

Learning transitions of three doctoral students in a Portuguese higher education institution facilitated by the use of ICT

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The growing complexity of the information society and the Bologna Declaration led higher education institutions to revise their curricula and contributed to renewed understandings of teaching, learning and research. Many authors agree that a doctoral study implicates creative endeavour through which the student contributes to knowledge development. Furthermore, the focus of the third cycle of education is no longer limited to the product of an original thesis, including also the students' development towards high quality and scholarly researchers of the next generation. This paper reports the learning transitions of three doctoral students with different backgrounds (two Language teachers and one Biology/Geology teacher) working together in the context of a first year module integrated in the curriculum of a Portuguese Doctoral Program in Didactics and Curricular Development. The research aims to discuss evidences of the (positive) impacts of the collaboration process in which the doctoral students were deeply involved throughout and beyond the one semester module. Taking into account that the three first authors are the doctoral students, the study has an auto-ethnographic nature. A qualitative content analysis of five types of documents produced by the group was analyzed. The data analysis scheme was developed, considering the characteristics of an active and independent high quality researcher, although some dimensions emerged from the corpora. It is believed that the discussion of this study might be relevant for the facilitation of the learning transitions of to early career researchers, thus supporting fine tunings of research training strategies implemented in the context of doctoral programs.

Key-words: doctoral education; lifelong learning; learning transitions; research(er) development/research training; auto-ethnography

1. Introduction: New challenges for doctoral education

The ongoing transformations in Higher Education in Portugal, resulting both from the Bologna Process (Bologna Declaration, 1999) and an easier access to digital tools and resources, many available online and free of charge, has brought to the higher education arena a renewed understanding of the relationships between education, learning and academic research (Evans, 2010; Ipsos/Mori, 2008; Moreira, 2008; Siemens, 2008). Doctoral education has become one of the key feature within the Bologna Process since the ministerial meeting in Berlin (Berlin Communiqué, 2003) and recognized as being the interplay between education and research and therefore an opportunity for reaching scientific quality and development. Indeed, the European University Association (EUA) recognizes doctoral students, as the future knowledge generators and innovators:

Doctoral education is a major priority for European universities and for EUA. It forms the first phase of young researchers' careers and is thus central to the drive to create a Europe of

knowledge, as more researchers need to be trained than ever before if the ambitious objectives concerning enhanced research capacity, innovation and economic growth are to be met. (Georg Winckler, European University Association – EUA President, 2005 – 2009, <http://www.eua.be/cde/Home.aspx>, retrieved September 2011)

As a result higher education institutions and particularly doctoral schools started are seen as privileged spaces for research training and thus knowledge generation and innovation (Evans, 2010; Kehm, 2004) and great attention is devoted on the design and implementation of research training strategies integrated in the first year of the Doctoral Programs. In this sense, the curricular modules of doctoral studies can be conceptualized as ‘pre-research stages/phases’ were the early career researcher has the opportunity to develop and to consolidate research competences needed to carry out an independent and original research.

During their doctoral education studies students are expected to move beyond fact finding, towards conceptual, critical and creative levels, identifying problems and questioning fixed truth, in order to engage in deep learning and contribute to knowledge development (Wisker & Robinson, 2009). Actually, the main tasks to fulfil throughout doctoral studies form part of a complex creative process which entails: i) identifying and describing a research problem, ii) selecting an appropriate approach to investigate the problem, iii) collecting and analyzing data, iv) writing the thesis and defending it during a viva voce examination, and writing research proposals and papers (Dewett, Shin, Tohn and Semadeni, 2005; Trafford & Leshem, 2009). However, considering the purpose of the Bologna Process, in nowadays context, the focus is not (only) on the quality of the academic research product, namely the PhD thesis, but on what Frick (2010) and Trafford and Leshem (2009) describe/define as *doctorateness* (seen as a process). The authors claim that this process lead doctoral students to become a responsible scholars, e.g., a researchers who have the confidence and courage to take risks, to make mistakes, to invent and re-invent knowledge, to transfer knowledge between contexts and to pursue critical and lifelong inquiries. Evans (2010) illustrates the characteristics of an active and independent high quality researcher, such as: i) uses and adapts established research methods and develops methodology; ii) strives constantly to apply deep levels of analysis; iii) constantly reflects upon, and frequently revisits and refines his/her own studies; iv) publishes frequently in high ranking academic journals. Some of the skills related to these characteristics were develop during the experience discussed throughout this paper.

Since nowadays the information is only a “click” away, the knowledge (re/co)construction process is also reconceptualised. The available digital tools, particularly Web 2.0, allow immediate posting of information by any Internet user and, in view of the considerable volume of information available at any moment, skills to access and select information are required (Conole, 2010). Furthermore, the researcher will also have to find ways to keep up-to-date with what is being posted, for instance, through specialized magazines or conference proceedings, and interact with peers with whom to work collaboratively, and participate in the co-construction of scientific knowledge, which is expected to be a collective enterprise (Siemens, 2004). Digital tools, such as blogs, forums, wikis, chats, email and contents management systems, are some of

the resources which may be explored for developing collaborative research activities, and offer countless potentialities for distance communication and research. These tools can facilitate the interaction between doctoral students, doctoral students and supervisors, as well as students and other researchers (Loureiro, Huet, Baptista, & Casanova, 2010). Furthermore, the Internet offers a vast number of tools in which the user is simultaneously a consumer and a contents manager (prosumer) (Moreira, 2008) and may encourage the creation of learning communities and emergent learning, provided that the approach to education is flexible and adapts to the students' needs, and the teacher fulfils regulatory duties (by giving feedback) and moderates interactions (Conole, 2010).

In the curricular unit of a doctoral program (3rd cycle of Bologna), to which this article reports, doctoral students (seen as a junior researcher) are encouraged to work in collaboration with colleagues. They are simultaneously guided to develop skills and learning aiming to help them to progressively carry out research in his/her area independently and/or in a network. In this context, a group of three students (the first three authors) collaboratively developed a meta-analysis of literature, resorting to digital tools available on the web. This contribution aims to discuss evidences of the (positive) impacts on the learning experience of these three doctoral students' due to the collaboration process in which they were involved. Through the exploration of the doctoral students' voices, expressed in several documents produced by the students, it is expected to contribute to the understanding of how research training opportunities can go beyond individualism. To focus the work, the following research question was defined: which learning impact entailed a collaborative work aiming at conducting and writing a meta-analytical study, involving doctoral students with different backgrounds?

The study is allocated within a qualitative-interpretative paradigm, since the main research focus is the personal learning experiences of three doctoral students. Using a *template approach* (Robson, 2002), content analysis of five types of documents was undertaken: (1) one final written report of the meta-analytical study; (2) the presentation of the meta-analytical study at the end of the module; (3) three individual reflective narratives about the learning experiences; (4) a presentation elaborated by the group to share the experience with colleagues of a following edition of the doctoral program (an invited talk proposed by the senior researchers responsible for the module - the two last authors of this article); (5) two research papers presented in international conferences (Macário, Lopes, Pinto, Loureiro, & Ançã, 2011; Lopes, Macário, Pinto, Loureiro, & Ançã, 2011). The first two documents were prepared as outcomes of the curricular unit. The last ones, written after the end of the curricular unit, aimed to reflect and disseminate the learning experience. Taking into account that the analysis is realized by the doctoral students themselves as an effort of outside positioning from their personal learning experience, while supported by their teachers, the study can be identified as being an auto-ethnographical reflection (Hernández, Sancho, Creus, & Montané, 2010; Mitra, 2010), where the concept of "auto" has a twofold meaning: i) at the individual level, each student *per se* contributed with their own view on the experience, and ii) at the group level, a collective reflection was carried out to disseminate the teaching strategies and outcomes of the curricular unit.

The paper firstly describes the background of the study. The findings are discussed afterwards taking into account characteristics of an active and independent high quality researcher (Evans, 2010), and dimensions that emerged from the corpora. In the conclusion, we reflect on the relevance of the work proposed and the research training model adopted in the curricular unit.

2. Context of study: collaboration in a doctoral program using ICT

In order to fully understand the context to which this study reports, the following paragraphs briefly describe (a) the expected learning outcomes of the curricular unit in which the students collaborated, and (b) the process of conducting the assigned learning task, namely a collaborative meta-analytical study.

Expected learning outcomes of the curricular unit Didactics and Curricular Development (DCD):

The curricular unit DCD is integrated in a doctoral program of the University of Aveiro, Portugal. The main task of the module is to conduct a collaborative meta-analytic study focused on the analysis of published literature related with the students' specific academic interests, but also including a common "umbrella" theme, linking the students' individual research interests. Evaluation of the students' performance in the curricular unit was based on the scientific quality of the final written report and also on the quality of the oral presentation and discussion of their meta-analytical study.

In order to maximize the learning opportunities the two university teachers (senior researchers and the two last authors of this paper) of the curricular unit suggested that the meta-analytical study should be carried out by a group of three to four doctoral students, if possible with different backgrounds. The group, to which this study reports, integrated three students with different professional backgrounds: 2 Language and 1 Biology teachers. The three students had teaching experience, although different, and some research background (Table 1). Thus, the students' profile corresponded to "(...) a learner who within a work and professional context might be an expert and at the same time an initiate into research education." (Kiley, 2009, p.295). The motivations to attend the doctoral studies (Table 1) are in coherence with Shacham and Od-Cohen (2009) arguments that adult learners are lifelong and goal-oriented learners. The research students expected/aspirated to be involved in learning experience relevant, authentic, and meaningful, as well as geared at raising their self-esteem, self-confidence and self-fulfilment (Alridge & Tucket, 2010).

Drawing on the principles of the Bologna Process, it was intended that each student:

- learn to access, select, systemize and analyze research literature, in order to collaboratively write an academic report;
- has the opportunity to extend and deepen the theoretical knowledge in a specific area related to his individual PhD project.

Thus the learning expectation was that during the process of conducting and writing the meta-analytical study the students would develop competences related with the research process, such as information related competences, collaboration and academic writing, facilitating and empowering the implementation of their individual PhD research project.

Table 1 – Professional and Motivational background of each doctorate student

Student*	Background	Brief Description of the Professional Background	Motivation to do the PhD
Ana	Language (secondary and primary school level)	<ul style="list-style-type: none"> - Bachelor in Portuguese Teaching; - Master in Education - teacher at higher education (teacher training since 1997) - Co-author of the Portuguese (language) Curriculum for Basic Education (Portuguese Ministry of Education); - member of the research Project PROTEXTOS (about writing) 	<ul style="list-style-type: none"> - To deepen knowledge; - Design, implement and evaluate teaching and learning strategies involving the development of writing competences
Beatrice	Biology/Geology	<ul style="list-style-type: none"> - Finished her Bachelor in Biology/Geology in 2004; - Has been teaching as a part-time teacher at several secondary school since 2004 - Concluded her master at Science communication and education in 2007 - Collaborated in a research project from 2007 to 2009 	<ul style="list-style-type: none"> - To continue the work started throughout the collaboration in a research project and extend the learning/skills acquired throughout that project; - To enhance the opportunity of employability.
Carol	Language (secondary school level)	<ul style="list-style-type: none"> - Finished her graduate in Portuguese studies in 2006; - Has been teaching as a part-time teacher at several basic schools since 2008 	<ul style="list-style-type: none"> - To learn more in the area - To develop personally and professionally

Carrying out the meta-analytical study

The meta-analysis should synthesise research papers in education with a common section and three different parts related with the research topics of the individual PhD projects of the students involved in the group work. The general thematic (which linked the individual project), and number of papers to be analyzed, was defined by the students themselves. The final written report of this particular group was entitled *Learning to write and writing to learn in the 21st century* (Figure 3). The final collaborative meta-analytical study is a product of a complex learning experience that can be divided into three procedural stages:

1. In order to define the *corpora* the three students had to describe to each colleague of their group the theoretical framework, rational and main aims of their individual PhD project in order to identify the “umbrella theme”, namely “Development of writing skills”. After this, the students selected the scientific researches/papers/articles to be considered for each of the three individual meta-analytical sub-studies. Due to time constraints the group decided that each individual study would include the analysis of 12 research papers, being those preferably of empirical nature. Therefore the findings of the final report resulted from the analysis of a total of 36 papers (3 x12).

2. After the creation of the database to be used in the meta-analytical study the group prepared its qualitative content analysis. This task implied the definition of common analytical categories by the students based on the floating reading of the collected information (namely the twelve studies by each student). Individual analysis was supported by frequent discussions between the three students in order to negotiate common interests and take shared decision. Naturally some categories of analysis were common to all, while others were adapted, included or excluded considering the specificities of each individual assignment, which would constitute the different sections of the final written report.
3. In order to produce a coherent final written report, the students had to continuously share, discuss, negotiate and synthesize ideas, like in the previous phase of data analysis, in order to scaffold the process of emphasizing common concepts and findings while writing their individual sections. Moreover, using collaborative writing tools the group members co-wrote the introduction and conclusion sections of the final report, linking the individual studies and findings.

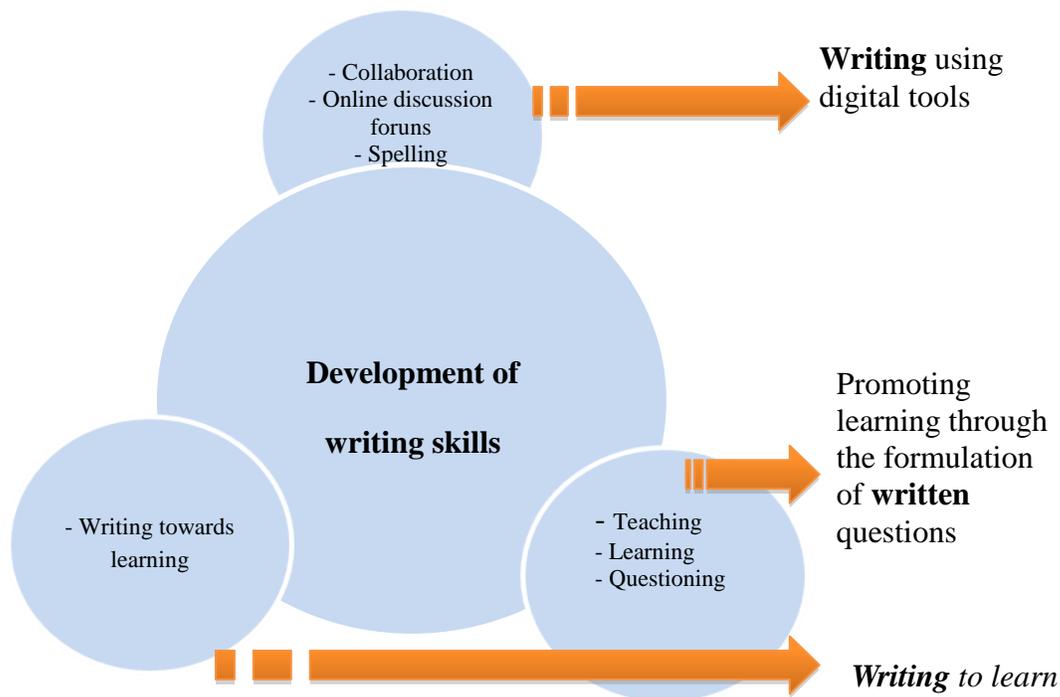


Figure 2 – Areas of interest of the group members and confluence theme (adapted from Macário, Lopes, Pinto, Loureiro, & Ançã, 2011)

ICT facilitated the learning tasks in diverse aspects. Throughout all stages, the group met in several occasions in presence and remotely (synchronously). There was also asynchronous communication via email. Those meetings were used to discuss and share the work progression, negotiate various criteria, overcome difficulties, establish common guidelines, among others. Table 2 presents a systematization of the digital tools used and corresponding activities.

The compilation of the corpora was facilitated by the use of EndNote X4 and allowed the creation of a collective database. The information was classified considering previously defined common analysis categories, as already mentioned. QSR Nvivo 8 was a pivotal element for content analysis process, given its potentialities to (re)organizing information into categories. Exploring the aforementioned packages enabled the development of ICT competences considered very useful and essential for future researchers.

Table 2 – Systematization of digital tools and main associated activities

Digital tool	Activities
Negotiation Process	
MSN	Sharing, negotiation and discussing ideas, socialization, preparing presentations
Email	Sharing relevant documents, discussing ideas, exchanging assignment versions
Google Docs	Collaborative writing
Meta-analysis development	
b-on, ISI Web of Science, ERIC, search engines of the university's libraries	Accessing to databases and unabridged documents
EndNote X4	Compiling the <i>corpora</i>
QSR NVivo	Contents analysis support

Collaboration, sharing and discussing ideas throughout the development of the assignment formed the basis for the co-planification and co-construction of the final document, which should be coherent and organized. The quality of the final report was achieved also because the document was written using GoogleDocs, which facilitated the regular access, updating and discussion of the co-written document at a distance. Although the assignment was formed by three meta-analytic studies, under a general subject, the authors believe that the use of the mentioned ICT tools provided high coherence and coordination between the group' members.

3. Results and discussion: reflecting on learning outcomes

In the present section we will present selected findings resulting from the content analysis of the previously identified documents (first section). Considering the aim of the study, and drawing on the conception of development towards a exemplary researcher (Kiley, 2009), we focused our attention on excerpts that evidence the idea of learning contributing for the ability of 'doing' research activities in a 'better way' (Evans, 2010). The first two dimensions of the analytical scheme (Robson, 2002), entail specific characteristic of Evans' (2010) concept of research professionalism, namely Cognitive Skills (a) and Attitude towards research (b). The other two dimensions, namely interpersonal skills (c) and transversal skills (d) emerged from the content analysis itself. Despite the fact that each dimension will be presented separately they should be conceptualized as overlapping and synergistic.

a) *Cognitive skills*: According to Frick (2010) creativity results from the complex interplay of the following intellectual abilities: synthetic ability (be able to see problems in new ways and to move beyond the boundaries of conventional thinking), analytic ability (be able to recognize which ideas are worth pursuing) and practical-contextual ability (to know how to persuade others of an idea). The fact that the students had so far developed their career in different academic fields enhanced the challenge of conducting a collaborative meta-analytical study. In order to link their interests it was first of all necessary to get familiar with the state of art of each research field and also with the individual project of the colleagues (namely Questioning, Writing Processes and Collaborative writing – cf. Figure 2). This contact with different (but related) scientific areas facilitated the crossing of the ‘comfort zone’ of each individual students. Like Beatrice and Carol state the contact with other types of knowledge would not have happened if the students had exclusively worked alone, or with colleagues of the same area:

“In my PhD work [...] I basically try to design and implement innovative teaching-learning assessment strategies that help undergraduate biology students to develop their questioning skills. By reading the references suggested by my colleagues about the stages of ‘learning to write’ and also references about the process of ‘co-writing’ ... I realized that I had to think of this dimension also ... because when I ask the students to write in different moments their questions down...well to what extent can I assert that the improvement of the questions quality is due to the improvement of their thinking skills, which are the focus of my research? Isn’t it possible that what actually improved was their writing abilities?! I never thought about this so obvious issue. I definitely will have to read more about this for my thesis...It is exciting to think how I can get inspired from Language teaching! After all questioning is a complex competence...” (Beatrice)

“During the journey of conducting the meta-analytical study I realized that the research area considering questioning, deeply embedded in Science Education, seems surprisingly not to include the dimension of the process of learning to write that is intimately linked to the formulation of (written) questions...” (Carol)

Furthermore, the effort of trying to explain your own research project to someone that is not an expert on that particular academic research topic extends the use of your own knowledge. It is like the *Information literacy* of the doctoral student who is trying to explain his ideas and expose his arguments is putted under ‘special proof’. Drawing on Beatrice’s statement, we had to be twice effective in selecting, organizing and synthesizing the main information. Since the key-points of the rationale had to be shared in a simple and, still, rigorous form:

“During the first phase of the curricular unit, when we were trying to identify our common theme I had to explain my PhD project to Anna and Carol. This caused a moment of anxiety, (...) How would I be able to show, and convince [them] that what I do in Biology [teaching] is important and make sense...and is NOT boring? (...) I was surprised with the interesting comments of my colleagues and (...) during the process of answering to their clarifying or simple curiosity doubts I realized I started to refine my own project...sometimes an external view is very positive [...].” (Beatrice)

Within the previous narrative excerpts the important ability of dealing with the comments of peers and integrating them in a constructive and relevant way is also present. Each student had to be able to understand the other and be able to recognize which ‘items’ of the work of her colleague were linked to her own research interest and therefore were worth pursuing. These learning challenges remained during the entire process of conducting the meta-analytical study:

“For me one learning output was the frequent process of sharing ideas while we were conducting our individual sub-studies ... we constantly had to plunge back...reflect on what we have produced so far in order to be certain that the ‘bits’ would fit together...we had to share and negotiate constantly our interests...it is like a meta-work about your own work ... it was very stimulating to step back ...every time (of the meetings) the bits gained more shape as one coherent work with a richer texture (...).” (Anna)

Indeed, only by a continuous effort of re-shuffling information, training their ‘cognitive flexibility’ it was possible to identify a common research topic underpinning the final report entitled “Development of writing skills”.

b) *Attitude towards research*: research is a process of constant knowledge extension and even reinvention. An active researcher recognizes this essence of lifelong learning, being truly engaged in reflective, critical and creative thinking (Evans, 2010; Frick, 2010). The constant cognitive challenge facilitated the students’ ‘engagement’ into a critical, reflective and creative ‘mood’ which defines the attitude of a researcher (Evans, 2010), identified by Kiley (2009) as the research culture. The constant strive to discuss arguments, generate ideas and understand the perspectives of others, and also the willingness to handle/manage critique, grew along the learning journey, being particularly strong during the last moments of the module:

“By working with my colleagues throughout this module, I realized that not every questions need a quick answer...there are issues that need deep reflection...and not an immediate answer. It is ok, and even desirable, to be involved in a study where new doubts are raised. And even when the questions came from the others it doesn’t mean that the study or work is bad or weak.. it might mean: interesting!... so doubts ... might be a good thing... it doesn’t mean that you have done a bad work...” (Beatrice)

The students’ ‘will to engage’ into research activity was re-expressed when they prepared a presentation to share their learning experience with their colleagues of the following edition of the doctoral program:

“The teachers’ invitation to share our ‘knowledge’ with our colleagues of the third edition was really rewarding...not just because it meant that the teachers recognized our work as being of merit to be presented to others...but also because it would be another opportunity to discuss ideas...and perhaps move one step further in our own research project.” (Carol)

Finally, throughout the semester, the collaborative work, which implied the negotiation of common area of interest and the re-organization of information in order to create common and (new) knowledge, helped students to create and maintain solidarity and to be aware of the individual, but also shared responsibility (Shamcham & Od-Cohen, 2009). First within the group, then with learners in the same situation (colleagues of the same Doctoral Program) and more recently with researchers in a broader community:

“On another level, the contact with my colleagues of the following doctoral school edition enhanced my awareness about belonging to a community of (novice) researchers, and the importance of collaborating towards a common goal: co-construct more and better knowledge... and when we had the opportunity to discuss our learning experience during the international conferences I really felt that we are giving our first steps in the ‘research world’ which was, for me, as a secondary school teacher a ‘separate and unachievable world ... ”
(Carol)

c) *Interpersonal skills*: this dimension relates to the ability (and the disposition) to communicate with others in a constructive way. Sharing knowledge and doubts with others (via oral communication) is not an intrinsic personal characteristic of every student. Some have the need of developing this facet. Like previously stated the ability to express your ideas and argue with peers is also an ability that can be developed. The process of meaning making through oral or written communication is mainly acquired by ‘field’ experience, e.g. ‘generating practical knowledge through their practice’ (Shachman & Od-Cohen, 2009):

“[...] For example presenting our work the second time [to the colleagues of the third edition of the Doctoral Program,... I felt much more confident. I was not that nervous, the ideas came out more clearly. And I honestly felt that my colleagues and me were already doctoral students with some valuable field expertise... at least to our younger colleagues... this gave us confidence... during the presentation, while speaking, you are being confronted with your own learning progress and also developing communication skills in public.” (Carol)

d) *Transversal skill*: this dimension relates to those skills involved, for instance, in the use of ICT to maximize the outputs of research activity, academic writing and methodological skills. The following excerpts document how the proposed task and the collaboration process facilitated their development.

“Anna’s’ knowledge about the methodological approaches was crucial when we were organizing our data. She alerted us to the importance of defining, a set of common key-concepts, as well as transversal criteria for including/excluding references to be included in the corpora. So we constructed a common grid to be used by everyone...Otherwise we would have lost a lot of time doing this in a more intuitive approach...” (Carol)

“Looking back, I now feel that I was a complete ignorant about many informatics tools that are available at the Internet. Ana and Carol were much more advanced in this knowledge, I never had used Google Docs...and this was an enormous help because it allowed us to work at distance. ... ”
(Beatrice)

“(...) the high quality of the collaboration (was) facilitated by the use of many informatics tools/instruments (...). It was throughout this particular collaboration that I recognized many other facilities/potentialities ICT tools of which I already had some knowledge...Some of those tools I actually started use on my own PhD project” (Carol)

“Academic writing constitutes, normally, a process of evidencing knowledge in a very personal format ... The work we developed implied a bigger effort of adaption of the ‘individual writing style’ of each student, in order to obtain a coherent puzzle, where every part fitted with the others. This challenge was an asset, since it ‘forced’ to constant syntactical and semantical reformulations (...)”. (Anna)

Concluding remarks: towards the empowerment of early career researchers

The present study focus on the learning journey of a group of three doctoral candidates which undertook an auto-ethnographic reflection in order to identify the learning outcomes that emerged from the collaborative research training strategy implemented in one semester long curricular unit. Since research on doctoral learning processes has shown that learning to do research has been, so far, experienced as a solitary process (McWilliam & Dawson, 2008; Shamchman & Od-Cohen, 2009), among others, the curricular unit aimed at developing strategies that can assist/empower doctoral students to achieve more creative outcomes by interacting with peers. The paper describes the collaborative work, involving students with different background, and provides evidences of access to new and different visions/perspectives on their previous knowledge. During the entire learning experience the members of the group had to immerse in several research linked tasks, to negotiate common area of interest and to (re)organise information in order to create common and (new) knowledge.

Within the critical and creative process of doing a meta-analytical study, students developed their ability and disposition to be an active (future) researcher. In fact opportunities for democratic work, collaborative decisions and collegiality (McWilliam & Dawson, 2008) were created. As active researchers the students had to assess the arguments of their peers and give input, even if their peer’ PhD topics were not exactly related to their own work (take as an example the peer-review process), developing cognitive flexibility (Evans, 2010) and self-management skills (Frick, 2010), that are considered to be important research skills.

The continuous challenge that the heterogeneous group had to deal with strengthened the cohesion between the doctoral students, enhancing the development of a sense of belonging, pivotal to the establishment of learning communities (Henri & Pudelko, 2003; Wisker & Robinson, 2009), and stimulating the students to make their first steps as and into a (broader) community of (research) practice (Shachman & Od-Cohen, 2009), empowering therefore their own ‘researcher identity’ (Figure 3). Indeed the doctoral learning experience is all about undertaking a ‘rite of passage’: Many doctoral students “(...) demonstrate through their writing, presentation, and even demeanour, that they have undergone a change in the way they understand learning and themselves as learners.” (Kiley, 2009, p. 293).

The established community may potentially develop towards a community of practice, because when experiences are meaningful they bring the group closer, encouraging it to continue, to share beyond the work itself. To this extent, the group wishes to learn together, is committed, feels that each member (students and teachers) is an asset and bring relevant inputs, important to

develop the group practice (Wenger, 2006) and to improve research. The digital tools used have contributed towards the creation and development of the community by allowing the co-construction and dissemination of knowledge, turning it into collective knowledge. It enabled to bring the members of the community closer together, encouraging a “scholarly collaboration over distance, exchange of information among scholars, access to skills, knowledge, research data and computational resources situated in remote locations and cooperative writing of academic material” (Carusi & Reimer, 2010, p. 12).

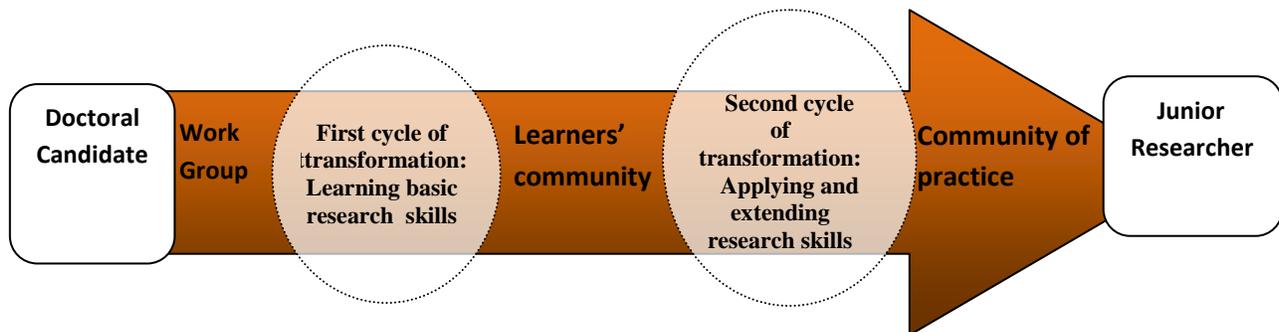


Figure 3 – The doctoral student in transition between lack and achievements of research ability (Evans, 2010; Shacham & Od-Cohen, 2009) or the “minimal state” (Kiley, 2009)

In this auto-ethnographical study, it was at the community level (and not individual) that creativity was initially fostered. Like McWilliam & Dawson (2008) state: “ (...) the creative impact and output of such research (working in teams with similar interests) is far more beneficial than small scale individualized studies. Indeed we believe that working with colleagues with different backgrounds helped the students to cross the *threshold concept* (Kiley, 2009) of *doctorateness* (Frick, 2010; Trafford & Leshem, 2009). Thus, the maximization of the diversity, by joining students with different backgrounds, may raise the significance of the learning experience/transition of each doctoral student, particularly during the first years of doctoral programs. Experiences as the one described above, which value divergence and diversity, seem to encourage risk-taking, experimentation and may promote students’ creativity (Shachman & Od-Cohen, 2009; McWilliam & Dawson, 2008).

Despite the relevant and rich highlights for training doctoral candidates of the adopted teaching strategies, the findings pertain to a singular case and cannot be generalised. In order to assert (with more certainty) the (positive) impact of the described training strategy, the following future investigations are suggested: a) conduct this kind of auto-ethnographical studies with other future doctoral students that attended similar research training strategies; ii) include interviews with senior researchers (teachers/supervisors) to gather their perceptions about the outcomes of the curricular year; iii) revisit this particular group after finishing their PhD, when theoretically the transition of the doctoral candidates towards an active researcher will be completed/consummated (Kiley, 2009). This would give access to their reflection about the entire learning experience in which they hopefully were involved.

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