doctoral students' experience. The Journey Plot proved to be a useful tool to retrospectively capture participants' significant experiences along the doctorate, place them in time and reflect on the whole trajectory. The Communities Plot, an instrument we designed to explore doctoral students' position in the research communities, was valuable in facilitating participants' description of their research network and the connections among groups and individuals. Altogether, the interview we designed promoted participants' awareness and reflection about their experiences and especially about emotions and the 'bigger picture' of their trajectory and network, issues which are difficult to describe orally. This interview was adapted, piloted and used to interview doctoral students and postdocs in the second phase of the FINS-RIDSS project. Moreover, these instruments could be used in other fields and topics that aim at exploring individuals' trajectories, networks and social support and participation.

Second, this thesis extended the methods used in the study of research writing perceptions. While previous studies explored relationships among variables related to doctoral students' perceptions, our study shows it is also possible to take an individual-based approach also in large-scale studies. We believe this is a methodological contribution as it is, to our knowledge, the first study to take such an approach in the study of doctoral students' research writing perceptions. The revised factorial structure of the writing scale is also a potential contribution for future studies conducted in other contexts, as it showed validity across three European countries.

Third, the results of the systematic review revealed some methodological gaps and limitations in the field of writing regulation in Higher Education. The identification of these gaps, discussed above, may help us design studies that are more coherent with the theoretical frameworks and that use innovative methods. Moreover, another contribution of this study was the mixed-method data analysis

procedure, which combined qualitative and quantitative analyses of the relationships among the characteristics of the selected articles.

Fourth, the method used in the last empirical study of the thesis was quite unique since it combined the collection and analysis of participants' activity and discourse, as well as their writing process and product. It proved to be useful to analyse on-line writing regulation processes preserving the natural conditions of writing and the longitudinal perspective. Moreover, it allowed us to contrast and complement the processes with participants' perceptions and products. As the first attempt to analyse the doctoral students' on-line writing regulation processes, we are aware the method needs to be improved, but we think it represents a different, more complex way to analyse these processes which is coherent with a sociocultural theoretical perspective.

Last, the mixed-method approach used in the thesis as a whole is a methodological contribution in that it provides evidence of different ways to approach the study of doctoral students' experiences and writing from a socially situated perspective, both in relation to the design and instruments and the analysis of the data.

Pedagogical contributions

The work conducted here has contributed to design resources and materials that can be used to facilitate doctoral students' development as researchers.

First, we created two guides for doctoral supervisors to use the Journey Plot and Communities Plot (or Network Plot) instruments with their students. These documents suggest different ways in which supervisors can reflect and promote reflection about doctoral students' trajectory, on the one hand, and about supervisors' research network and the strategic use of this network in the development of their supervisees, on the other. These tools have already been piloted in several workshops addressed to supervisors in our context and are available as on-line open resources in the research team website (https://www.researcher-identity.com/resources).

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Second, based on the experience gathered in the challenging process of conducting a systematic literature review, we designed a workshop and some materials to help other researchers conduct such a study. The core material of this workshop is available here: https://www.researcher-identity.com/resources.

Third, we designed a short workshop for doctoral students aimed at identifying and discussing the main challenges and most effective strategies for writing scientific articles. The first edition of this workshop took place at Tallinn University in the spring of 2017.

Fourth, we designed two activities to promote doctoral students' awareness and reflection about their writing processes. In the first activity, doctoral students' are encouraged to use Inputlog in the first writing session and analyze it using the feature *Inputlog graph*. Then, the graphs of all the participants are compared to promote and facilitate discussion and awareness about the process carried out by each doctoral student. This activity was initially used in the context in which the fourth study of this thesis was set, the *Writing Workshop for Doctoral Students* which takes place annually in the *Facultat de Psicologia, Ciències de l'Educació i de l'Esport,* and it was later incorporated as part of this workshop for the following editions.

The second activity encourages doctoral students' analysis of the evolution of their texts and, consequently, about their writing process. In the context of a workshop, we collect several drafts of the paper each participant is writing. Using the *compare* feature of Microsoft Word, Adobe Acrobat or Juxtacommons, we compare each draft with the following version. In a group session, we present each participant the result of the comparison, in which the additions, deletions and revisions introduced are highlighted, and we promote reflection and discussion about the reasons of the changes and the evolution of the text through the different drafts. This activity was initially used in the context of the writing workshop in which study one was set.

Fifth, another pedagogical contribution of this thesis is the activities used as the basis of the fourth study. The use of an extended abstract as an initial structure of the research article and providing early feedback on students' initial drafts can be effective ways to support doctoral students', and other participants', awareness and regulation of the writing process.

Finally, this thesis is embedded in two SINTE-LEST projects on Researcher Identity Development (FINS-RIDSS and RID-SSISS). The participation in these projects has had a significant impact on the process and outputs of this thesis. In turn, the work conducted here has directly contributed to the design and adaptation of different materials and resources that have been and are been developed as part of these projects.

Limitations and future lines of research

We are aware this thesis and the studies included in it are not without limitations. In this section, we discuss the main limitations along with the future lines of research.

In this thesis, we used and explored different methods and instruments to collect and analyse data about doctoral students' experience and writing. As we discussed earlier, this diversity allowed us to capture different aspects and areas of participants' experience and from different angles. In all the studies, we tried to keep a longitudinal and developmental perspective, either by asking them to reflect on their trajectory (Study 1), by looking at differences between doctoral students in different phases of the doctorate (Study 2), and by looking at the process of writing a draft of an extended abstract (Study 4). However, we acknowledge that exploring PhD students' doctoral journey and their writing process(es) might benefit from a longitudinal design that includes several data collection moments, for instance by conducting multiple interviews along the doctoral trajectory or recording multiple sessions of the process of writing a

research article. Regarding the latter, we already collected some longitudinal data and we intend to explore these issues in further research.

On the other hand, although the thesis as a whole takes a mixed-method perspective, and some studies combined multiple instruments, we did not conduct any mixed-method(design) study where we combined quantitative and large-scale methods with qualitative and small-scale methods. Such approach might have helped us to get a deeper and multi-perspective understanding of the same phenomenon. Some preliminary studies have been conducted within the research team combining and contrasting large-scale and small-scale designs, and we intend to extend this line of work in the future.

Finally, as we claimed along these pages, doctoral education is not only students' responsibility, but a multi-layered phenomenon that needs to be analysed and improved at all levels. In this thesis, we included this multi-layered and communities perspectives in the analysis, but only doctoral students' point of view was explored. Collecting supervisors', other researchers' and even institutional doctoral education agents' perspectives could have provided new insights on the matters of doctoral development and writing and constitutes a line for future research. As pointed out earlier, exploring the role of research teams in doctoral students' development is also a challenge for future research.

CONCLUSIONS - versió en català

Aquesta secció es divideix en tres parts. En la primera part, es resumeixen les conclusions dels quatre estudis inclosos en la tesi. A la segona part, presentem les principals aportacions teòriques, metodològiques i pedagògiques de la tesi i, finalment, en la tercera part, comentem algunes de les limitacions i futures línies de recerca.

Principals conclusions dels estudis inclosos en la tesi

Estudi 1. Exploring the relationship between doctoral students' experiences and research community positioning

Els resultats d'aquest estudi suggereixen una interacció complexa entre els tipus d'experiències i els agents socials implicats. Les experiències individuals van ser les més freqüents per a tots les estudiants, mentre que, en relació al valor de les experiències, tant les positius com les negatives van ser freqüents per a tots ells estudiants de doctorat independentment de la seva percepció d'èxit i satisfacció. Les experiències positives, especialment aquelles que involucren a la comunitat àmplia, semblen promoure el sentit de pertinença de les participants en la comunitat investigadora. Per la seva banda, les experiències negatives, especialment les relacionades amb la negociació de rols i responsabilitats amb les supervisores, van provocar la insatisfacció amb la seva posició i alienació de la comunitat investigadora. Aquests resultats posen de relleu el paper de les supervisores a l'hora de promoure l'agència relacional de l'estudiant de doctorat i la creació de xarxes i les conseqüències de la manca d'aquest suport.

Malgrat aquestes relacions i similituds, la trajectòria de les participants i la posició percebuda a la comunitat van variar molt entre ells. Contràriament a les expectatives de la formació doctoral, només una doctoranda es considerava part de la comunitat. Dos estudiants estaven esforçant-se per convertir-se en

participants legítims i ampliar la seva xarxa i participació. Els resultats mostren també un tercer inesperat perfil, el d'un estudiant que presenta resistència a les regles de les comunitats de recerca i intenta transformar-ne les pràctiques des d'una posició externa. La diversitat en la posició percebuda i la trajectòria d'aquests estudiants de doctorat suggereixen camins diferents però igualment satisfactoris i reeixits.

Finalment, una altra constatació especialment rellevant en el context d'aquesta tesi està relacionada amb les experiències d'escriptura de recerca. Al llarg de la trajectòria, els participants van viure moltes experiències relacionades amb l'escriptura i la comunicació de recerca, no només en el nivell individual, sinó en tots els nivells socials identificats en l'anàlisi. Aquests resultats aporten evidència empírica sobre com la dimensió social de l'escriptura es manifesta a través de diferents accions concretes. L'escriptura científica s'entén com a una activitat social molt complexa però potencialment gratificant.

Estudi 2. Doctoral students' research writing perceptions profiles: A cross-national study

En aquest estudi, vam identificar tres perfils distintius pel que fa a la percepció de l'escriptura de recerca: *productive writers, struggler writers* i *reduced productivity writers*. Encara que el primer grup tenia percepcions adaptatives i transformadores, molts participants en l'estudi van expressar percepcions d'escriptura que potencialment poden obstaculitzar el seu èxit (com ara bloquejos i procrastinació) i van expressar uns nivells de productivitat mitjans o baixos. Les percepcions de perfeccionisme apareixen com a percepcions que no són ni completament desadaptatives ni adaptatives, ja que els escriptors més adaptatius i productius informaren de nivells mitjans d'aquest tipus de percepcions.

El perfil *Reduced Productivity* va ser un perfil inesperat en què els participants no van mostrar nivells elevats de percepcions desadaptatives i, tanmateix, van expressar baixos nivells de productivitat. La comparació amb la

seva productivitat real en termes de nombre de publicacions va corroborar les seves percepcions: aquests estudiants de doctorat informen d'un menor nombre d'articles publicats, tant com a primers com a coautors. En general, les estudiants de doctorat semblen tenir poques oportunitats de publicar fora de la seva tesi (és a dir, com a coautors). Per la seva banda, els *Productive writers* van experimentar la màxima quantitat de suport social tant de les supervisores com de les comunitats de recerca, però formar part d'un grup de recerca no està relacionat amb el perfil de percepció de l'escriptura de les estudiants de doctorat. A més, els *Struggler writers* presentaren un major risc d'abandonar els estudis de doctorat. Aquests resultats apunten a la importància de la dimensió social de l'escriptura científica i la provisió no només d'estructures grupals, sinó especialment d'oportunitats i suports per a l'escriptura.

Finalment, el fet que no existeixin relacions significatives entre els perfils i la llengua de la tesi i els país de les estudiants de doctorat suggereix que les percepcions de l'escriptura científica estan relacionades amb qüestions més profundes i universals, com ara el coneixement del gènere i la identitat investigadora.

Estudi 3. *Writing regulation processes in Higher Education: A review of two decades of empirical research*

Els resultats d'aquest estudi mostren que aquest és un tema emergent i confirmen que encara hi ha pocs estudis que exploren els processos de regulació de l'escriptura d'estudiants de doctorat. Les tres principals perspectives per escriure la regulació, les perspectives cognitives, sociocognitives i socioculturals, estan igualment representades en la literatura, amb la majoria d'ells centrats en l'anàlisi dels processos. Un altre grup d'estudis estava enfocat a avaluar els efectes d'intervencions sobre regulació de l'escriptura i un tercer grup estava centrat en explorar les percepcions de les participants sobre els processos de regulació.

L'anàlisi de les relacions entre la perspectiva teòrica i l'objectiu, i entre elles i el dispositiu metodològic dels estudis, va revelar que la perspectiva teòrica està relacionada amb l'elecció de participants, el context de l'estudi i la inclusió de les emocions com a part de l'anàlisi, mentre que l'elecció dels instruments es relaciona amb els objectius dels estudis. L'ús dels mateixos d'instruments en les diferents perspectives teòriques suggereix que s'estan produint intents d'estendre ponts entre les perspectives. Tant la perspectiva com l'objectiu dels estudis estan relacionats amb el disseny i l'anàlisi dels textos. El tipus de tasca d'escriptura no està determinat per cap dels dos aspectes. Les anàlisis qualitatives suggereixen una major estabilitat entre els estudis socioculturals pel que fa als mètodes emprats, mentre que els mètodes dels estudis cognitius presenten una variació significativa en funció dels seus objectius. Els mètodes dels estudis sociocognitius són els més heterogenis dins i a través dels diferents objectius.

En aquest estudi, vam identificar alguns buits i limitacions en la literatura: molt pocs estudis exploren les emocions implicades en la regulació de l'escriptura; l'ús de tasques autèntiques d'escriptura és sorprenentment baix, pocs estudis utilitzen gravacions de l'activitat per explorar els processos online de les participants i la combinació de diferents tipus d'instruments també és escassa. Més diàleg entre les diferents perspectives teòriques i metodològiques és necessari.

Estudi 4. Doctoral students' regulation processes when writing the first research article

Els resultats d'aquest estudi mostren que les participants van afrontar la tasca d'escriure un resum extens des d'una conceptualització de l'activitat com a *text-driven* (guiada pel text) i com a tasca d'*escriptura a partir de les seves pròpies fonts*, però els seus processos de regulació van ser molt diferents i es van orientar a diferents objectius generals (*transmetre el coneixement* versus *transformar el coneixement*). A la segona sessió d'escriptura, les participants van passar de

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dependre de les seves pròpies fonts a dependre dels comentaris de retroalimentació sobre el seu text, en lloc de revisar-lo i ampliar-lo. La retroalimentació va promoure canvis en el text i en l'enfocament de les estudiants de doctorat, així com en la quantitat i tipus de processos de regulació ja que va estimular processos de regulació més flexibles i d'estratègies. També va augmentar la seva consciència sobre els reptes enfrontats i va promoure'n una definició més ajustada i discussió dels problemes en relació al gènere de l'article científic i al discurs de la seva disciplina. L'abast i la direcció dels canvis promoguts per la retroalimentació van variar entre les dues estudiants de doctorat. La participant amb una comprensió més complexa dels seus processos d'escriptura i el gènere i el discurs de la seva comunitat es va beneficiar més dels comentaris, ja que va poder desenvolupar estratègies de regulació més flexibles i una major diversitat en la resolució dels reptes plantejats pels seus companys. L'altra participant també va millorar el seu text abordant alguns dels comentaris de comentaris, però algunes de les solucions implementades van ser bastant locals i no van aconseguir resoldre completament els problemes del text.

Els resultats apunten a la regulació de l'escriptura com un procés fonamentalment social i situat que pren una forma distintiva i diferenciada en cada situació, context i escriptora particular. Aquest procés també sembla estar relacionat amb la posició de les estudiants de doctorat com a investigadores, i més concretament a la seva percepció de si mateixes com a escriptores i la forma en què interactuen amb les veus externes dels seus companys.

Contribucions principals

Contribucions teòriques

A continuació presentem les principals conclusions i contribucions teòriques generals que es poden extreure d'aquesta tesi. En primer lloc, els nostres resultats demostren que la formació i l'escriptura doctoral són activitats complexes i demandants relacionades amb múltiples i simultanis nivells socials.

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Cadascun d'ells té un paper diferent i important en el desenvolupament de les estudiants. La resolució efectiva dels reptes en els nivells més propers sembla necessària o, com a mínim, desitjable per a una millor i més satisfactòria interacció amb agents i comunitats socials més distants. No obstant això, hem trobat inconsistències en el paper que juguen els equips de recerca en la trajectòria de les estudiants de doctorat, també assenyalades per investigacions prèvies. Tot i l'expectativa de que aquests actuïn com a importants agents de socialització, els nostres resultats mostren un impacte inconsistent, almenys per a algunes de les participants. En segon lloc, els nostres resultats presenten múltiples maneres en què les percepcions i sentiments de les estudiants de doctorat respecte a l'escriptura científica i elles mateixes com a escriptores poden afectar la seva manera d'abordar l'escriptura, el seu procés i, per tant, la seva productivitat. Això, alhora, suggereix una relació entre la identitat de les estudiants de doctorat i el seu enfocament vers l'escriptura, però també entre la identitat de les estudiants i la forma en què regulen els processos d'escriptura, els reptes que identifiquen i trien abordar, les solucions que implementen i la forma en què utilitzen els comentaris. Aquests temes podrien ser explorats en futurs estudis.

En tercer lloc, aquesta tesi ha contribuït a construir un panorama exhaustiu del camp de l'escriptura de la regulació a l'educació superior i repensar la seva definició teòrica des d'una perspectiva socialment situada. Des del nostre punt de vista, aquesta definició ens permet tenir en compte les dimensions socials i cognitives de la regulació de l'escriptura i representa un intent d'ampliar les definicions proporcionades per estudis previs i superar les perspectives tradicionals, cognitives i socioculturals.

En quart lloc, una altra contribució d'aquesta tesi és l'ús de la conceptualització de la regulació de l'escriptura en un estudi empíric, que representa un primer intent d'analitzar la regulació de l'escriptura des d'una perspectiva situada en un context natural i en l'escriptura d'un gènere complex i autèntic i utilitzant un procediment microanalític. Les conclusions d'aquest

estudi proporcionen suport empíric de la naturalesa local, social i multivocal dels processos de regulació i com es pot utilitzar la multivocalitat per a promoure canvis en processos de regulació i textos.

En cinquè lloc, aquesta tesi presenta un marc teòric ampli que integra tots els estudis (i, per tant, objectius i temes) des d'una perspectiva socialment situada i sociocultural. En última instància, això ens ajudarà a construir un marc teòric sòlid per definir el desenvolupament, l'escriptura i la identitat de les investigadores novells.

Contribucions metodològiques

Un dels objectius generals d'aquesta tesi era aportar noves eines metodològiques i procediments per explorar l'ensenyament de doctorat i l'escriptura de doctorat.

Una primera aportació metodològica va ser el disseny d'una entrevista multimodal que combina l'elicitació oral i visual i la reflexió sobre l'experiència de les estudiants de doctorat. El Journey Plot és una eina útil per capturar retrospectivament les experiències significatives de les participants al llarg del doctorat, posar-les en el temps i reflexionar sobre tota la trajectòria. El Communities Plot, un instrument que vam dissenyar per explorar la posició de les estudiants de doctorat en les comunitats de recerca, es va mostrar útil per a facilitar la descripció de les participants de la seva xarxa de recerca i les connexions entre grups i persones. En el seu conjunt, l'entrevista que vam dissenyar va fomentar la consciència i reflexió de les participants sobre les seves experiències i sobretot sobre les emocions i la visió general de la seva trajectòria i xarxa, temes difícils de descriure de manera oral. Aquesta entrevista va ser adaptada, pilotada i utilitzada per entrevistar estudiants de doctorat i postdoctorat en la segona fase del projecte FINS-RIDSS. A més, aquests instruments es podrien utilitzar en altres àmbits i temes que busquen explorar les trajectòries, les xarxes i el suport social i la participació de les persones.

En segon lloc, aquesta tesi amplia els mètodes utilitzats en l'estudi de les percepcions d'escriptura científica. Tot i que els estudis previs van explorar

relacions entre variables relacionades amb la percepció de les estudiants de doctorat, el nostre estudi demostra que és possible adoptar un enfocament individual també en estudis a gran escala. Aquesta és una contribució metodològica ja que, al nostre entendre, és el primer estudi que adopta aquest enfocament en l'estudi de les percepcions d'escriptura científica de les estudiants de doctorat. L'estructura factorial revisada de l'escala d'escriptura també és una contribució potencial per a futurs estudis realitzats en altres contextos, ja que ha mostrat validesa en tres països europeus.

En tercer lloc, els resultats de la revisió sistemàtica van revelar alguns buits metodològics i limitacions en el camp de l'escriptura de la regulació en l'educació superior. La identificació d'aquests buits, comentats anteriorment, ens pot ajudar a dissenyar estudis més coherents amb els marcs teòrics i amb mètodes innovadors. A més, una altra aportació d'aquest estudi va ser el procediment d'anàlisi de dades de tipus mixt, que combina anàlisis qualitatives i quantitatives de les relacions entre les característiques dels articles seleccionats.

En quart lloc, el mètode utilitzat en l'últim estudi empíric de la tesi és únic ja que combina la recollida i anàlisi de l'activitat i el discurs de les participants, així com el seu procés d'escriptura i els productes. Aquest mètode va resultar útil per a analitzar els processos de regulació online d'escriptura, tot preservant les condicions naturals de l'escriptura i la perspectiva longitudinal. A més, ens va permetre contrastar i complementar els processos amb les percepcions i els productes de les participants. Aquest representa un primer intent d'analitzar els processos de regulació online de l'escriptura de les estudiants de doctorat. Som conscients de que el mètode està subjecte a millora, però pensem que representa una forma d'anàlisi diferent i més complexa, i més coherent amb una perspectiva sociocultural.

Finalment, l'aproximació multimetodològica utilitzada en la tesi en el seu conjunt és una contribució metodològica ja que aporta evidències de diferents maneres d'abordar l'estudi de l'experiència i l'escriptura de les estudiants de

doctorat des d'una perspectiva socialment situada, tant pel que fa al disseny com als instruments i l'anàlisi de les dades.

Contribucions pedagògiques

El treball realitzat ha contribuït a dissenyar recursos i materials que poden utilitzar per promoure el desenvolupament de les estudiants de doctorat com a investigadores.

En primer lloc, hem creat dues guies per a supervisores de doctorat per utilitzar els instruments Journey Plot i Communities Plot (o Network Pot) amb les seves estudiants. Aquests documents suggereixen diferents maneres en què les supervisores poden reflexionar i promoure la reflexió sobre la trajectòria de les estudiants de doctorat, d'una banda, i sobre la xarxa de recerca de les supervisores i l'ús estratègic d'aquesta xarxa en el desenvolupament dels seus estudiants, de l'altra. Aquestes eines ja han estat pilotades en el nostre context en diversos tallers adreçats a supervisores i estan disponibles com a recursos oberts en línia al web de l'equip de recerca (https://www.researcher-identity.com/resources).

En segon lloc, a partir de l'experiència adquirida en el complex procés de realització d'una revisió sistemàtica de la literatura, vam dissenyar un taller i alguns materials per ajudar altres investigadores a dur a terme aquest tipus d'estudi. El material bàsic d'aquest taller està disponible aquí: https://www.researcher-identity.com/resources.

En tercer lloc, hem dissenyat un breu taller per a estudiants de doctorat orientat a identificar i discutir els principals reptes i les estratègies més efectives en l'escriptura d'articles científics. La primera edició d'aquest taller va tenir lloc a la Universitat de Tallinn la primavera de 2017.

En quart lloc, vam dissenyar dues activitats per promoure la consciència i reflexió de les estudiants de doctorat sobre els seus processos d'escriptura. En la primera activitat, les estudiants de doctorat utilitzen Inputlog en els seus ordinadors durant la primera sessió d'escriptura de l'article científic, i analitzen

la sessió utilitzant l'eina de *process graph*. A continuació, es comparen els gràfics de tots els participants per promoure i facilitar la discussió i la consciència sobre el procés seguit per cada estudiant de doctorat. Aquesta activitat es va utilitzar inicialment en el context del quart estudi d'aquesta tesi: el Taller d'escriptura per a estudiants de doctorat, que es realitza anualment a la Facultat de Psicologia, Ciències de l'Educació i l'Esport, i més endavant es va incorporar com a part d'aquest taller per a les següents edicions.

La segona activitat fomenta l'anàlisi de l'evolució dels propis textos i, per tant, del propi procés d'escriptura per part de les estudiants de doctorat. En el context d'un taller, recollim diversos esborranys del treball que escriu cada participant. Mitjançant la funció de 'Comparar documents' de Microsoft Word, Adobe Acrobat o Juxtacommons, es compara cada esborrany amb la següent versió. En una sessió de grup, presentem a cada participant el resultat de la comparació, en què es destaquen les addicions, eliminacions i revisions introduïdes, i fomentem la reflexió i la discussió sobre els motius dels canvis i l'evolució del text a través dels diferents esborranys. Aquesta activitat es va utilitzar inicialment en el context del taller d'escriptura en el qual es va realitzar el primer estudi d'aquesta tesi.

En cinquè lloc, una altra contribució pedagògica d'aquesta tesi són les activitats utilitzades en el quart estudi. L'ús d'un resum extens com a estructura inicial de l'article científic i proporcionar retroalimentació en els esborranys inicials de les estudiants poden ser formes eficaces de donar promoure la consciència i regulació dels processos d'escriptura de les estudiants de doctorat, i són potencialment útils també per a escriptors i aprenents en altres contextos.

Finalment, aquesta tesi està integrada en dos projectes de l'equip SINTE-LEST sobre Desenvolupament de la Identitat Investigadora (FINS-RIDSS i RID-SSISS). La participació en aquests projectes ha tingut un impacte significatiu en el procés i els resultats d'aquesta tesi. Alhora, el treball realitzat ha contribuït directament al disseny i adaptació de diferents materials i recursos que han estat i s'estan desenvolupant com a part d'aquests projectes.

Limitacions i línies de recerca futures

Som conscients d'aquesta tesi i els estudis que s'hi inclouen tenen algunes limitacions. En aquesta secció, es discuteixen les principals limitacions, juntament amb les línies de recerca futures.

En aquesta tesi, hem utilitzat i explorat diferents mètodes i instruments per recollir i analitzar dades sobre l'experiència i l'escriptura de les estudiants de doctorat. Com hem comentat anteriorment, aquesta diversitat ens ha permès capturar diferents aspectes i àrees de l'experiència de les participants i des de diferents àmbits. En tots els estudis, vam intentar mantenir una perspectiva longitudinal, ja sigui demanant a les estudiants que reflexionessin sobre la seva trajectòria (Estudi 1), observant les diferències entre les estudiants de doctorat en diferents fases del doctorat (Estudi 2) i mirant en el procés d'escriure un esborrany d'un resum extens (Estudi 4). No obstant això, els dissenys d'aquests estudis no són longitudinals. L'ús de dissenys longitudinals, que incloguin diversos moments de recollida de dades, per exemple, realitzant múltiples entrevistes al llarg de la trajectòria de doctorat o enregistrant diverses sessions del procés d'escriptura introduint un article de recerca, aportaria una perspectiva diferent i probablement més rica en l'estudi de la trajectòria doctoral de les estudiants de doctorat i els seus processos d'escriptura. En aquest sentit, ja disposem de dades longitudinals sobre el procés d'escriptura d'un article científic a través de diferents sessions, i tenim la intenció d'explorar aquests temes en investigacions futures.

D'altra banda, tot i que la tesi en el seu conjunt comporta una perspectiva multimetodològica, i alguns estudis combinen diversos instruments, no hem dut a terme cap estudi de mètode mixt (en relació al disseny) que combini mètodes quantitatius de gran escala amb mètodes qualitatius d'anàlisi en profunditat. Aquest enfocament podria haver ajudat a obtenir una comprensió més profunda i multidimensional del mateix fenomen. Dins del nostre equip de recerca s'han dut a terme alguns estudis preliminars en aquesta línia de treball, que tenim la intenció d'ampliar en el futur.

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Finalment, com hem dit al llarg d'aquestes pàgines, l'educació doctoral no només és responsabilitat de les estudiants, sinó un fenomen multinivell que cal analitzar i millorar a tots els nivells. En aquesta tesi, hem inclòs aquesta perspectiva multinivell en l'anàlisi, però només es va explorar el punt de vista de les estudiants de doctorat. L'anàlisi de les perspectives de supervisores, altres investigadores i fins i tot d'agents institucionals (per exemple, coordinadors d'escoles de doctorat i de programes) podria haver proporcionat noves visions sobre la formació i l'escriptura de les estudiants de doctorat i constitueix una línia per a futures investigacions. Com s'ha assenyalat anteriorment, explorar el paper que juguen els equips de recerca en el desenvolupament de les estudiants de doctorat també és un repte per a futures investigacions.

CHAPTER SEVEN

Final remarks

I could probably fill dozens of pages reflecting on my trajectory and my personal and professional development, what I've learnt during the last four years and what I'd do differently. I probably should (and probably would) since, as we claim several times in this thesis, writing promotes awareness, reflection and learning.

However, it is a bit difficult to find the place for it along these pages since, while the objective of doctoral education is for us, doctoral students, to learn all about research, a dissertation is supposed to present a –hopefully successful- product. It is expected to only *reflect the* learning product, not *reflect on* the learning process.

From the theoretical, methodological and pedagogical perspective we defended here, this is a contradiction within the activity of doing and writing a thesis, and also intrinsic to any research. It is a contradiction between the –learning- process and the –learning- product, among conflicting rules and motives. Its manifestations appear(ed) in many and different occasions along my trajectory, in writing as if I was an expert when I am a novice researcher; when learning from my mistakes along the process while trying to somehow disguise –or at least justify- them in the products; or when presenting preliminary results in a conference.

To me, this contradiction became even more obvious and pressing when I was writing the introduction of this dissertation. I was writing the introduction after completing the studies, but I had to do it as if I had not yet done (and therefore yet learnt from) the studies I was introducing. It had to introduce four studies that build on one another, but pretend they are independent although thematically connected. It had to be the introduction of a project that started when I knew *nothing* about the topic and about research. But, at the same time, it had to be the introduction of a solid four-year research; it had to show expertise on the topic. What an impossible exercise to do! I would have liked this –and any

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other- dissertation to reflect the learning process as well as the products, to show how *little* I knew at the beginning and how *much* I know now, to expose the evolution in my ways of doing, thinking, talking and writing about research –at the very least-.

Process matters. It matters to understand how I got here and how this document became (becomes) what it is. What we do alongside -or in close connection- to the thesis matters. We know that. Along these pages, we argued that a thousand times (the search function of my Microsoft Word tells me that the words process(es), trajectory and journey appear 405 times in this document). My process, my trajectory is this dissertation, of course, it is. But it's also so much more. It's also other papers and presentations, and contents on a website; the data that we collected but have not yet analysed. My trajectory includes the unsuccessful attempts and mistakes; the several rejections from the journals; the procrastination and blocks. It is the meetings and projects I participated in; and the courses, conferences, talks, seminars and any other form of training I took; my visits to other universities; and the thousands of drafts that are still stored in my computer. But, above all, it is the many (many!) conversations with Montse, Núria, Mariela, Andrea, and many other colleagues; conversations that, of course, have had a very significant impact on the process, but to whom this 'end-product dissertation' fails to do justice.

I would have liked this dissertation to *reflect* (and *reflect on*) that and much more but this genre forces me (us) to focus on the product and relegate all these essential elements of the process to the acknowledgements. We play(ed) along, but let me have these final pages to point at this contradiction and acknowledge all the voices, moments, setbacks and thresholds that I see in every page of this dissertation but that may not be obvious to any reader.

I realise these contradictions are not only mine but intrinsic of any research process. However, they probably become more critical and conflicting when they appear along a process aimed at learning and, from my perspective, they point at the need to find new and different ways to assess and evaluate the doctoral trajectory; ways that allow for greater coherence between doctoral

education objectives and assessment, and between the future roles, tasks and job we early career researchers will take and the roles, tasks and jobs that are currently assessed.

COMENTARIS FINALS - versió en català

Probablement podria omplir desenes de pàgines reflexionant sobre la meva trajectòria i el meu desenvolupament personal i professional, el que he après durant els últims quatre anys i el que faria de manera diferent. Probablement ho hauria de fer (i probablement ho faré), ja que, tal com diem diverses vegades al llarg d'aquesta tesis l'escriptura promou la consciència, la reflexió i l'aprenentatge.

No obstant això, és una mica difícil trobar un espai al llarg d'aquestes pàgines per fer-ho ja que, si bé l'objectiu de l'educació doctoral és que nosaltres, estudiants de doctorat, aprenguem a fer recerca, s'espera que una tesi doctoral presenti un producte -amb sort, exitós. L'expectativa és, doncs, que *reflecteixi* el producte de l'aprenentatge, no que s'hi *reflexioni* sobre el procés d'aprenentatge.

Des de la perspectiva teòrica, metodològica i pedagògica que hem defensat, això suposa una contradicció en l'activitat de fer i escriure una tesi, també intrínseca a qualsevol recerca. Es tracta d'una contradicció entre el procés -d'aprenentatge- i el producte -d'aprenentatge-, entre regles i motius contradictoris. Les seves manifestacions apareixen i han aparegut en moltes ocasions al llarg de la meva trajectòria, quan intentava escriure com si fos una experta tot i ser investigadora novell; a l'hora d'aprendre dels meus errors al llarg del procés mentre els havia d'intentar dissimular -o, almenys, justificar- en els productes; o al presentar resultats preliminars en una conferència.

Per a mi, aquesta contradicció es va fer encara més evident i crítica quan estava escrivint la introducció d'aquesta tesi. Estava escrivint la introducció després de completar la recerca, però havia de fer-ho com si encara no hagués fet -i per tant, encara no hagués après sobre- els estudis que estava presentant. El text havia d'introduir quatre estudis que es construeixen l'un sobre l'altre, però presentar-los com a ens independents, encara que connectats temàticament. Havia de ser la introducció d'un projecte que va començar quan no sabia *res* sobre el tema ni sobre recerca. Però, al mateix temps, havia de ser la introducció d'una sòlida investigació de quatre anys; havia de mostrar expertesa sobre el

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tema. Un exercici impossible! M'hauria agradat que aquesta -i qualsevol altra- tesi reflectís el procés d'aprenentatge i els productes, que mostrés el *poc* que en sabia al principi i *quant* en sé ara, i que ensenyés, com a mínim, l'evolució de les meves formes de fer, pensar, parlar i escriure sobre la recerca.

El procés és important. És important per a comprendre com he arribat fins aquí i com aquest document ha esdevingut (i esdevé) el que és ara. Allò que fem en paral·lel -o en estreta relació- a la tesi és important. Ho sabem. Al llarg d'aquestes pàgines, ho hem defensat centenars de vegades (la funció de 'cerca' del meu Microsoft Word em diu que les paraules procés(sos) i trajectòria - process(es), trajectory and journey- apareixen 405 vegades en aquest document). El meu procés, la meva trajectòria, és aquesta tesi, és clar. Però també és molt més. També és altres treballs i presentacions, i continguts en webs; les dades que hem recollit però que encara no hem analitzat. La meva trajectòria inclou els intents frustrats i els errors; els diversos rebuigs de les revistes; la procrastinació i els bloquejos. Són les reunions i projectes en què he col·laborat; i els cursos, conferències, xerrades, seminaris i qualsevol altra forma de formació en què he participat; les visites a altres universitats; i els milers d'esborranys que encara estan guardats al meu ordinador. Però, sobretot, són les moltes (moltes) converses amb la Montse, la Núria, la Mariela, l'Andrea i moltes altres persones; converses que, per descomptat, han tingut un impacte molt significatiu en el procés, però a les quals aquest producte final no fa justícia.

M'hauria agradat que aquesta tesi *reflectís* (i *reflexionés*) això i molt més, però aquest gènere ens obliga a centrar-nos en el producte i relegar tots aquests elements essencials del procés als agraïments. Hem seguit les normes, però m'agradaria dedicar aquestes pàgines finals a assenyalar aquesta contradicció i reconèixer totes les veus, els moments, els contratemps i els *thresholds* que veig en cada pàgina d'aquesta tesi, però que poden no ser obvis per a tothom qui la llegeixi.

Sóc conscient de que aquestes contradiccions no són només meves, sinó que són intrínseques a qualsevol procés de recerca. No obstant, probablement resulten més crítiques i conflictives quan apareixen en el context d'un procés

d'aprenentatge i, des de la meva perspectiva, aquestes contradiccions posen de manifest la necessitat de trobar noves i diferents maneres de valorar i avaluar la trajectòria doctoral; formes que permetin una major coherència entre els objectius i l'avaluació de la formació, i entre els rols, tasques i treballs futurs que nosaltres, com a investigador/es novells, realitzarem i els rols, tasques i llocs de treball que s'avaluen actualment.

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Aquesta Tesi Doctoral ha estat defensada el dia _____ d_____ de 201__

al Centre_____

de la Universitat Ramon Llull, davant el Tribunal format pels Doctors i Doctores

sotasignants, havent obtingut la qualificació:

President/a

_____

Vocal

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Vocal *

_____

Vocal *

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Secretari/ària

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Doctorand/a

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(*): Només en el cas de tenir un tribunal de 5 membres