ACTA DE EVALUACIÓN DE LA TESIS DOCTORAL
(FOR EVALUATION OF THE ACT DOCTORAL THESIS)

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DOCTORANDO *(candidate PHD)*: **NOGUEIRAS REDONDO, GLORIA**
D.N.I./PASAPORTE *(Id.Passport)*: ******4555N**
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TITULACIÓN DE DOCTOR EN *(Phd title)*: **DOCTOR/A POR LA UNIVERSIDAD DE ALCALÁ**

En el día de hoy 13/02/2018, reunido el tribunal de evaluación, constituido por los miembros que suscriben el presente Acta, el aspirante defendió su Tesis Doctoral **con Mención Internacional** *(In today assessment met the court, consisting of the members who signed this Act, the candidate defended his doctoral thesis with mention as International Doctorate)*, elaborada bajo la dirección de *(prepared under the direction of)* ALEJANDRO IBORRA CUÉLLAR.

Sobre el siguiente tema *(Title of the doctoral thesis)*: *MANAGING EPISTEMOLOGICAL CHANGE: A PROCESS-ORIENTED APPROACH TO STUDENTS' EMOTIONAL EXPERIENCE IN CONSTRUCTIVE-DEVELOPMENTAL LEARNING CONTEXTS IN HIGHER EDUCATION*

Finalizada la defensa y discusión de la tesis, el tribunal acordó otorgar la CALIFICACIÓN GLOBAL[1] de (**no apto, aprobado, notable** y **sobresaliente**) *(After the defense and defense of the thesis, the court agreed to grant the GLOBAL RATING (fail, pass, good and excellent)*: ——— SOBRESALIENTE ———

Alcalá de Henares, a ...13... de ...Febrero... de 2018

Fdo. *(Signed)*: Mª del Pcdillo   Fdo. *(Signed)*: Rebecca Klaw   Fdo. *(Signed)*: Juan José Zacarés

FIRMA DEL ALUMNO (candidate's signature),

Fdo. *(Signed)*: Gloria Nogueiras Redondo

Con fecha 1 de marzo de 2018 la Comisión Delegada de la Comisión de Estudios Oficiales de Posgrado, a la vista de los votos emitidos de manera anónima por el tribunal que ha juzgado la tesis, resuelve:

[X] Conceder la Mención de "Cum Laude"
[ ] No conceder la Mención de "Cum Laude"

La Secretari de la Comisión Delegada

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[1] La calificación podrá ser "no apto" "aprobado" "notable" y "sobresaliente". El tribunal podrá otorgar la mención de "cum laude" si la calificación global es de sobresaliente y se emite en tal sentido el voto secreto positivo por unanimidad. *(The grade may be "fail" "pass" "good" or "excellent". The panel may confer the distinction of "cum laude" if the overall grade is "Excellent" and has been awarded unanimously as such after secret voting.).*

En aplicación del art. 14.7 del RD. 99/2011 y el art. 14 del Reglamento de Elaboración, Autorización y Defensa de la Tesis Doctoral, la Comisión Delegada de la Comisión de Estudios Oficiales de Posgrado y Doctorado, en sesión pública de fecha 1 de marzo, procedió al escrutinio de los votos emitidos por los miembros del tribunal de la tesis defendida por *NOGUEIRAS REDONDO, GLORIA*, el día 13/02/18, titulada *MANAGING EPISTEMOLOGICAL CHANGE: A PROCESS-ORIENTED APPROACH TO STUDENTS' EMOTIONAL EXPERIENCE IN CONSTRUCTIVE-DEVELOPMENTAL LEARNING CONTEXTS IN HIGHER EDUCATION*, para determinar, si a la misma, se le concede la mención "cum laude", arrojando como resultado el voto favorable de todos los miembros del tribunal.

Por lo tanto, la Comisión de Estudios Oficiales de Posgrado **resuelve otorgar** a dicha tesis la

MENCIÓN "CUM LAUDE"

Alcalá de Henares, 2 de marzo de 2018
EL PRESIDENTE DE LA COMISIÓN DE ESTUDIOS
OFICIALES DE POSGRADO Y DOCTORADO
(en funciones)

Juan Ramón Velasco Pérez

Copia por e-mail a:
Doctorando: NOGUEIRAS REDONDO, GLORIA
Secretario del Tribunal: JUAN JOSÉ ZACARÉS GONZÁLEZ
Director de Tesis: ALEJANDRO IBORRA CUÉLLAR

DILIGENCIA DE DEPÓSITO DE TESIS.

Comprobado que el expediente académico de D./Dª _____ reúne los requisitos exigidos para la presentación de la Tesis, de acuerdo a la normativa vigente, y habiendo presentado la misma en formato: ☐ soporte electrónico ☐ impreso en papel, para el depósito de la misma, en el Servicio de Estudios Oficiales de Posgrado, con el nº de páginas: _____ se procede, con fecha de hoy a registrar el depósito de la tesis.

Alcalá de Henares a _____ de _____ de 20_____

Fdo. El Funcionario

As human beings, as we mature we are expected to develop increasingly complex ways of making meaning of ourselves, our relationships and our experiences. This epistemological development is triggered by contextual demands that render our current –and taken-for-granted– ways of meaning-making obsolete, and thereby encourage us to re-examine and change them in order to successfully adapt to our ever-changing environment.

Starting from the assumption that challenging experiences are coupled with individuals' emotional upset, the present thesis, composed of three empirical studies, aims to investigate higher education students' emotional experiences in constructive-developmental learning contexts which are intended to trigger their epistemological development.

In this quest, a process-oriented approach is adopted, by combining both qualitative research methods and dynamic systems methods which together provide a deeper insight into how development occurs.

The findings of this thesis shed light on the *what* and the *how* of the changes undergone by students who displayed evidence of epistemological development over the course of the learning experiences under research, and provide teachers with valuable insight to generate developmental learning contexts. Likewise, this thesis could serve as a source of methodological inspiration both for education and psychology practitioners and researchers who are interested in understanding and keeping track of individuals' change processes over time.

Gloria Nogueiras Redondo

Managing epistemological change

2017

Universidad de Alcalá

Managing epistemological change:

A process-oriented approach to students' emotional experience in constructive-developmental learning contexts in higher education

Doctoral Thesis presented by

Gloria Nogueiras Redondo

2017

Universidad
de Alcalá

ACUERDO DE LA COMISIÓN ACADÉMICA DEL PROGRAMA DE DOCTORADO EN EDUCACIÓN DEL DEPARTAMENTO DE CIENCIAS DE LA EDUCACIÓN SOBRE LA TESIS DOCTORAL PRESENTADA POR DÑA. GLORIA NOGUEIRAS REDONDO

Título de la Tesis: "**Managing epistemological change: A process-oriented approach to students' emotional experience in constructive-developmental learning contexts in higher education**"

Programa de Doctorado: D433 "Educación"

Director de la Tesis: Alejandro Iborra Cuéllar

Como Coordinador del Programa de Doctorado en Educación, hago constar que, en la Reunión de la Comisión Académica celebrada el 19 de diciembre de 2017, se acordó informar favorablemente la Tesis Doctoral presentada por Dña. Gloria Nogueiras Redondo, dado que reúne los requisitos académicos y administrativos que la normativa establece.

Para que así conste firmo el presente informe a 19 de diciembre de 2017.

Fdo.: Alejandro Iborra Cuéllar
Coordinador del Programa de Doctorado en Educación

UNIVERSIDAD DE ALCALÁ, PATRIMONIO DE LA HUMANIDAD

D. Alejandro Iborra Cuéllar, Director y Tutor de la Doctoranda Dª Gloria Nogueiras Redondo, dentro del Programa de Doctorado en Educación,

INFORMA que su Tesis Doctoral titulada "Managing epistemological change: A process-oriented approach to students' emotional experience in constructive-developmental learning contexts in higher education", reúne los requisitos científicos de originalidad y rigor metodológicos para ser defendida ante un tribunal.

Para que así conste y surta los efectos oportunos, se firma el presente informe en Alcalá de Henares a 13 de Diciembre de 2017.

Fdo.: Alejandro Iborra Cuéllar

Managing epistemological change:

A process-oriented approach to students' emotional experience in constructive-developmental learning contexts in higher education

Gloria Nogueiras Redondo

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Universidad de Alcalá

Doctoral Program in Education

Managing epistemological change:

A process-oriented approach to students' emotional experience in
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Gloria Nogueiras Redondo

Doctoral Thesis supervised by

Dr. Alejandro Iborra Cuéllar

Alcalá de Henares, 2017

Bridging…

The evocative image of a bridge has been present in the background of the present thesis right from its roots. These roots can be traced back to my first year as a student in a Degree in Educational Psychology, when I met my thesis supervisor, Alejandro, to whom I am indebted for a whole host of things that have greatly helped to shape the person I am today and will be in the future.

Crossing a bridge can serve as a metaphor for developmental transitions. Today, nearing the end of my doctoral thesis, I can acknowledge that in the three studies that compose it, I have tried to approach and gain a better understanding of a specific type of developmental transition, paying close attention, in different but related ways, to individuals' experiences while changing.

I would like to express my deep gratitude to David for the beautiful cover photograph and, above all, for his priceless company throughout a meaningful part of the challenging and enjoyable journey toward development.

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Preface

As any learner, I am quite satisfied of my thoughts until I go into a compelling situation that obliges me to change my perspective.
Laura Formenti, in Formenti & Dirkx, 2014, pp. 124-125[1]

Learning because you have to is not the same as choosing what you want to learn. As I have discovered during this semester, it is not "what" but "how"
Lana, master's student [2]

My interest in learning and development has led me, over the last years, to be trained in the fields of educational and developmental psychology. This training, particularly since my period as a student in a degree in Educational Psychology from 2008 to 2010, has helped me to understand better *what* is learning, *how* do we learn or what are the relationships between learning and development. Throughout some courses in the referred degree I started to experience a *kind* of learning which was completely different from the one that I was used to. I encountered teaching methodologies that promoted students' leading role, that encouraged us to explore personal experiences in collaboration with others, and that in doing so generated certain destabilization in our ways of understanding what a learning context was and what we were expected to do as students. These contexts enhanced that I started to question aspects of myself and of my relationships that I had never contemplated. It was then that a period of plenty of doubts and questioning, few certainties, emotional upheaval and some discoveries started to unfold.

What I have narrated in the previous lines might seem to have little to do with the kind of university teaching that most of us are familiar with. Rather, it might seem to have to do with a process of personal development. In this sense, it

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[1] Formenti, L., & Dirkx, J. (2014). A Dialogical Reframing. *Journal of Transformative Education*, *12*(2), 123–133. doi: 10.1177/1541344614554508
[2] This student's excerpt comes from the findings of chapter 2, the first empirical study out of the three that compose the present thesis.

might be connected, and indeed it is, to the encounter of life issues which are be-yond –but related to– my role and experiences as a university student and as an emerging adult. My narration might, also, help me to support the argument that it is time for higher education to go beyond its mere role as a transmissor of knowledge.

When I was awarded with the *FPU* scholarship[3] and I started to teach in the Teacher Training degree at the University of Alcalá –a degree that I myself had studied some years earlier– I became aware of my wish to try to generate learning contexts that enabled my students to undergo something of *that* that I had experi-enced in the above described courses. In this line, when I started to think on the topic of my doctoral thesis it seemed natural that, together with my supervisor, Alejandro, I moved toward wanting to understand how individuals make sense of and respond emotionally to learning experiences that challenge their current ways of understanding what is learning, what is teaching and, more fundamentally, their current understandings of themselves, their relationships, and their way of interact-ing with the world.

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[3] The *FPU Scholarship* (in Spanish "Formación del Profesorado Universitario"), four-year-long, is aimed at training Higher Education teachers and researchers. The one that I was awarded with was granted by the University of Alcalá (Spain).

Part I

Introduction

Chapter 1

Introduction

Chapter 1

Introduction

1. Contextualization

This doctoral thesis was born from the acknowledgment that those situations that enter into conflict with our ways of making meaning are, as claimed by constructivists and dynamic systems theorists, a potential trigger for learning and development (Piaget, 1975/1985; Van Geert, 1994). As we develop, we often encounter inconsistencies between our known ways of creating meaning of our experiences and the demands arising from our environment. To respond to such inconsistencies, we need to engage in a process of cognitive *accommodation* (Piaget) or *restructuration* (Van Geert), which entail significant changes in our meaning-making. These changes might lead to what has been termed *epistemological development* (Perry, 1970) or *transformative learning* (Mezirow, 2000). As a researcher and as an university teacher I am interested in and committed to the facilitation of students' epistemological development. This is taken as one of the main goals of higher education and as a requisite for a successful adult development (Baxter Magolda, 2000; Kegan, 1994; Perry, 1970). Learning contexts intended to facilitate students' epistemological development, however, are plenty of challenges which very often lead students to experience unpleasant emotions such as confusion, anxiety or frustration (Formenti & Dirkx, 2014).

Within the previous framework, I became interested in exploring the emotional experience of higher education students' participating in learning contexts that challenged their taken-for-granted ways of making meaning. Throughout the past years I have materialized this interest through the development of three empirical studies, which compose the present thesis –chapter 2, chapter 3, and chapter 4. Although each study is self-contained, in what follows I provide a general theoretical framework to enhance a comprehensive understanding of the rationale of the thesis. After that, I provide an overview of the scope of the thesis –its framing assumptions, aims and methodological approach– and of its structure.

2. Theoretical framework

2.1. Constructivist learning and epistemological development

2.1.1. Constructivist and dynamic view of learning and development

From a constructivist perspective, human beings make meaning of reality by constructing our own theories or models, which provide us a framework for understanding our experiences. These models are provisional in such a way that they might become destabilized when we encounter contextual information which comes into conflict with them, a phenomenon that Piaget (1952) named *cognitive disequilibrium*. Our usual response to such disequilibrium is to *assimilate* the conflicting contextual information into our model of the world. However, if this adjustment does not work because the new information is not possible to fit in, it is likely that we engage in an *accommodation* process. Accommodation involves making qualitative changes in our prior model of the world. Thus, from a constructivism stance learning and development are dynamic processes through which we create adapted responses to an ever-changing environment (Piaget, 1975/1985). In this sense, conflicting experiences in which there is a discrepancy between our way of creating meaning of reality and the results we get, are desirable in that they provide individuals with an opportunity to review and fine-tune our current ways of making meaning and in such a way learn and develop (Kunnen & Bosma, 2000).

From a dynamic systems perspective, the former process can be rephrased as follows. As a first premise, human beings are characterized by the stability of our patterns of making meaning. With this in mind, learning and development might arise when some internal or external factor challenge those patterns so that there is the opportunity to re-organize them on a more complex level (Thelen, 2005). Thus, contextual variability increases the likelihood of cognitive conflicts to occur and in such a way offers individuals room for exploration and adaptation to new situations (Thelen & Smith, 1994; Van Geert, 1994).

2.1.2. Epistemological development

Epistemological development has been defined as the transformation of our way of experiencing the world (Keeney, 1983). This phenomenon has been widely investigated in adults throughout their university years, leding to various interesting theoretical models (e.g. Baxter Magolda, 1992; Perry, 1970). Constructive de-

velopmental models acknowledge that there are common patterns in the development of individuals' ways of making meaning as we mature, and that moving from one stage to the next one involves a transformation in how we understand ourselves, the world, and the relationship between both. Specifically, throughout our development we are thought to become increasingly aware of our own and others' beliefs, values and interpersonal relationships (Kegan, 1982, 1994).

2.2. Successful adult development: a specific epistemological shift

2.2.1. Nowadays society's demands to adults' minds

According to Hoare (2011), "development and learning occur in a complex adult, one who adapts the self and the environment to changing needs and shows the promise of changing positively in a number of qualitatively unique modes" (p. 8). The changing needs arising from nowadays society are characterized by interconnectedness, scientific and technological breakthroughs, and a knowledge-driven economy. In this context, the competences that adults need to develop in order to perform successfully as workers, learners, parents, and citizens, are becoming increasingly complex (Drago-Severson, 2011; King & Siddiqui, 2011). Adults are requested for innovation, self-management, personal responsibility, and self-direction (Kegan & Lahey, 2009). Underlying these competences is the need for adults to undergo a specific type of epistemological shift. In what follows we address three different –and related– ways to conceptualize such shift, which are particularly relevant in the context of this thesis: 1) self-authoring mind; 2) transformative learning; 3) conception of learning as construction.

2.2.2. Toward a self-authoring mind that enables for self-direction

Underlying the development of the referred competences, there is the need for adults to move from an uncritical reliance on external sources of authority to the internal authorship of their identities, relationships, and beliefs (Baxter Magolda, 2001; Kegan, 1994) or, in Kegan and Lahey's (2009) terms, to move from a socialized mind to a self-authoring mind. While the socialized mind is shaped by the expectations of our environment, the self-authoring mind is able to take a step back from that environment in order to generate an internal authority that makes choices about external expectations. Thus, the emergence of the capacity to intentionally coordinate one's beliefs, values and interpersonal loyalties marks the transition toward individuals' self-direction. Specifically, self-directed individ-

uals demonstrate critical thinking and individual initiative, are able to set their own goals and standards and use resources to pursue them, as well as assume responsibility for their own learning and are able self-evaluation (Grow, 1991).

2.2.3. Toward transformative learning

Kegan (2000) points out that the transition toward a self-authoring mind is the specific epistemological shift that transformative learning theory calls for. Transformative learning theory (Mezirow, 1978, 1991, 2000; Mezirow & Associates, 2000) describes adult learning as a process of examining, questioning, and revising our understandings, assumptions and expectations about the world –our *frames of reference*– in the light of new experiences which challenge such assumptions and enable us to understand the world from a more complex perspective (Mezirow, 2000). According to Mezirow (1997), our frames of reference are initially shaped by social and cultural influences, such as parents and peers, but are open to modification when we are able to critically reflect on –or *reframe*– the assumptions upon which our habits of mind are based. Thus, the focus of transformative learning theory would be "on how we learn to negotiate and act on our own purposes, values, feelings, and meanings rather than those we have uncritically assimilated from others to gain greater control over our lives" (Mezirow, 2000, p. 8).

2.2.4. Toward a conception of learning as construction

Adults' different stages of epistemological development are related to qualitatively distinct ways of understanding learning. Van Rossum and Hamer (2010) propose a six stage model on how individuals' learning and teaching conceptions develop, from learning as increasing knowledge –learning conception 1– to learning as growing self-awareness –learning conception 6. These authors relate every of their six learning conceptions with the different epistemological stages of models such as Kegan's (1994). According to Van Rossum and Hamer, the most challenging epistemological shift that a person can undergo involves crossing the "great divide" from thinking about learning in terms of reproductive application –learning conception 3– toward thinking about learning in terms of knowledge (re)construction –learning conception 4. Learning conception 4 entails that students think by themselves, make connections to achieve understanding, and use criteria and evidences to support their opinions. These authors pose that coming nearer to the learning conception 4 goes hand in hand with the epistemological transition to a self-authoring mind and, we add, with transformative learning.

2.3. Higher education role in adults' epistemological development

2.3.1. Need for an ontological turn in higher education

For a long time, the most extended educational model has been based on teachers' transmission of knowledge and students' reproduction of such knowledge. This model has perpetuated students' unsophisticated learning conceptions and has maintained their dependence on external authority (Doll, 2012). As a response to this situation, there has been a great demand for the need of an ontological turn in higher education in such a way that it trascends its exclusive focus on knowledge and skills acquisition to support students in their epistemological development (Barnett, 2004; Dall'Alba & Barnacle, 2007). Underlying this claimed turn, there is a constructivist approach to learning (Bruner, 1966; Vygotsky, 1930/1978).

2.3.2. Constructive developmental learning contexts

Higher education settings can enhance students' epistemological development by generating contexts that challenge students' taken-for-granted frames of reference in such a way that they might be reexamined (Kegan, 1994; Mezirow, 2000; Piaget, 1952). In this quest, there is the need of providing students a balanced system of challenges and supports (Baxter Magolda, 2000; Drago-Severson, 2011). This has been also referred to as *holding environment*, namely an environment that that both provides welcoming acknowledgment of where the individuals are developmentally and fosters their evolution (Kegan, 1994; Winnicott, 1962). Likewise, in the quest of triggering learners' development the establishment of authentic relationships among students and teachers (Brady, 2014) has been taken as a key element. Providing more detail on how to generate constructive developmental learning contexts, Slavich and Zimbardo (2012) posit that transformative teaching should be based on constructivist principles and organized around collaborative, experiential, and problem-based learning methodologies.

2.3.3. Experiential learning and collaborative learning

Two constructivist teaching methodologies that we find particularly meaningful when it comes to promote students' epistemological development are process-oriented experiential learning and collaborative learning. On the one hand, a process-oriented experiential learning model (McWhirter, 2002) proposes that teaching commences with the students' exploration of their intuitive understandings about the issues under study. After that, formal theoretical models are provid-

ed by the teacher so that they can be compared with students' personal and group experiences. In this way, experiential learning is assumed to increase students' awareness of their own epistemological assumptions, what enables their re-examination. On the other hand, collaborative learning (Iborra, García, Margalef, & Samaniego, 2009) aims to promote learning by doing, interacting and sharing ideas with other learners. This facilitates that students acknowledge others' perspectives and frames of reference, what might lead to revise and critically questions their own perspectives and thus enable the transition from externally to internally grounded decision making (Baxter Magolda, 2000; King & Siddiqui, 2011).

2.4. Students' emotions in constructive developmental learning contexts

2.4.1. Challenging learning contexts and unpleasant emotions

The experience of conflicting situations has been usually associated to individuals' emotional upset, and particularly to the experience of negative emotions (Antonacopoulou & Gabriel, 2001; Arpiainen, Lackéus, Täks, & Tynjälä, 2013; Frijda, 1986; Inzlicht, Bartholow, & Hirsch, 2015). As for learning contexts that aim to promote students' epistemological transition toward a self-authoring mind, they are very often taken by students as unsettling and threatening, eliciting emotions such as confusion, frustration, anxiety, or uncertainty (Formenti & Dirkx, 2014; McEwen, Strachan, & Lynch, 2010; Poutiatine, 2009; Dirkx, 2011).

2.4.2. Unpleasant emotions as triggers for epistemological development

It has been widely acknowledged that emotions should be considered an integral part of our meaning-making processes (Dirkx, 2006, 2008; Värlander, 2008). Not in vain, they focus our attention and provide guidance and support for adaptive action in our environment (Damasio, 1999; Frijda, 1988; Lazarus, 1991). As for unpleasant emotions, some authors have been argued that they are bad for learning (see for example Noddings, 2003). However, Sansone & Thoman (2005) point out that it is the dynamic patterns of positive and negative emotions at certain points in time in a given context what can be good or bad for learning. Furthermore, unpleasant emotions can be taken as drivers for transformative learning in that they might: 1) motivate us to question and revise our ways of making meaning (Kegan, 1994; Kunnen & Wassink, 2003); 2) enable us to identify our obsolete assumptions, which in such a way can be reflected upon (Mälkki, 2010).

2.5. An idiographic and process-oriented approach to the study of developmental phenomena

2.5.1. Idiographic and process-oriented approaches: a historical overview

2.5.1.1. From nomothetic to idiographic approaches

Classical developmental theorists such as Piaget and Vygotsky claimed that in order to understand any phenomenon its developmental process had to be investigated (Van Geert, 1998). Despite this initial emphasis on the study of processes, in the 1960s psychology moved to a nomothetic approach in its quest to be regarded as scientific (Conner, Tennen, Fleeson, & Barrett, 2009). The nomothetic approach uses sample-based methods to compare the product of development in groups by taking a series of snapshots at different points in time. In doing so, it underestimates wholes and relationships and ignores the processes inherent to development (for this argument, see Toomela, 2007; Valsiner, 2009). As a response to this obvious limitation, in the two last decades there has been a claim for the need for a theoretical and methodological paradigm shift on the study of development. This has lead to the emergence of the so-called *developmental science* (Lerner, 2006; Overton, 2013; Van Geert & Van Dijk, 2015). This new developmental science focuses on the qualitative, dynamic, and holistic nature of psychological phenomena and proposes the adoption of process-oriented, idiographic and systemic approaches that enable to study both individuals and complex wholes and relationships (Molenaar, 2004; Ohlsson, 2007; Valsiner, 2014).

2.5.1.2. Interpretive turn: toward a qualitative approach

Around the middle of the 20th century, and after a predominance of positivist and postpositivist approaches to research, the increasing influence of disciplines such as hermeneutics and phenomenology, led to a epistemological shift known as the "interpretive turn" (Rabinow & Sullivan, 1979). This shift emphasized the intersubjective nature of social reality, which is constantly constructed and re-constructed by individuals' meaning-making processes in dialogical interaction with their contexts. Thus, underlined by a constructivist epistemology and influenced by various interpretivist theories, social research led to the flourishment of *qualitative research* (Denzin & Lincoln, 2000).

2.5.2. Two idiographic and process-oriented research approaches

Two approaches that are suited to study individuals' developmental experiences from an idiographic and process-oriented perspective are the qualitative approach and the dynamic systems approach.

2.5.2.1. A qualitative approach

Qualitative research focuses on understanding the way in which individuals make sense of our experiences (Denzin & Giardina, 2015). In doing so it adopts: 1) an *emic* –from the inside– perspective as a path to explore the quality of individuals' meaning-making processes and its dynamics as a process over time; 2) an idiographic stance by studying a relatively small number of individuals or situations. Some of the features defining qualitative research (see Sparkes & Smith, 2013) are its focus on textual data, which enable individuals to express their thoughts and beliefs in their own terms, and the resort to purposeful sampling, which allows the focus on information rich cases. Considering the former, a qualitative approach is particularly suited to investigate adults' learning and developmental experiences (e.g. Lim, 2011) and has been widely used in epistemological research (e.g. Baxter Magolda, 2001; Van Rossum & Hamer, 2010) and on the transformative learning arena (Merriam & Kim, 2012). Likewise, its potential to investigate in detail the quality of the emotional experience of such adults is clear.

2.5.2.2. A dynamic systems approach

Dynamic systems theory investigates development as it unfolds through multiple interactions between individuals and their environment (Thelen, 1989; Van der Maas, 1994; Van Geert, 1994; Kunnen, 2012). Starting from the assumption that individuals' development is characterized by change, its study requires the observation of change while it is occurring (Fogel, 1990; Siegler, 2006; Van Geert & Van Dijk, 2015). In doing so, individual micro developmental trajectories are taken as the unit of analysis and examined through as many repeated measurements as possible over time (Yan & Fischer, 2007). A dynamic systems approach looks particularly suitable for the study of emotions, as they are processes that evolve over time (Barrett, 2009; Fogel et al., 1992; Frijda, 2009). In doing so, a focus on within-person emotional patterns of change over time has shown to be relevant (e.g. Kuppens, Oravecz, & Tuerlinckx, 2010; Larsen, Augustine, & Prizmic, 2009).

3. Overview of the thesis

3.1. Scope of the thesis

3.1.1. Framing assumptions

The present doctoral thesis is rooted in the following premises –which have been developed further in the preceding theoretical framework:

- Learning and development are dynamic processes that occur in response to contextual demands that challenge individuals' ways of meaning-making and encourage them to create more complex and adapted ones (Piaget, 1975/1985; Kunnen & Bosma, 2000). In this sense, cognitively destabilizing situations are taken as potentially developmental (Piaget, 1952; Thelen, 2005).

- A main goal of higher education is to support adult students in the development of increasingly complex ways of making meaning of themselves and their surroundings. This has been named epistemological development (Perry, 1970).

- A key epistemological shift for adult students is their transition toward a self-authoring mind (Kegan & Lahey, 2009) or the kind of transformative learning which is essential for them to manage the complex demands arising from the current society, such as being self-directed (Mezirow, 2000; Kegan, 2000). Related to the experience of this epistemic shift is students' transition from a conception of learning as knowledge reproduction to a conception of learning as knowledge construction (Van Rossum & Hamer, 2010).

-To promote the transition toward a self-authoring mind, there is the need for constructive developmental educational approaches that offer students a balanced system of challenges and supports (Baxter Magolda, 2000; Cranton, 2002) and are based on methods such as collaborative and experiential learning (Slavich & Zimbardo, 2012).

- Learning contexts that lead students to question their taken-for-granted and long-held ways of creating meaning –which enable them to keep coherence and continuity in their daily experiences– use to be threatening and therefore associated to the experience of unpleasant emotions such as confusion, anxiety or frustration (Formenti & Dirkx, 2014; Poutiatine, 2009).

- Emotions are essential in our meaning-making process, since they focus our attention and provide us guidance for adaptation to our environment (Damasio, 1999; Frijda, 1988). Specifically, unpleasant emotions might motivate us to reduce the discrepancy between our known ways of making meaning of reality and the contextual demands (Kunnen & Wassink, 2003) and enable us to identify our obsolete assumptions (Mälkki, 2010).

- When it comes to investigate development, learning, and related phenomena –such as individuals' emotional experiences– a process-oriented approach that focuses on how they unfold over time at the individual level is needed (Overton, 2013; Van Geert & Van Dijk, 2015). In this quest, qualitative methods (Denzin & Giardina, 2015) and dynamic systems methods (Van Geert, 1994) are very suited.

3.1.2. Aims of the thesis

The main aim of the present thesis is to investigate how higher education students emotionally experience and manage the challenging demands arising from experiential and collaborative learning contexts attempted to facilitate their epistemological development. In relation to the former, this thesis also aims to investigate what are the potential epistemological changes that students undergo in the learning experiences under research. Likewise, the thesis aims to shed light on how the mentioned constructive developmental training methodologies might effectively contribute to the promotion of students' transition toward increasingly complex meaning-making. The former aims were specified in the three empirical studies that compose this thesis –for more details, see the summary of the thesis as well as the complete studies in chapters 2, 3, and 4.

3.1.3. Methodological approach

In order to achieve the referred aims, we adopted an idiographic and process-oriented approach (Ohlsson, 2007). Specifically, we resorted both to qualitative methodology (Denzin & Giardina, 2015), which aims to understand how individuals make meaning of our experiences, and to dynamic systems methods (Kunnen, 2012), which enables the follow-up of individuals' developmental and learning trajectories through the collection of time-series data.

3.2.   Structure of the thesis

The present doctoral thesis is composed by three main parts:

(I)   The present introduction –chapter 1– that encompasses a contextualization of the thesis, a general theoretical framework, and a thesis' overview in terms of its scope –framing assumptions, aims and method– and its structure.

(II) Three empirical studies that have been published as articles in journals in the fields of education and psychology –chapter 2, chapter 3, chapter 4. Within this part, two brief transition sections–one between chapter 2 and chapter 3, another one between chapter 3 and chapter 4– describe the connection between the studies.

(III) A general discussion and conclusion –chapter 5– which aims to provide an overview of the research motivation and context of the thesis, summarize the findings, review and integrate theoretical and methodological implications, address limitations, indicate future research lines, and make concluding remarks.

Additional sections of the thesis are: preface, epilogue, references, an author's biography and list of publications, and acknowledgments.

The decision of structuring this thesis in three interrelated empirical studies, instead of choosing a monographic format, has two main rationales.

On the one hand, it has allowed me to engage in a more genuine research trajectory in which what one learns in one study can be embedded in the next. Thus, the insights and limitations identified in one study led the way to considerations in further specific research aims and designs. Likewise, I have had the opportunity to interact in different research settings with different research participants.

On the other hand, the publication of these studies in the form of articles addressing the standards of scientific journals of my field, has brought me closer to the real challenges that researchers encounter when aiming to disseminate their findings. In this sense, it has helped me to become familiar with the publication process, including tasks such as the submission and the revision of manuscripts.

In any case, I think that a thesis conceived as a compendium of articles, which is in line with the most extended format in European universities in recent

years,[1] facilitates the transition from being a PhD student to becoming a full researcher. Specifically, it enables PhD students to become more prepared to face the demands that university poses to its members in order to maintain their status: the publication of their research findings in journals of international standing.

As for the empirical studies, it must be noted that they vary in their length because of the guidelines provided by the journals in which they have been published. In terms of the authorship of the studies, the three of them are first-authored by me. The second author –in the study 1– and the second and third authors –in the study 2 and study 3– are respectively Dr. Alejandro Iborra, my thesis supervisor, from the University of Alcalá in Spain, and Dr. Saskia Kunnen, an invaluable support in my research during the three research stays that I have enjoyed at the University of Groningen in the Netherlands.

Finally, it must be noted that, although my native language is Spanish, the thesis is written in English.[2] This can be explained by three reasons: first, I wrote the articles –empirical studies– in such language because I submitted them to international journals; second, I found coherent to write the complete thesis in the language in which almost all the scientific literature that I have been reading over the last years is written; third, I am aware that in this way the thesis will potentially reach more readers. However, I provide an Spanish summary of the thesis, so that readers who do not master English –both researchers and some of my beloved relatives and friends– can get a flavour of my work. Likewise, I provide an Spanish version of the acknowledgments section, in which I appreciate the strong support that I have received by non-English speakers throughout the elaboration of this thesis.

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[1] It is worth mentioning the cases of universities in the Netherlands, which I am particularly familiar with. It must be noted, also, that this format of doctoral thesis as a compendium of articles is still fairly new in the Spanish academia in general and at my university in particular.

[2] I highlight this point because in Spain it is still not very usual to write –and to defend– the doctoral thesis in English.

Part II

Empirical studies

Chapter 2

Understanding and promoting self-direction in freshman and master's students: a qualitative approach

Gloria Nogueiras, Alejandro Iborra

Department of Educational Sciences, University of Alcalá (Spain)

Chapter 2

Understanding and promoting self-direction in freshman and master's students: a qualitative approach

Abstract

This study investigates how the transition toward self-direction is experienced and facilitated in 2 semester-long courses in teacher education degree programs and the differences in such a transition for freshman and master's students. The thematic analysis of the written self-assessments of 8 illustrative examples enabled the detection of (a) students' initial upset in the face of demands for internal authority; (b) the support of the teacher and peers in managing that upset; and (c) the students' shift toward more complex conceptions of learning and teaching, including evidence of increasing self-direction. These findings shed light on the potential of intentionally designed learning contexts for promoting students' epistemological development. The similarities found between freshman and master's students' experiences when managing the demands of internal authority emphasize the underutilization of the most extended teaching practices in higher education.

Keywords: self-direction; higher education; epistemological development; teacher education; qualitative methods.

1. Introduction

In recent decades, major changes in Western societies have resulted in the demand for individuals to undergo qualitative changes in their ways of making sense of life. Globalization, interconnectedness, scientific and technological breakthroughs, and a knowledge-driven economy all require adults to develop complex competences such as being adaptable or being able to manage uncertainty. What underlies this is the need for increasingly complex ways of making meaning (Kegan, 1994; Taylor & Cranton, 2013) or epistemological development—a phenomenon widely studied from a constructive developmental perspective (for a review, see Van Rossum & Hamer, 2010).

What society today demands of adults is a shift from an uncritical reliance on external sources of authority to the internal authorship of their identities, relationships, and beliefs (Baxter Magolda, 2001; Kegan, 1994) or, in Kegan and Lahey's (2009) terms, a shift from a socialized mind toward a self-authoring mind. While the socialized mind is shaped by the definitions and expectations of our social environment, the self-authoring mind is able to take a step back from that environment in order to generate an internal authority that evaluates and makes choices about external expectations. A self-authoring developmental stage is related to the possibility of self-directing one's learning, which involves the development of critical thinking and individual initiative, the setting of one's own goals and standards, the use of resources to pursue these goals, the assumption of responsibility for one's learning, and the acquisition of the competence of self-evaluation (Grow, 1991).

When facilitating the transition toward self-direction, higher education can play an essential role by providing students with learning experiences that require them to go beyond a socialized developmental stage (Baxter Magolda, King, Taylor, & Wakefield, 2012; King & Siddiqui, 2011). For students accustomed to relying on external authority, however, these demands can initially make them feel "in over their heads" (Kegan, 1994). In this respect, it is worth noting that the movement toward internal ways of making meaning does not imply a mere increase in individuals' behavioral repertoire but rather a qualitative change in their way of knowing (Kegan, 2000). This kind of change, inherent to the so-called transformative learning, involves examining and questioning one's current assumptions in the light of new experiences and then creating more accurate assumptions in order to understand the world from a more complex perspective (Mezirow, 2000). One case in point is the need for students to cast aside the conceptions of learning and teaching that they have built on the basis of previous experiences and usually taken for granted. In this regard, Van Rossum and Hamer (2010) highlight the fact that the greatest challenge for students is to shift from conceiving learning in terms of quantity and knowledge reproduction toward conceiving it in terms of quality and collaborative knowledge construction.

Although there are still many higher education environments that do not provide learners support in order to enhance their progressive internal meaning making (for this argument, see Barber, King, & Baxter Magolda, 2013), there is also evidence of an increasing interest in identifying models to guide educational practice in the promotion of such a transition (see, e.g., Baxter Magolda, 2012;

Cranton & Wright, 2008; Pizzolato, 2008). As for empirical research on this topic, well-known studies have been carried out by Baxter Magolda (for recent examples, see Barber et al., 2013; Baxter Magolda et al., 2012) and by Pizzolato (see, e.g., Pizzolato, Nguyen, Johnston, & Wang, 2012). Most often, studies have approached the shift of university students toward internal authority as a result of merely taking higher education courses over a period of 4 to 5 years. However, as far as we are concerned, only a few studies have attempted to study the transition toward self-direction in the context of specific learning experiences that sought to deliberately facilitate it (for a related example, see Sze-yeng & Hussain, 2010).

As higher education teachers, we are deeply committed to promoting students' self-direction in the developmental and educational psychology courses that we teach at different levels of teacher education degree programs. Within this context, in the present study, we aim (a) to investigate how the transition toward increasing self-direction occurs throughout a semester-long course and how that transition may be different for freshman and master's students and (b) to investigate how the teaching methodology proposed can facilitate this kind of epistemological transition.

2. Method

2.1. Research context: participants and training methodology

This study focuses on two semester courses in two teacher education degree programs: a course on developmental psychology for freshman students earning a degree in primary education and a course on developmental and educational psychology for postgraduate students earning a master's degree in secondary education. Both courses were taught at a Spanish university. They were taught by the second author of this paper. The first author was a participating observer at the face-to-face sessions. The undergraduate course was attended by 59 students and taught over 42 hr in 28 sessions; the master's course was attended by 56 students and taught over 21 hr in 14 sessions.

The two courses had many common traits, not only with regard to their field of study but also with regard to their underlying epistemology, the teaching methodology adopted, and the competences they aimed to develop. The courses adopted a constructivist epistemology based on the active role of learners (Piaget, 1975/1985; Vygotsky, 1930/1978). Within this framework, of particular relevance for our purpose in promoting students' self-direction are the ideas of participatory

appropriation (Rogoff, 1995) and dialogical inquiry contexts (Anderson, 1997). The former encompasses the process of the learner's transformation through his or her involvement in activities where a greater sense of autonomy, reflection, and appropriation is achieved. The latter highlights the need for collaborative relationships between learners and teachers when undergoing such a transformation.

These ideas were embodied in the teaching methodology of the courses, which was based on collaborative learning (Iborra, García, Margalef, & Pérez, 2009) and experiential learning focused on the process (McWhirter, 2002) approaches. The face-to-face classes consisted of exercises dealing with the analysis of different contents, such as case studies, brief texts or videos, and with participants' own experiences, such as analyzing students' transitions as they took place during a class, creating an emotional bond with a new object, exploring how one's teaching differs in accordance with one's familiarity with the content taught, and so forth. These collaborative and experiential exercises were interspersed with teacher dialogue and discussion with the whole group of students when theoretical concepts were introduced in order to encourage students to make connections with their own personal experiences. In addition to this, a variety of materials, such as texts, videos, presentations, or links to web pages, were available for the students to explore. Moreover, at the beginning of the course, it was suggested to students that they created an optional personal blog where they might write about whatever they deemed appropriate as the course progressed, with a view to encouraging their engagement in reflection and self-assessment processes.

As for the structure of the sessions and the courses themselves, it should be stressed that this was not made explicit to the students at the beginning. Rather, this structure was conceived as something that the students had the opportunity to construct actively in the light of the connections that they were able to make as the sessions progressed. In this respect, the courses had a marked optional component that permitted the students to decide how to get involved in the activities, the sessions, or the whole course.

The competences that the courses sought to develop were the analysis and the interpretation of cases from a developmental and educational perspective and, in this respect, the analysis of students' own learning and development throughout the courses by making use of theoretical concepts such as trajectory, transition, turning point, variational and transformational change, orthogenetic principle, epigenesis, accommodation and assimilation processes, feedforward and feedback,

critical incidents, implicit conceptions, zone of proximal development, and so forth. Ultimately, the courses sought quite intentionally to generate different contexts of exploration in which students could become more sensitive to human developmental processes and better disposed to reviewing and challenging their current forms of meaning making.

2.2.   Data collection

In qualitative research, individuals' meanings are fundamental for understanding how they make sense of their own experiences (Denzin & Giardina, 2015). In order to gain knowledge of those experiences, textual data are optimal in that they contain the expression of individuals' thoughts and the explanation of their actions in their own words (Avis, 2005). Accordingly, at the end of the courses, we asked the students to complete written self-assessments. For our purposes, self-assessment provided a context for the students to reflect on their own learning processes over a period of around five months and at the same time gave them the opportunity to practice and supply evidence of their degree of self-direction (for further details, see Nogueiras, Herrero, & Iborra, 2017). In this sense, we expected the theoretical and processual distinctions learned throughout the courses to equip students to put into more effective practice the competence of self-analysis from a developmental perspective. In line with our courses' optional component, we asked the students to elaborate on their self-assessments as they deemed most appropriate. Nonetheless, it was suggested that they referred to issues such as: what they had learned in terms of concepts, competences, or ways of learning; their experience of peer activities; and the quality of and the reasons for the degree of their engagement throughout the course.

2.3.   Sample

Our aim in comparing freshman and master's students' experiences was to explore whether they responded differently to a similar learning context in light of their distinct experiences of prior academic socialization and their expected different developmental features and needs. In this regard, while freshman students at the start of their university studies are transitioning toward a new stage in their lives, master's students are preparing themselves for entering the professional world and leaving behind formal training. Thus, master's students were expected to be more prepared than freshman students to make use of their own personal resources in order to face demanding learning situations; in other words, master's students were

expected to self-direct themselves in more complex ways than freshman students.

For this study, we selected four freshman students (three women; age range of 19–23; average age of 20) and four master's students (two women; age range of 28–30; average age of 29.75) who were considered to be optimal examples of the transition toward increasing self-direction at the end of the courses under research. The greatest evidence of this consisted of the degree of complexity and elaboration of their final self-assessments. Additional evidence was the quality of these students' participation throughout the courses, both in the face-to-face classes and in virtual environments such as the blog. The students were informed of the purpose of this research and given guarantees regarding the confidentiality of the information gathered. In the following sections, we use pseudonyms when referring to them in order to ensure their anonymity.

2.4.   Data analysis

The qualitative approach to making sense of students' self-assessments was operationalized through a thematic analysis performed with the aid of NVivo software, Melbourne, Australia (QSR International Pty Ltd., 2008). The analysis was run by the first author of this article. The second author played the role of a critical friend (Foulger, 2009) who took part in the ongoing process of analysis and in the definition and discussion of the themes identified. The thematic analysis was carried out by taking as guidelines the phases proposed by Braun and Clarke (2006). To begin, the students' self-assessments were read thoroughly in order to make an initial appraisal of significant patterns of meaning. Then, initial codes were generated inductively from the students' texts in such a way that, rather than imposing themes on them, the texts were explored in search of the themes that were important for the students. Next, in order to facilitate the sorting of the different codes into tentative themes—a process requiring a more deductive approach to our data— conceptual maps were created. The refinement of the conceptual maps made it much easier to identify the main themes progressively and to subsequently review, define, and name them. Finally, the analysis was refined in the process of drafting the findings report, which is presented in the next section.

3. Findings

The analysis of the students' self-assessments enabled three themes to be identified: (a) the experience of some initial upset when faced with the demands of

internal authority underlying the courses under research; (b) the support of the teacher and peers in managing that upset; and (c) the students' transition toward more complex conceptions of learning and teaching, including evidence of increasing self-direction. In the following sections, these themes are presented and illustrated with excerpts taken from the students' self-assessments.

3.1.   Initial upset. *Why doesn't the teacher tell me clearly what I am expected to do?*

The courses' methodology proved to clash with the students' expectations founded on transmissive teaching models where the emphasis was on knowledge reproduction and closed guidelines were provided by teachers. This is noticeable in the following excerpts:

> • *The teacher no longer explains the lesson or expects us to memorize it. Now he wants us to find and form that lesson for ourselves, to make it ours, to build it on our own* (Sally, freshman student).

> • *Everything is very different from what we were used to. It seems that no one is assessing us, that everything is in our hands* (Nadia, freshman student).

> • *I expected that the teacher, the expert, would come onto the stage and transfer his knowledge to us, simplifying it so that we swallowed and digested it* (Lana, master's student).

> • *I expected to understand very well what I had to do, that the teachers would spell out the objectives and the activities so that we did them as well as possible in order to get a good degree* (Jake, master's student).

Thus, when first immersed in a constructivist and open-structured learning context that put demands of internal authority on them, both freshman and master's students experienced some upset characterized by the sense of feeling lost, the impression that they were wasting their time instead of learning, or a concern about the appropriateness of their performance in relation to the expected external assessment. Upset was accompanied by puzzling emotions, such as disorientation, insecurity, or frustration. The following excerpts exemplify this:

> • *The first few days we felt quite lost. There weren't exams or deadlines, but we were free to look for information and learn on our own* (Sally, freshman student).

> • *At the beginning I felt frustrated. I felt that reflecting on the blog, reading texts or attending classes was useless. It was useful for me, but not for the teacher. I believed that it wouldn't help me to get a good degree* (Nadia, freshman student).

> • *The "non-master class" sessions disoriented me, without the pressure of assignments or exams, without a syllabus with delimited topics to be learnt in order to pass, without knowing how you [the teacher] were going to evaluate us* (Edith, master's student).

3.2. Supportive resources. *New ways of taking advantage of learning companions*

In the process of facing the new demands arising from the courses, students referred to both the teacher and their peers as supportive resources. As far as the teacher was concerned, the students highlighted his facilitating attitude, as shown by his ability to generate a context of confidence, empathy, and symmetry and by his respect for individual differences. The following excerpts refer to these qualities:

> • *He made the effort to get to know us and to find out what we wanted. He understood that all this was new for us and never forced us to go quicker. He adopted a close position and made us feel comfortable* (Sally, freshman student).

> • *By accepting our way of understanding without feeling compassion, he set the foundations for our initial mental stage. In this way we could establish a dialogue at the same level as well as bases for building further* (Lana, master's student).

As for peer work, both freshman and master's students highlighted its value in helping them consider others' ways of thinking, which in turn enabled them to question and revise their own. This is illustrated in the next excerpts:

> • *The contrasts between peers' opinions allowed you to take other points of view that you might have not taken into account before and that led you to broad knowledge* (Aaron, freshman student).

> • *The different ways of thinking of every student made me reconsider my own points of view, accept the arguments of others' points of view and change some of my preconceptions* (Edith, master's student).

Unlike freshman students, master's students were able to generate an informal learning community initiated by the network of their personal blogs. We regard this as evidence that they derived greater benefit from peer groups as a resource for learning in greater autonomy without the teacher. The following excerpts refer to the potential of this learning community:

> • *Little by little, we formed a network of tools, interchange, complicities and concerns which was very positive for creating the conditions for good learning and collective responsibility (*Adam, master's student).

> • *Everyone contributes what they think may favour their peers. We progress very quickly. There is a leap in quality in a process which doesn't require the constant presence of the teacher and which is supported by individual and collective inquiry* (Jake, master's student).

3.3. Increasingly complex conceptions of learning and teaching. *Seeing the former landscape from a vantage point of view*

In their interaction with the new teaching methodology, the students' initial conceptions of learning and teaching were questioned and evolved over the courses. In contrast to learning conceptions based on knowledge reproduction, students furnished evidence of a new understanding of learning as the application of knowledge. In this regard, freshman students stressed the value of making connections between theoretical content and reality:

> • *Seeing theory reflected in a practical event is what makes us understand it. Theoretical knowledge is useless if we don't know to apply it* (Sally, freshman student).

For their part, master's students were more subjective when describing the application of theory in relation to specific personal experiences, as is clear from this excerpt:

> • *My switch turned on one Saturday afternoon, when I was in front of the TV watching a film. It was the application of what I had learnt in an everyday situation that caused it. I had learnt things and I was using them outside classroom, in my daily life* (Lana, master's student).

Further evidence of students' modifying their initial conceptions of learning and teaching was their awareness that learning was not simply an externally imposed activity to be assessed by quantifiable products:

> • *If I learnt something on this course it is that the product is not as important as the process itself* (Nadia, freshman student).

> • *The most important thing in this course has been to learn that it is not grades which matters, but learning for pleasure and not because you have to* (Anne, freshman student).

> • *Learning because you have to is not the same as choosing what you want to learn. As I discovered in this semester, it is not "what" but "how"* (Lana, master's student).

These excerpts provide evidence of the students' transition toward more complex conceptions of learning and teaching, a transition that was directly connected to our deliberate efforts to generate a context for enhancing their self-direction. The following excerpts, which highlight a greater sense of agency, a tendency toward self-examination, and an engagement in self-assessment processes, show how, over the course, the students came increasingly to author their own learning processes:

> • *I've been a part of my learning process, knowing where I was, my doubts, what I knew, making choices, asking when I did not understand and reflecting when sharing ideas with peers* (Aaron, freshman student).

> • *The embodiment of knowledge in my personal life led me to ask myself questions about myself, about the "whys" in my life* (Anne, freshman student).

> • *I started to sense that I was expected to develop personal initiative, a commitment not to the teacher or the course, but to myself and my own learning process* (Jake, master's student).

> • *The self-assessment is meaningful in itself as a reflection for and about oneself, as a dialogue with our "inner self" and this aim has been attained. Taking this course has meant a redefinition of my personal goals and achievements* (Lana, master's student).

> • *The activities that I have got involved in have given me the capacity to generate my own criteria and my own learning preferences* (Adam, master's student).

3.4.   Overview of findings

The themes identified shed light on the experiences of freshman and master's students when successfully managing a learning context that encouraged them to develop more complex ways of making meaning than they initially had. Both freshman and master's students experienced some initial upset as a result of the mismatch between their learning and teaching conceptions and the demands of a collaborative and experiential learning methodology that required increasing self-direction of them. A horizontal relationship with the teacher and peer work became key resources when facing these new demands. The students responded actively to the initial upset by revising their initial understanding of learning and teaching and thus moving toward more complex conceptions. One instance of this transition was that the students became aware of the fact that the courses were intended to enhance their self-direction and acted accordingly. When comparing freshman and master's students' experiences, we did not find as many differences as expected. However, master's students seemed to have reached a more consolidated stage in their conception of learning as application, as demonstrated in their more autonomous resort to peer work.

4.   Discussion

Intended as it was to promote self-direction, the methodology of the courses under research entailed new demands for students whose conceptions of learning and teaching had, for the most part, been built in transmissive, hierarchical, and content-based learning settings. Learning contexts that lead students to question their accepted ways of knowing tend to be unsettling (Apte, 2009; Cranton, 2002; McEwen, Strachan, & Lynch, 2010) and tend to elicit emotions such as fear, grief, loss, regret, or anger (Dirkx, Mezirow, & Cranton, 2006). In this line, Cranton (2002) and Devís-Devís and Sparkes (1999) offer the example of two students, Andrew and Guillem, whose ways of understanding learning were deeply challenged in the context of educational programs aimed at enhancing their internal meaning making. As an initial response, they felt frustrated and angry and regarded the learning context as useless. This kind of reaction is similar to our own students' initial upset, characterized by disorientation, insecurity, frustration, and doubts about their performance when faced with a learning context where, unexpectedly, no delimited topics, deadlines, or exams were provided by teachers.

An upsetting experience like the one described by our students might,

however, be desirable in that it provides them with an opportunity to review their current ways of making meaning. Piaget (1975/1985) described development as a combination of assimilation and accommodation processes in response to conflicting contextual demands that destabilize individuals' ways of understanding. In this regard, our participants were examples of students who underwent accommodation processes in response to the initial upset associated with the teaching methodology. From a dynamic systems view, the initial upset experienced by the students could be understood as the trigger for a transition (Kunnen & Van Geert, 2012) in that it offered students room for exploration and adaptation to the new demands arising from the learning context.

The students' transition toward internally driven ways of making meaning appeared to not be trouble free. In this sense, although we cannot teach self-direction directly, we can create conditions that facilitate the development of such a competence by providing students with an ever-changing balance of challenge and support (Cranton, 2002; Taylor, 2008). Our students acknowledged this when they stressed the role of the teacher and their peer group as supportive resources in their progressive transition toward internal authority (Pizzolato, 2003).

As for the teacher, the students valued the fact that he acknowledged their initial ways of making meaning, which is in line with a developmentally tiered approach where effective challenges involve taking, as a starting point, students' current developmental capacities (Baxter Magolda & King, 2004; Kegan, 1994). Similarly, the students reported that the teacher was willing to provide them with support when necessary. In this regard, Cranton and Wright (2008) define transformative educators as learning companions who deliberately create a safe environment by developing a sense of trust and possibility that enables students to overcome their initial fears. Our students reported also the generation of a climate of trust, which emphasizes the importance of taking care of the quality of the relationship generated between teachers and learners (Brady, 2014).

As for their peers, both freshman and master's students highlighted the value of working in teams due to the possibility of exchanging different perspectives with others. Students with a socialized mind make meaning of their experiences through contact with different perspectives from those around them. In this regard, peer relationships might serve as a "transitional object, both part of the old way of knowing and part of the new" (Kegan, 1994, p. 44). This happens because young adults do believe that other individuals are like themselves, when in fact

these others hold different perspectives from the young adults themselves. Thus, the likely dissonance between others' and one's own perspectives opens the door to the revision and critical questioning of one's own perspectives, which enhances an internal move toward internally grounded decision making (Apte, 2009; Baxter Magolda, 2000; King & Siddiqui, 2011). In the case of master's students, their creation of a community of learners is a good example of the use of a peer group as a resource for autonomous learning (Baxter Magolda, 2000). The collaborative dynamics generated in the group were at the service of further knowledge elaboration. We consider this to be evidence of how these students responded with greater complexity than freshman students to a methodology underpinned by the demand for increasing personal initiative and decreasing teacher dependence.

The process of creating a developmental response to the demands of the learning context, which was supported by both the teacher and their peers, led students to experience qualitative changes in their initial way of understanding learning and teaching. What the students understood as learning at the beginning of the semester came from their previous learning experiences, mainly based on the reproduction of factual knowledge. Conceptions of learning from such environments are usually related to simplistic conceptions according to which learning is increasing knowledge and memorizing, in line with Van Rossum and Hamer's (2010) six-stage theoretical model of ways of learning and knowing. Similarly, acting according to these learning conceptions is connected to a socialized mind (Kegan & Lahey, 2009). From this developmental stage, what one thinks is influenced by what one believes that others expect from oneself. In a learning context, this translates into learners believing in right and wrong answers and relying on an expert who is in possession of the truth.

The move beyond this stage was evidenced by our students at the end of the course when they described learning as a process engaged in for internally generated reasons instead of in response to external demands. In comparison with the students' initial expectations of having clear protocols to follow and their initial concerns about external assessment, this amounted to a significant change. In this regard, going beyond a learning conception based on content leads the way to more complex conceptions related to application and to the possibility of thinking for oneself (Van Rossum & Hamer, 2010). These conceptions involve a qualitative change toward an active student role and emphasize the processes of learning versus the contents of learning.

At the end of the courses, both freshman and master's students highlighted the possibility of applying what they had learned to everyday situations, which is evidence of a conception of learning as application (Van Rossum & Hamer, 2010). The ability to use theoretical concepts to understand real-life cases was noticeable in both groups of students. However, it was slightly less consolidated in freshman students than in master's students. For the former, application was an objective realization at a more intellectual level insofar as they made connections between theory and reality— but as something "out there." For the latter, application was a more subjective experience that involved a greater internalization and an inclusion of themselves as something to make connections with (Nogueiras et al., 2017). Students also displayed evidence of characteristic features of a thinking for oneself learning conception (Van Rossum & Hamer, 2010) related to self-direction. They showed individual initiative, use of resources to pursue their goals, an increasing responsibility for their learning, and the competence of self-evaluation (Grow, 1991). In this regard, they started to move from a simplistic reliance on authority toward a greater responsibility that led them to become active authors of their learning (Baxter Magolda, 2004), to consider themselves as an object of change, and to be the authors of their reality (Kegan, 1994).

Two interesting issues for discussion emerge from our findings. On the one hand, we admit that the courses under research are examples of deliberately developmental learning contexts (Kegan & Lahey, 2016). However, we wonder to what extent the changes undergone by the students may be no more than an example of an optimal level of performance connected to the high degree of social– contextual support. If this was the case, students would be expected to regress toward a functional level in learning contexts where such support was not provided (Fischer & Yan, 2002). In this regard, Apte (2009) highlights the challenge that students face when maintaining the epistemological progress experienced in specific contexts after returning to their usual social environments and, more precisely, to non-developmental educational settings, such as other courses in the same training program.

On the other hand—but still related to the previous point—another issue of interest has to do with the similar upset experienced by both freshman and master's students when faced with demands for internal authority and with their similar shift beyond conceptions of reproductive learning. This leads us to wonder to what extent many higher education settings may simply be perpetuating students' dependence on external authority and unsophisticated conceptions of learning and teach-

ing developed in their school years. Once the role that higher education can play in students' epistemological development is admitted, our findings stress the need to adopt teaching approaches that promote students' real autonomy. This is something that does not usually occur in many university courses, where students are externally directed and technical and informational learning is prioritized over transformational learning (Kegan, 2000).

We further wonder whether higher education teachers are epistemologically ready for considering the issues discussed herein. A large proportion of the adult population is located within a socialized developmental stage or in transition toward a self-authoring developmental stage (Kegan, 1994). Viewed this way, the questions arise: To what extent are higher education teachers able to reflect on and question their own learning and teaching conceptions? To what extent are they prepared to support students through their epistemological development? Or, at a more fundamental level, is students' epistemological development an issue for them? If Keeney's (1983) idea regarding therapy is applied to the educational field, for teachers to support students' development, it is indispensable that they have an epistemology that is more abstract than that of their students. We find this issue particularly interesting from our perspective as educators of future teachers, a perspective that makes us more aware of the importance of continuously challenging our own assumptions and conceptions at the same time as we attempt to challenge those of our students.

5. Limitations

We would like to highlight two limitations to the present study. On the one hand, we specifically investigated the experience of students who were considered optimal examples of being in transition toward increasing self-direction at the end of our courses. In order to generate a more comprehensive understanding of the effect of learning contexts designed to promote epistemological development, the experience of students showing different degrees of performance and change should also be investigated. On the other hand, we acknowledge that the kind of epistemological change that we intended to facilitate in our students cannot be fully accomplished within the context of a semester-long course but instead needs to continue developing over time. In this sense, it would be useful to carry out longitudinal studies in order to follow up with those students who, like the participants of the present study, display evidence of epistemological transition at the end of a specific learning experience.

6.   Directions for future research

The present study showed that students experienced some initial upset associated with puzzling emotions when faced with the challenging demands of internal authority underlying our courses. This is in line with previous findings that show how situations of cognitive conflict lead to emotional arousal in individuals (Arpiainen, Lackéus, Täks, & Tynjälä, 2013). In this sense, approaching students' emotional experiences throughout training programs aimed at facilitating self-direction can help us understand what the process of managing destabilizing demands is like (for this argument, see also King & Siddiqui, 2011). In doing so, in addition to students' texts, it would be interesting to gather time series data on the emotions that they experience and the degree of challenge and support that they perceive. A dynamic systems approach to these data would enhance the follow-up of students' changes over time (see for example, Nogueiras, Kunnen, & Iborra, 2013).

7.   Conclusion

Beyond theoretical arguments for the role of higher education in promoting the transition toward self-direction in order to enhance adult development, exploring specific individuals' shift toward internal authority might provide valuable clues for educators, who are considered key resources in such transition. In this regard, we believe that the main achievements of this research lie in: 1) giving an account of the initial upset experienced by students when faced with the demands for internal authority made by two semester-long courses in teacher education programs: one for freshman students and the other for master's students; 2) providing evidence of these students' shift toward more complex conceptions of learning and teaching over the courses, a shift illustrated by their increased final self-direction; 3) pointing out many similarities between the experiences of freshman and master's students' in such courses, similarities that lead us to question the underutilization of current teaching practices in promoting students' epistemological development during their college years; and 4) related to the above, acknowledging the key role of the constructivist methodology proposed and the value of both teacher and peer support in enhancing students' transition toward internal ways of authoring their lives.

Transition

from the first to the second empirical study

The empirical study presented in the previous chapter made use of students' retrospective accounts of their experiences throughout two training courses intended to promote their self-direction in order to gain insights about such epistemological transition. One of the findings was the identification of student's initial disorientation, insecurity and frustration in face of the new learning demands.

On this point, we started to wonder how this initial emotional upset could have evolved over time. We acknowledged that the students had overcome successfully the upset, as evidenced by their adaptive response to the course and their transition toward self-direction. However, we did not have detail on *how* this change had happened. Our first thought was that if we tracked students' emotional trajectories over time, we could grasp potential qualitative changes in the patterns of such trajectories. Specifically, we expected that the initially intense unpleasant emotions would decrease and that the intensity of pleasant emotions, predictably low initially, would increase. In our view, these changes would be evidence of meaningful changes in students' ways of making meaning of and managing the training complexity and, hence, of epistemological development. An additional hypothesis was that after a period of acclimatization to the learning setting, particularly complex input could be the necessary trigger for students' qualitative changes in their emotional experience and in such a way in their meaning-making.

At this juncture, we started to design a new study focus on students' emotional experience and on its relationship with training complexity. In order to grasp students' emotional experience over time, we realized that relying on a qualitative retrospective account, as in the previous study, would not be successful. Thus, and in line with dynamic systems principles, we decided to collect time-series data on both the emotions experienced and the degree of complexity perceived by students throughout an intensive training course based on process-oriented experiential learning. Further details on how these ideas evolved can be found in the next chapter, which encompasses the second empirical study of this thesis.

Chapter 3

Managing contextual complexity in an experiential learning course: a dynamic systems approach through the identification of turning points in students' emotional trajectories

Gloria Nogueiras,[1] E. Saskia Kunnen,[2] Alejandro Iborra[1]

1. Department of Educational Sciences, University of Alcalá (Spain)

2. Department of Developmental Psychology, University of Groningen (Netherlands)

Chapter 3

Managing contextual complexity in an experiential learning course: a dynamic systems approach through the identification of turning points in students' emotional trajectories

Abstract

This study adopts a dynamic systems approach to investigate how individuals successfully manage contextual complexity. To that end, we tracked individuals' emotional trajectories during a challenging training course, seeking qualitative changes –turning points– and we tested their relationship with the perceived complexity of the training. The research context was a five-day higher education course based on process-oriented experiential learning, and the sample consisted of 17 students. The students used a five-point Likert scale to rate the intensity of 16 emotions and the complexity of the training on 8 measurement points. Monte Carlo permutation tests enabled to identify 30 turning points in the 272 emotional trajectories analyzed (17 students * 16 emotions each). 83% of the turning points indicated a change of pattern in the emotional trajectories that consisted of: (a) increasingly intense positive emotions or (b) decreasingly intense negative emotions. These turning points also coincided with particularly complex periods in the training as perceived by the participants (p = 0.003, and p = 0.001 respectively). The relationship between positively-trended turning points in the students' emotional trajectories and the complexity of the training may be interpreted as evidence of a successful management of the cognitive conflict arising from the clash between the students' prior ways of meaning-making and the challenging demands of the training. One of the strengths of this study is that it provides a relatively simple procedure for identifying turning points in developmental trajectories, which can be applied to various longitudinal experiences that are very common in educational and developmental contexts. Additionally, the findings contribute to sustaining that the assumption that complex contextual demands lead unfailingly to individuals' learning is incomplete. Instead, it is how individuals manage complexity which may or may not lead to learning.

Finally, this study can also be considered a first step in research on the developmental potential of process-oriented experiential learning training.

Keywords: contextual complexity, cognitive conflict, complexity management, emotional trajectories, dynamic systems, turning points, Monte Carlo permutation tests, process-oriented experiential learning.

1. Introduction

This study is based on two assumptions: first, that learning and development occur in response to contextual demands that challenge individuals' ways of meaning-making and lead to the creation of more adapted ones (Piaget, 1975/1985); second, that individuals' encounters with conflicting contextual demands are usually associated with the experience of negative emotions (Carver & Scheier, 1990; Frijda, 1986; Inzlicht, Bartholow, & Hirsch, 2015). Within this framework, we find that a promising way to grasp individuals' successful management of challenging environmental demands is to track their emotional experience over time from a Dynamic Systems perspective (Kunnen, 2012; Thelen, 1989; Van Geert, 1994). This process-oriented approach supports the idea that it is the dynamic patterns of positive and negative emotions over time which can be positive or negative for learning (Sansone & Thoman, 2005). Our assertion is that individuals' initial emotional responses to conflicting and potentially unpleasant demands will be replaced by a qualitatively different and more pleasant emotional response, in the event of successful management. This change will be indicated by turning points (Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007; Eubanks-Carter, Gorman, & Muran, 2012) in the individuals' emotional trajectories. We also assume that a particularly complex contextual input may be a trigger for the successful management of complexity.

As higher education teachers, we find process-oriented experiential learning methodologies to be particularly appropriate for challenging individuals' ways of meaning-making, and thus for contributing to their learning and development. In this study we therefore focused on the 17 participants in a five-day higher education course based on process-oriented experiential learning. We aimed to investigate how these students successfully managed contextual complexity by tracking their emotional trajectories during the training, in search of turning points and determining their relationship with perceived training complexity.

1.1. Cognitive conflict as a trigger for meaning-making

From a constructivist standpoint, human beings make meaning of reality by creating our own personal theories or models of the world, which give us a provisional framework for understanding. As a result, meaning-making entails a dynamic process of continuous updating of these models in order to create adapted responses to an ever-changing environment (Piaget, 1975/1985). This process is triggered by conflicts that arise in the event of discrepancies between our experience and our model of the world, or in other words, between our way of creating meaning and the results we obtain (see Piaget, 1952, and cognitive disequilibrium).

Conflicts are acknowledged as being the trigger for learning (Piaget, 1975/1985), although whether this happens depends on the strategies we adopt to cope with those conflicts (Kunnen, 2006). In Piagetian terms, when we are first confronted with a conflict, our most economical reaction is to try to solve it through assimilation. In other words, we change our interpretation of the situation, or if possible, the situation itself, so that it once again fits in with our model of the world. The more challenging response of accommodation is only applied if assimilation is unsuccessful. Accommodation entails making significant changes in our model of the world, which reduces the discrepancy between our way of meaning-making and the contextual demands. These accommodational changes lead to learning and development (Kunnen & Bosma, 2000). By contrast, if we are unable to resolve the discrepancy, our confidence in our way of creating meaning is undermined and the potential for learning is narrowed.

1.2. Cognitive conflict and negative emotions in learning contexts

Emotions enhance our meaning-making processes by boosting what we attend to and by providing us guidance for adaptive action (Bradley, 2009; Frijda, 1988; Lazarus, 1991; Solomon, 2007). In particular, conflictive situations tend to be linked with negative emotions (Carver & Scheier, 1990; Frijda, 1986; Inzlicht et al., 2015). In this context, Kunnen and Wassink (2003) state that unpleasant emotions are drivers for learning, as they motivate us to react in order to reduce the discrepancy between the meaning we create in a given situation and the demands of that situation. However, like conflict, emotional arousal does not automatically lead to learning (Weiss, 2000). Instead, emotions may either impede or motivate learning depending on how individuals become aware of those emotions and how they manage them (Taylor & Cranton, 2013). As an example, D'Mello and

Graesser (2011) argue that "it is not confusion itself, but the effortful cognitive activities aimed at resolving the confusion that presumably are beneficial to learning" (p. 1307).

Research in higher education has proved that learning settings that lead students to question their accepted ways of knowing tend to be unsettling (Apte, 2009; Antonacopoulou & Gabriel, 2001; Cranton, 2002; Kegan, 1994; McEwen, Strachan, & Lynch, 2010) and elicit emotions such as fear, grief, and anger (Dirkx, Mezirow, & Cranton, 2006; Dirkx, 2011). As examples, the following studies investigated the relationship between conflicting learning demands and students' unpleasant emotional experiences: D'Mello, Craig, and Graesser (2009) found a predominance of confusion and frustration in a learning context that was aimed at facilitating deep learning; Nogueiras, Herrero, and Iborra (2017), and Nogueiras and Iborra (2017) found disorientation, insecurity and frustration as a common initial response to a training course that promoted students' self-direction.

1.3.   Studying emotions from a dynamic systems perspective: identifying turning points

It has long been widely accepted that negative emotions are bad for learning and positive emotions are good for learning, to the extent that the former should be controlled or eliminated (Lepper & Henderlong, 2000; Noddings, 2003). However, some authors (see for example D'Mello, Lehman, Pekrun, & Graesser, 2014) argue that this assumption is simplistic and inaccurate. Interestingly, Sansone and Thoman (2005) point out that "it is the dynamic patterns of positive and negative emotions at certain points in time in a given context what can be considered good or bad for learning" (p. 509). This emphasis on dynamic patterns is at odds with the widespread static approach to the study of emotions, which is based on cross-sectional research designs underlined by a unidirectional model of causation. However, if emotions are considered to be processes that dynamically evolve over time due to interactions between individuals and context (Barrett, 2009; Fogel et al., 1992; Frijda, 2009), a paradigm shift is required. This paradigm shift points toward process-oriented approaches that enable the study of within-person emotional patterns of change (Kuppens, Oravecz, &Tuerlinckx, 2010; Larsen, Augustine, & Prizmic, 2009; Scherer, 2009). Dynamic systems theory is particularly suited to this approach (Camras & Witherington, 2005; Lewis, 2005; Lichtwarck-Aschoff, Kunnen, & Van Geert, 2009).

Dynamic systems theory is a metatheoretical framework for understanding developmental processes, which are conceived as non-linear dynamic systems (Van Geert & Van Dijk, 2015; Witherington, 2007). These systems are formed by inter-connected and interacting components that affect each other and develop over time, due to interactions between individuals and their context (Kunnen, 2012; Thelen, 1989; Van Geert, 1994). As developmental processes are characterized by sudden changes and irregularities, their study requires methodologies that enable to grasp variability and change while they occur, rather than comparing pre- and post-change behavioral patterns (Fogel, 2011; Van Geert & Van Dijk, 2002; Van Dijk & Van Geert, 2007). A dynamic systems approach therefore uses individual microde-velopmental trajectories[1] as the unit of analysis, and examines them using as many measurements over time as possible (Yan & Fischer, 2007; Molenaar, 2004; Siegler, 2006).

Qualitative changes in individual microdevelopmental trajectories can be identified based on the concept of turning point. Turning points are points that mark meaningful deviations in trends in time series data that involve discontinuous changes (Hayes et al., 2007; Eubanks-Carter et al., 2012). These changes entail a transition from one variability pattern to another variability pattern (Kunnen, Van Dijk, Lichtwarck-Aschoff, Visser, & Van Geert, 2012) in such a way that the trajectories separated by a turning point differ in direction or nature (Abbott, 1997).

1.4.   Meaning-making from a dynamic systems perspective

From a dynamic systems perspective, contexts contribute to the emergence of individuals' behavior by providing both constraints and opportunities (Thelen & Ulrich, 1991; Van Geert, 1994; Vallacher, Van Geert, & Nowak, 2015). The great-er the contextual variability, the greater the likelihood of experiencing conflicts that lead us to make changes to adapt (Bosma & Kunnen, 2001; Hayes, Yasinski, Barnes, & Bockting, 2015). In other words, contextual variability offers systems room to explore and to adapt to new situations (Thelen & Smith, 1994; Van Geert, 1994). As a result, if learning and development is to occur, a factor must challenge our patterns of meaning-making so that they are reorganized on a more complex level (Kloep, Hendry, & Saunders, 2009; Thelen, 2005). Within this framework, and in line with Piaget's argument, the stability of our model of the world due to

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[1] The general course of change over time in a variable is described as a "developmental trajectory" (Bosma & Kunnen, 2001).

the maintenance of our meaning-making patterns would entail assimilation, whereas the destabilization of our model of the world and the emergence of new meaning-making patterns would entail accommodation. In this sense, the occurrence of any variability in developmental trajectories of any kind – such as emotional trajectories - enables us to identify developmental transitions (Granott, Fischer, & Parziale, 2002; Van der Maas & Molenaar, 1992).

1.5.   Experiential learning as a source of cognitive conflict

Our understanding of experiential learning differs from the model proposed by Kolb (Kolb, 1984; Kolb & Kolb, 2009). This model is based on a learning cycle that starts with students' reflection on the content of concrete experiences in order to create abstract concepts, which are then tested by active experimentation. This in turn generates further concrete experiences. By contrast, and based on the work of McWhirter (2002), we argue that the key to experiential learning is the use of students' own sensory and natural experiences to subsequently structure them using detailed modelling distinctions. As a result, in the "process-oriented experiential learning model"[2] (McWhirter, 2002), the emphasis is not on the creation of abstract ideas or explanations of personal experiences –based on the content of the experience, or *what* happens. On the contrary, the emphasis is on the creation and exploration of formal distinctions that are then tested as they may be useful in making sense of the individual's experiences in a more complex way - considering the whole experience from a process perspective, or *what*, *how* and *why* it happens.

In specific terms, the experiential learning model that we present is based on the following sequence: 1) Creating an experience: students undertake an open exploration of their natural experience or intuitive understanding about the phenomena being studied; 2) Reviewing: students share the range of experiences they obtained in the exploration, identifying similarities and differences in comparison with other classmates' experiences - or even with other previous personal experiences; 3) Formalising: the trainer introduces formal models and distinctions; 4) Testing: students compare and test the formal model and distinctions against their own personal and group experience.

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[2] In the remainder of the article, and for the sake of brevity, we will use the label "experiential learning" to refer to a process-oriented experiential learning model as described by McWhirter (2002).

The experiential learning model differs from the traditional learning model, labelled didactic learning, which is based on the following sequence: 1) Description of a formal model: the trainer tells; 2) Demonstration: the trainer shows; 3) Experience: the students do; 4) Provision of feedback: the trainer tells the students what went wrong and right. This sequence is useful for rote learning and learning protocols, so that there is an increase in "knowing" before the uncertainty and risk involved in "doing". However, it overlooks the fact that ready-made techniques do not correspond with reality, which has variations that are ignored in favour of the illusion of certainty that is provided by protocols. The didactic learning model therefore leads to a reduction toward the "correct" way, and fosters a dependent, repetitive and unquestioning style of learning that prevents students from engaging in exploration, creativity, and self-direction.

By contrast, experiential learning as understood by McWhirter (2002) contributes to developing the competence of learning to learn, increases the depth of learning, encourages an attitude of curiosity and wonder, and prepares students to take what they learn into the world. Indeed, this learning sequence is similar to the one we all naturally follow as children when making meaning of our surroundings: starting from a baseline of not knowing, we build an understanding. However, the application of an experiential learning sequence also entails little security in "knowing", because there is no "right answer" or example to begin with. This might initially lead students to feel insecure and uncomfortable, as they have to develop an open orientation to new experiences. Furthermore, if students continue to apply the didactic learning sequence they are accustomed to, they may have an additional sense of not "knowing", while believing that they should know before they continue to learn. Apart from the learning sequence itself, the contents explored in process-oriented experiential exercises also tend to be complex and challenging for students.

A formal model that can be useful for illustrating students' typical responses to experiential learning when they are first exposed to it is the *Three sets model: set-up - upset - set-down* (McWhirter, 2000). This model describes three stages in the process of meaning-making of a conflictive experience. The students' initial set-up would be the learning sequence that they are used to, and which they expect to find at the beginning of the training - the didactic sequence in most cases. The upset would be the destabilization experienced by the students caused by the challenging demands of the experiential sequence and the exploration of personal expe-

riential content. The set-down would involve potential changes made by the students in response to the upset. This set-down could potentially be related to cognitive accommodation.

In view of the above, the hypothetical emotional trajectory of students in a process-oriented experiential learning context may be as follows. First, the students' upset at the conflicting training demands could lead them to the experience of intense negative emotions and a low level of positive emotions. Later, the students' development of new meaning-making strategies for coping with the challenging demands would entail a decline in the intensity of negative emotions and an increase in the intensity of positive emotions. This could be identified through the occurrence of turning points in emotional trajectories.

It is important to note the positive aspect of the upset in a process-oriented learning setting, and how students are also supported to learn to learn in this way. In fact, the experiential methodology itself revolves around learning management, which in this methodology is considered as something that can be taught and learnt. In fact, this learning model is intended to facilitate qualitative changes in students' way of learning, and specifically in the way they organize information while they learn. In this process, both the recognition and the management of the negative emotions that are expected to be experienced as a response to contextual challenge are assumed to enhance individuals' ability to manage learning effectively.

1.6. The present study

The main goal of the present study is to investigate the process of successfully managing contextual complexity by the 17 participants in a five-day higher education course, based on a process-oriented experiential learning model. To meet this goal, we aimed to: 1) identify turning points in the participants' positive and negative emotional trajectories, 2) test whether those turning points coincide with periods in the training perceived by participants as particularly complex. We also aimed to test the widespread assumption that contextual complexity leads to the destabilization of individuals' ways of meaning-making, and consequently to learning.

2. Method

2.1. The learning context studied

2.1.1. Description of the training course

This study focuses on an intensive training course based on a process-oriented experiential learning model (McWhirter, 2002). The course took place in a Faculty of Education at a Spanish university. It was part of a summer training program for both university students and non-students. The training course lasted 31.5 hours over five consecutive sessions. The first four sessions lasted for 7 hours, and the fifth lasted for 3.5 hours. The training was conducted by the developer of Developmental Behavioural Modelling (DBM)[3] John McWhirter (McWhirter, 2011).

The course was entitled *Self-created learning throughout life*, and aimed to develop participants' life competences of self-managing and self-directing their own learning processes. Participants were therefore expected to: 1) gain a deeper understanding of the learning to learn process by modelling, developing, and assessing their autonomous learning processes; 2) explore changes in beliefs, values, self-concept, identity or vital aspirations that take place as a consequence of self-created learning. The reason why we selected this training course for this study was that both the course content (how to manage learning) and the experiential learning methodology (intended to support students' in their improved management of learning) were expected to be highly upsetting and challenging for the participants. This made the training ideal for examining adaptation to cognitive conflict.

The first session of the course started with the participants' exploration of their current understanding about learning. The next sessions started with a review by the participants of the content covered and the exercises performed during the previous session, in order to reconnect with the experience, share their understandings, make connections and identify issues for clarification. The remainder of all the sessions consisted of: 1) the trainer's proposal of experiential exercises and the students' performance of them, with an emphasis on trying different ways of doing things and on extending one's own attention; 2) sharing experiences in order to

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[3] Developmental Behavioural Modelling is a comprehensive field to systematically model modelling (McWhirter, 2002, 2011). It studies how human beings create our own models of the world through natural modelling skills, how effective our models are, and how we change them in order to adapt them to new circumstances in an optimal way (McWhirter, 1998).

identify what was similar and what was different, fostering the students' awareness of variety, 3) the trainer's feedback, 4) the trainer's introduction of formal models and process distinctions so that the students could explore their experience with further direction.

During the experiential exercises, three processes were encouraged: a) to *attend* (playing with attention and moving it); b) to *notice* (paying attention to the content of what one notices and to the way in which one notices: active or passive, detailed or not, rigid or open); c) to *explore* and to *investigate* (going beyond what is initially recognized, opening things up and creating things that one does not know). By way of an example, an experiential sequence which was used on the course to explore different personal learning experiences consisted of the following steps: 1) Identifying the experience of learning to be explored; 2) Identifying the resources available before the experience, both from the environment and from oneself; 3) Reviewing what happened throughout the learning sequence, paying attention to what was changing and what one was doing; 4) Reviewing how one checked that the learning had happened; 5) Thinking about further development, in terms of changes that could be introduced to improve learning.

2.1.2. Participants

The course participants were 31 higher education students and professionals, mostly from educational, psychological, and health disciplines. At the beginning of the course, the participants were informed about the research and the confidentiality thereof, and all contributed information and agreed to take part by means of informed consent.

The sample in this study consisted of 17 participants (12 women, mean age 33.53, age range 19-55) who completed all the measurements during the course. All the participants lived in Spain, except one who lived in United Kingdom and came to Spain for the training. There were 13 participants from Spain, 1 from Ireland, 1 from Mexico, 1 from the United Kingdom and 1 from Romania. Of the 17 participants, 7 were undergraduate students on either Teacher Training or Psychology courses, 2 were doctoral students in Education, 2 were psychologists, 2 were Psychology university lecturers, 1 was a Secondary Education English teacher, 1 was a librarian, 1 was a veterinarian and 1 was a doctor.

2.2.   Data collection

The first author of this article attended the course as a participant, while the third author was an active observer of the training. The two authors and the trainer were responsible for the data collection. Within the framework of a more extensive data collection, the focus in this article is on a follow-up questionnaire distributed over eight measurement points (m.p.) during the training course, i.e. twice per session in the first four sessions. The follow-up questionnaires were strategically distributed at the beginning and at the end of the session or at particular points that were expected to be more challenging for the course participants, so that the potential emotional arousal associated with them was more likely to be recorded. See Appendix 1 for an overview of the timeframe of the training course, including the distribution of questionnaires.

In each questionnaire, the participants self-reported the intensity of their emotions and the degree of perceived training complexity that they experienced at that point on the course.

The intensity of the emotions was assessed by means of a list rated on a Likert scale, from very low (1) to very strong (5). The list was designed by the first and the third authors of this article with the trainer, and included a range of emotions that they had observed in previous process-oriented experiential learning training activities they had led. The 16 emotions in the list were: joy, sadness, anger, fear, enjoyment, interest, distress, boredom, hope, overwhelmed, overload, confusion, enthusiasm, dissonance, ignorance and curiosity.

The degree of perceived training complexity was assessed using two items, rated on a Likert scale from very low (1) to very strong (5). The items were: (a) conceptual complexity, which referred to the complexity associated with the students' understanding of the formal models introduced by the trainer, (b) performative complexity, which referred to the complexity involved in doing the experiential exercises, in terms of both their structure and the personal experiential content explored by students.

2.3.   Data analysis

In order to systematize the analysis of the emotions assessed by the participants, each emotion was coded as either positive or negative, which resulted in: (a)

6 positive emotions (joy, enjoyment, interest, hope, enthusiasm, curiosity), and (b) 10 negative emotions (sadness, anger, fear, overwhelmed, boredom, distress, overload, confusion, dissonance, ignorance). Emotional trajectories were created for each participant and for each emotion, which consisted of the series of intensity scores provided for the eight measurement points. This means that the trajectories are nested, i.e. there are several emotional trajectories for each individual.

For the analysis of the complexity scores, an overall complexity score for every participant was computed for each measurement point by averaging the scores given in the two items included in the questionnaires –conceptual complexity and performative complexity. This provided a score for complexity for each student and for each measurement point, with a range of between 1 and 5.

2.3.1. Identifying turning points

Looking for an unexpectedly large peak in the data has proved to be effective in identifying discontinuous patterns showing the emergence of qualitative changes in individual developmental trajectories (see for example Van Dijk & Van Geert, 2007, 2011; Van Geert & Van Dijk, 2002). This technique inspired us when we designed our procedure to identify turning points in the participants' emotional trajectories. The procedure consisted of two steps. First, the trajectories for the 16 emotions scored by the 17 participants (i.e. 272 emotional trajectories: 102 positive and 170 negative) were examined for points that fell outside a computed confidence interval. These were labelled as exceptional points. Second, exceptional points were examined using Monte Carlo permutation tests to determine whether they showed a qualitative change in the pattern of the emotional trajectory. In this case they were labelled as turning points. The complete procedure is detailed below.

2.3.1.1. The first step: looking for exceptional points

The regression line underlying every emotional trajectory was first computed. Based on the values of that regression line, a confidence interval of 1.65 standard deviations around the spread of the data was computed, so that the upper control limit (UCL) of the confidence interval was 1.65 standard deviations above the regression line, and the lower control limit (LCL) of the confidence interval

was 1.65 standard deviations below the regression line.[4] The points on the emotional trajectories which fell outside the computed confidence intervals were labelled exceptional points.

Table 1 shows an example of the computing of the confidence interval of the scores for intensity of distress of one of the participants throughout the eight measurement points (m.p.). In the example, m.p. 5 is an exceptional point, which means that the score in the intensity of distress in that point is greater than the value of the upper control limit of the computed confidence interval. Figure 1 graphically presents the emotional trajectory for distress, the underlying regression line and the upper and lower control limits of the confidence interval computed from the regression line. This graph shows the exceptional point at m.p. 5, which can be seen above the upper control limit.

2.3.1.2. The second step: determining which exceptional points are turning points

Once the exceptional points were identified, a statistical analysis was performed in order to determine whether they indicated a qualitative change in the emotional trajectory, i.e. a turning point. The analysis consisted of a comparison of the slope[5] of the emotional trajectory before and after the exceptional point, in search of significant differences. To that end, Pop tools (Hood, 2010) in Microsoft Excel 2010 were used to perform Monte Carlo permutation tests (see Todman & Dugard, 2001). These tests are also known as random permutations, random sampling techniques or resampling techniques, and are included in the family of bootstrap techniques (Efron & Tibshirani, 1993; Good, 1999). Resampling techniques are well-suited to longitudinal research, and have great explanatory value for small or skewed samples, and result in reliable P values, since they do not assume any underlying distribution, or a minimum sample size (for this argument see Van Geert, Steenbeek, & Kunnen, 2012). Standard tests such as t-tests are not allowed in these cases (Kunnen, 2006).

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[4] In a normal distribution, 1.65 standard deviations from the sample's mean represents around 90% of the population. We therefore assumed that a confidence level of 90% was reasonable for identifying exceptional points in the trajectories.

[5] The slope is a linear trend parameter that describes both the direction (increase or decrease) and the steepness (the strength of such decrease or increase) of the changes in the variable studied.

Table 1 Example of the computation of the confidence interval for the scores in the intensity of distress of one of the participants. Data associated to the exceptional point (scores in distress, UCL and LCL), located in m.p.5, are boldfaced.

m.p.	Scores in distress (17)	Regression line (intercept + slope) * data	Variance (data-regression line) ^{2}	Confidence Interval	
				UCL (regression line + 1,65 σ)	LCL (regression line – 1,65 σ)
1	2	1.666	0.111	2.754	0.579
2	1	1.690	0.477	2.778	0.603
3	1	1.714	0.510	2.802	0.627
4	2	1.738	0.068	2.826	0.650
5	**3**	1.762	1.533	**2.849**	**0.674**
6	2	1.787	0.046	2.873	0.698
7	2	1.809	0.0363	2.897	0.722
8	1	1.833	0.694	2.921	0.746
		Average Variance	0.434		
		Standard deviation (σ)	0.659		
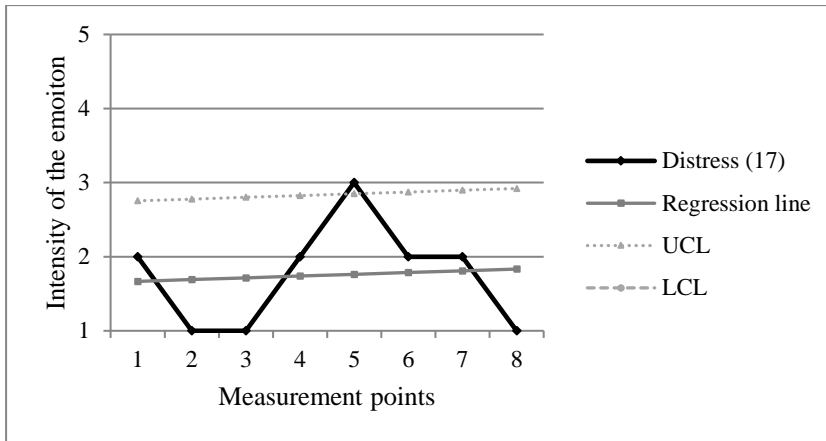
Fig.1 Example of an exceptional point (m.p.5)
UCL = Upper Control Limit; LCL = Lower Control Limit

Monte Carlo permutation tests estimate the chances that an observed result is caused by chance alone. They compare an empirical distribution of data with a random distribution that is created by reshuffling the empirical data in accordance with a null hypothesis. In this case, the null hypothesis stated that there was no significant difference between the slopes of an emotional trajectory before and after an exceptional point. The reshuffling computes all possible re-orderings of the empirical data set, by computing a very large number of accidental distributions and counts how often the observed or a bigger difference occurs in the random distributions. In this case, the reshuffling counted how often the difference between slopes was the same or bigger than the observed difference. This frequency is then divided by the number of random samples in order to produce a P value for the tested difference, which is the probability of the observed difference occurring in the random distributions of the data. If the probability is low, this means that the observed difference is not due to chance and therefore that it is a legitimate difference (for more detail, see Van Geert, Steenbeek, & Kunnen 2012). In this analysis, 10.000 random distributions were computed and a P value lower than 0.05 was considered significant.

2.3.2. Testing the relationship between turning points and perceived training complexity

The next step in the analysis consisted of testing whether the perceived complexity of the training was significantly higher at the measurement points

where at least one turning point in some emotional trajectories had been identified. Monte Carlo permutation tests were performed to that end. The average complexity score for the measurement points where turning points had been detected and the overall complexity score of the measurement points where no turning points had been identified was computed in order to test whether the former was higher than the latter. The perceived complexity scores of each participant at every measurement point were then reshuffled, and the overall complexity score at the measurement points with turning points, the average score of complexity in measurement points without turning points and the difference between both were then computed. Monte Carlo simulations (10.000 random distributions computed) were used to test whether the difference in the degrees of perceived complexity was significant (a P value lower than 0.05) or due to chance.

3. Results

3.1. Detection of turning points

3.1.1. The first step: identification of exceptional points

In the 272 emotional trajectories analyzed, 142 exceptional points were identified, i.e. 52% of the trajectories had at least one exceptional point. There were 53 exceptional points in positive emotion trajectories (52 % of these trajectories), and 89 exceptional points in negative emotion trajectories (52% of these trajectories). Two types of exceptional points were identified: 1) High exceptional point: a point on a trajectory above the upper control limit of the trajectory's confidence interval; 2) Low exceptional point: a point on a trajectory below the lower control limit of the trajectory's confidence interval. Low exceptional points were the most common in positive emotion trajectories (62 %) and high exceptional points were the most common in negative emotion trajectories (75 %). These two types accounted for 70% of the total number of exceptional points (23% and 47 % respectively). The amount and percentage of high and low exceptional points in positive and negative emotion trajectories are presented in Table 2.

3.1.2. The second step: detection of turning points

30 of the 142 exceptional points (21%) were identified as turning points. This meant that 11% of the total number of emotional trajectories analyzed (272)

had a turning point. Of the 30 turning points, 12 turning points were found in positive emotion trajectories (12% of positive emotion trajectories) and 18 turning points were found in negative emotion trajectories (11% of negative emotion trajectories).

Two types of turning points were identified: 1) Pre-decrease turning point: a point on an emotional trajectory above the upper control limit of the confidence interval of the trajectory, indicating a change in the trajectory from an increasing pattern in the intensity of the emotion toward a decreasing pattern; 2) Pre-increase turning point: a point on an emotional trajectory below the lower control limit of the confidence interval of the trajectory, indicating a change in the trajectory from a decreasing pattern in the intensity of the emotion toward an increasing pattern.

Pre-increase turning points were the most common in positive emotion trajectories (83%), while pre-decrease turning points were the most common in negative emotion trajectories (83 %). These two types accounted for 83% of the total number of turning points (33% and 50% respectively). The amount and percentage of pre-decrease turning points and pre-increase turning points in positive and negative emotion trajectories are presented in Table 3.

The figures 2, 3, 4, and 5 are examples of the two types of turning points, pre-decrease and pre-increase, in positive and negative emotion trajectories.

The 30 turning points were distributed over 13 of the 17 participants (76%) and 9 of them presented pre-increase turning points in positive emotions, pre-decrease turning points in negative emotions, or both, which could be considered positively trended turning points. A high percentage of turning points (63.33%) were located at m.p. 4 (9 turning points: 3 pre-decrease turning points in negative emotions, 4 pre-increase turning points in positive emotions, and 2 pre-increase turning points in negative emotions), and at m.p. 6 (10 turning points: 1 pre-decrease turning point in a positive emotion, 3 pre-decrease turning points in negative emotions, and 6 pre-increase turning points in positive emotions). A precise and detailed distribution of the turning points for the participants and for each measurement point is given in Appendix 2.

Second empirical study. Managing contextual complexity: a dynamic systems approach

Table 2 Amount and percentage (rounded) of high and low exceptional points.

Type of exceptional points	Exceptional points in positive emotions trajectories			Exceptional points in negative emotions trajectories		
	No.	Percentage in positive emotions trajectories	Percentage in the total no. of trajectories	No.	Percentage in negative emotions trajectories	Percentage in the total no. of trajectories
High exceptional points	20	38%	14%	67	75%	47%
Low exceptional points	33	62%	23%	22	25%	16%
Total	53	100%		89	100%	

Table 3 Amount and percentage (rounded) of pre-decrease and pre-increase turning points.

Type of turning points	Turning points in positive emotions trajectories			Turning points in negative emotions trajectories		
	No.	Percentage in positive emotions trajectories	Percentage in the total no. of trajectories	No.	Percentage in negative emotions trajectories	Percentage in the total no. of trajectories
Pre-decrease turning points	2	17%	7%	15	83%	50%
Pre-increase turning points	10	83%	33%	3	17%	10%
Total	12	100%		18	100%	
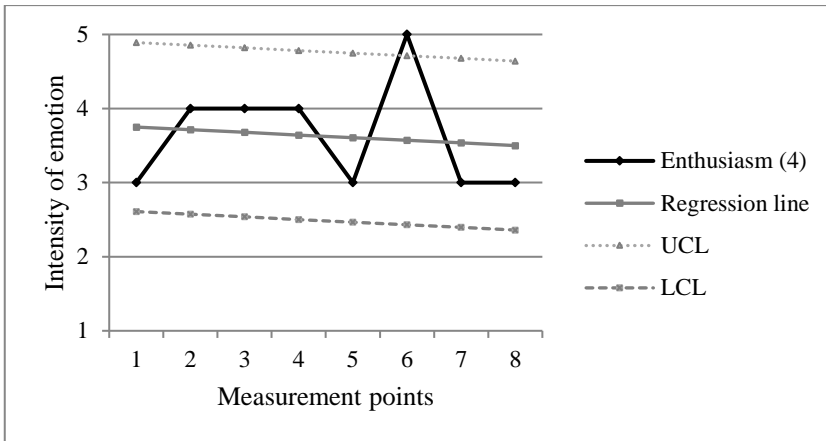
Fig. 2 Example of a pre-decrease turning point (m.p.6) in a positive emotion trajectory
UCL = Upper Control Limit; LCL = Lower Control Limit
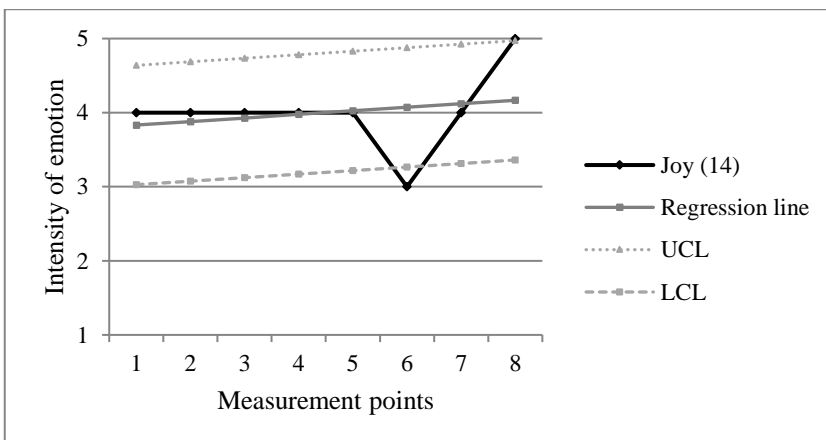
Fig. 3 Example of a pre-increase turning point (m.p.6) in a positive emotion trajectory
UCL = Upper Control Limit; LCL = Lower Control Limit
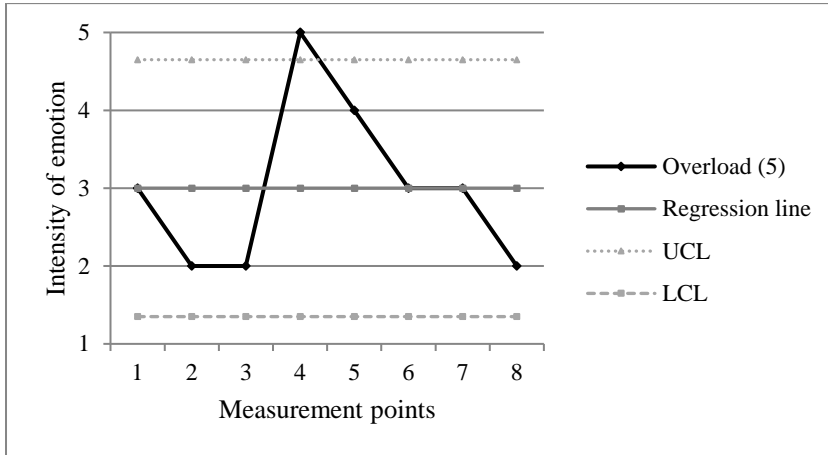
Fig. 4 Example of a pre-decrease turning point (m.p. 4) in a negative emotion trajectory
UCL = Upper Control Limit; LCL = Lower Control Limit
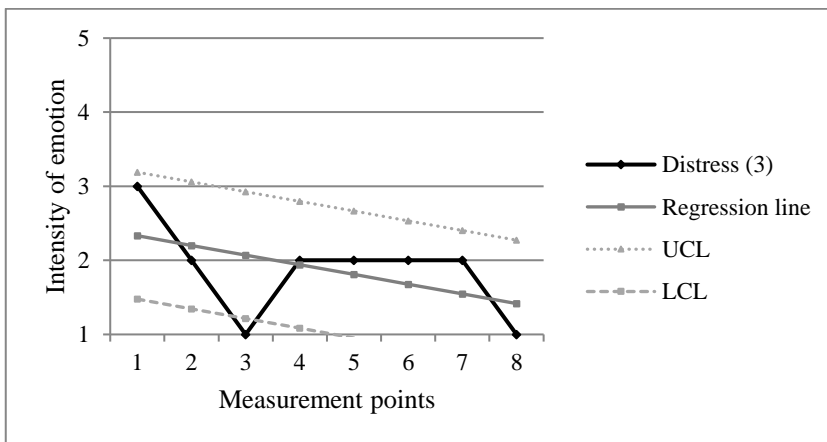
Fig. 5 Example of a pre-increase turning point (m.p. 3) in a negative emotion trajectory
UCL = Upper Control Limit; LCL = Lower Control Limit

3.2.   The relationship between turning points and perceived training complexity

The measurement points at which turning points were identified had significantly higher complexity scores than the other measurement points ($p = 0.002$). More detailed results were found when the pre-decrease turning points and pre-increase turning points were analyzed separately in both positive and negative emotion trajectories: significantly higher levels of complexity were found at the

measurement points with pre-increase turning points in positive emotion trajectories (p = 0.003) and at the measurement points with pre-decrease turning points in negative emotion trajectories (p = 0.001). Table 4 shows the average and the range of the complexity scores for each measurement point. Table 5 shows detailed results for the differences in complexity scores between the measurement points with turning points and the measurement points without turning points. An overview of the trajectories of the complexity scores for each student over the 8 measurement points is provided in Appendix 3.

3.3.   Summary of results

11% of the emotional trajectories analyzed had a turning point. The two most common types were: 1) pre-increase turning points in positive emotion trajectories (83% of the turning points in these trajectories); 2) pre-decrease turning points in negative emotion trajectories (83 % of the turning points in these trajectories). These two types of turning points accounted for 83% of the total. The relationship between the occurrence of turning points and perceived training complexity was significant at: 1) pre-increase turning points in positive emotion trajectories (p = 0.003); and 2) pre-decrease turning points in negative emotion trajectories (p = 0.001), which was consistent with the first result.

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Table 4 Average and range of complexity scores for each measurement point.

	Measurement points							
	1	2	3	4	5	6	7	8
Average complexity scores	2.450	2.980	2.996	3.245	3.176	3.086	3.133	3.279
Range complexity scores	1.5 - 5	1.5 – 4	2 - 5	2 - 5	2.5 – 5	1.5 - 5	2.5 – 5	2 - 5

Table 5 Significant differences in complexity scores between m.p. in which turning points (t.p.) were identified and m.p. in which no turning points were identified. Note: * $p < .01$

Types of turning points	Scores in complexity (scale 1 to 5)				Difference between mean scores in complexity of m.p. with and without t.p.	Scores in complexity higher in m.p. with t.p. than in m.p. without t.p. (*p*)
	M.p. with t.p.		M.p. without t.p.			
	Mean	Std dev	Mean	Std dev		
All	3.731	0.629	3.162	0.78	0.569	.002*
Pre-decrease t.p. in positive emotions	3.250	0.25	3.231	0.793	0.019	.562
Pre-increase t.p. in positive emotions	4.250	0.433	3.201	0.776	1.049	.003*
Pre-decrease t.p. in negative emotions	3.889	0.489	3.191	0.783	0.698	.001*
Pre-increase t.p. in negative emotions	3.50	0.25	3.231	0.793	0.269	.533

4. Discussion

We have organized our discussion around four issues: 1) The positive orientation of the students' emotional trajectories; 2) The relationship between contextual complexity and positively trended turning points in the students' emotional trajectories; 3) The concentration of turning points in the students' emotional trajectories around the middle of the training course; 4) The apparent scarcity of turning points in the students' emotional trajectories.

4.1.   The positive orientation of the students' emotional trajectories

Emotions play a key role in learning processes, since they enable us to make meaning of our experiences and adapt to our environment (Bradley, 2009; Frijda, 1988; Lazarus, 1991; Solomon, 2007). We therefore expected our participants' emotional experience to fluctuate over time as a result of their changing ways of making meaning of the new demands arising from the process-oriented experiential learning setting. The predominant emotional trajectory among our participants had a positive orientation, as evidenced by the two most frequent types of turning points: pre-increase turning points in positive emotion trajectories, and pre-decrease turning points in negative emotion trajectories. These turning points indicated that an initial response consisting of either increasingly intense negative emotions or decreasingly intense positive emotions was replaced by a pattern that consisted of decreasingly intense negative emotions or increasingly intense positive emotions.

On the one hand, the participants' prevalent initial experience of intense negative emotions and non-intense positive emotions in response to challenging demands is consistent with previous findings in higher education settings (see for example Apte, 2009; Dirkx, 2011). Dirkx (2008) argues that adults' emotional responses in learning settings are usually related to the content, the structure or the processes that they entail, so that an open structure can lead students to feel overwhelmed and to complain of a lack of direction. This is consistent with the likely experience of our participants.

Instead of the typical emphasis on learning protocols that would be expected in a didactic learning sequence, an experiential learning sequence places the emphasis on the students' exploration of their natural experience. This means that

there is a predominance of open and exploratory exercises and that no closed answers or procedures to follow are provided by the trainer. This is potentially challenging for many students, who are mostly used to content-based teaching practices (for related findings, see Nogueiras & Iborra, 2017), and can be a source of upsets. In addition to the new experiential learning sequence, something that can be upsetting for students is the content explored in the exploratory exercises. Newcomers may become upset at the beginning of the training by the mismatch between their expectations and the proposed learning sequence. Meanwhile, students who are used to the experiential learning sequence are expected to have a maximized set-up, since they already expect that they will not know from the beginning and know that they have to remain curious and open. For them, the possible upset would not be related to the experiential learning sequence, but instead to the possibility of dealing with complex experiential content.

On the other hand, the positive orientation of our participants' emotional trajectories over time is similar to that found by Arpiainen, Lackéus, Täks, and Tynjälä (2013) in their research on students' emotions in an entrepreneurship learning program. In their thematic analysis of the students' in-depth interviews after the training, they found "waves of emotions" consisting of frequent negative emotions at the beginning of the program, and positive emotions toward the end. According to these authors, the students' negative emotional experience was a response to the new learning environment and to the challenging tasks they were set. Conversely, the positive shift in the students' emotional experience over time was considered to be related to their increased ability to cope with uncertainty during their learning process. This is something that we find also plausible in our study, as discussed in the paragraphs below.

In situations where our ways of meaning-making are destabilized, managing both the destabilization and the associated unpleasant emotions is necessary if learning is to occur (Taylor & Cranton, 2013). Our participants might have developed two different responses to the likely destabilization they experienced. One possibility is that participants were successful in their attempt to reduce the discrepancy between the demands of the training and their ways of meaning-making, so that they effectively managed their learning process. In this case, participants would have moved from a period of emotional discomfort to a period of emotional comfort (see Kunnen & Wassink, 2003). Another possibility is that participants were unable to manage the challenging demands of the training, so that the destabi-

lization might have been counterproductive for learning, and undermined the participants' confidence in their way of creating meaning. In this case, the initial unpleasant emotional experience would have persisted or become more profound over time.

The predominantly positive orientation of our participants' emotional trajectories over time can be interpreted as evidence of their successful management of the challenging demands of the situation. This may in turn indicate a greater possibility for participants' cognitive accommodation. At this point, it is necessary to explicitly state what kind of cognitive accommodation we are referring to. To do this, it is possible to distinguish between two types of accommodation. On the one hand, individuals can change their cognitive structures when they understand something. In this case, the accommodation is focused on the content. On the other hand, the accommodation can be more focused on the process. In our case, we refer to a kind of accommodation that is related to the participants' adaptation to the learning methodology, rather than to the content of learning itself. The former would involve a change in the way in which the participants adapted to the course, modifying their initial expectations and going beyond them. If this kind of accommodation took place, it would involve the participants changing their preference to a didactic learning sequence, and being more open to investigation and development in an experiential learning sequence. This would necessarily involve a higher degree of flexibility and tolerance of uncertainty.

In short, the two most common types of turning points found in emotional trajectories can be taken as an evidence of the students' positive set-down in response to the initial upset arising from the mismatch between their expectations and the training demands. After the students adapted to the new learning model, their emotional experience shifted from being predominantly unpleasant to being predominantly pleasant.

In view of the above, the study of emotional patterns over time in both Arpiainen et al.'s (2013) research and our own research supports the idea that a dynamic approach to the study of emotions enable to overcome the simplistic claim that positive emotions are good for learning and negative emotions are bad. Instead, and according to Sansone and Thoman's (2005) arguments, this study confirms that it is the dynamic patterns of positive and negative emotions over time, in connection with individuals' changing ways of managing contextual complexity,

which can be considered positive or negative for learning. This last point is discussed further below.

4.2. The relationship between contextual complexity and positively trended turning points in the students' emotional trajectories

The coincidence between positively trended turning points and particularly complex periods in the training is consistent with the idea that high levels of contextual complexity might act as a catalyst for individuals' new and more adapted behavioral patterns (Piaget, 1975/1985). If an experience is not challenging for individuals, they will not become involved in a meaning-making process aimed at creating a response that is adapted to their environment and the experience will therefore not be developmental. The positively trended turning points in the participants' emotional trajectories are an example of a developmental orientation, which leads us to assume that the complex experiential training triggered the participants' adaptation to the new contextual demands.

However, these assertions do not mean that contextual complexity always leads to experiences of upsets, and that those upsets lead to learning. Instead, if this happens it depends on how individuals manage complexity and the emotional upset associated with it. If the reasons for contextual complexity were emotional, all the participants' emotional trajectories would be similar, and this is not the case. Our hypothesis is therefore that there are other issues involved apart from complexity, such as the individuals' self-management baseline and the different paces and phases that individuals can follow over time when learning how to manage complexity, and which play an important role in learning. For example, some students may respond to contextual complexity by experiencing excitement and enjoyment, and not necessarily by experiencing unpleasant emotions. Thus, contextual complexity will not therefore always match upsets. Indeed, as people learn to manage complexity, emotional upsets may no longer be an issue. As mentioned above, students who expected complexity in the experience may have been less upset than students who did not expect complexity. In conclusion, we cannot generalize that complexity is upsetting for every individual, and neither can we state that it will inevitably lead to a successful adaptation to the context.

4.3.   The concentration of turning points in the students' emotional trajectories around the middle of the training course

In connection with the above, it must be acknowledged that the contextual complexity identified at various points in the training may have led to different responses by the participants. If very high levels of complexity had been elicited at the beginning of the course, the participants' destabilization could have been too high to be managed successfully. However, the middle period of a training program is a more suitable time for participants to become destabilized. This is potentially because they are more prepared after a prior period of experience, in which their ways of meaning-making might have been reorganized. From this vantage point, facing high complexity might have led to the emergence of a qualitatively different and more adapted emotional response, as indicated by positively trended turning points in the emotional trajectories. Interestingly, not only were more complex exercises likely to be proposed, but the participants' perception of complexity might also have varied over time. For example, at the beginning of the training the participants' complexity scores were not still very high probably because they were creating their own standards for the course, and not necessarily because the exercises proposed were less complex. This makes sense when we recall that a large percentage (63.33%) of the 30 turning points in emotional trajectories were located at m.p. 4 and at m.p. 6, and that furthermore, most of these turning points were positively oriented. The middle period of the training might therefore be considered the safest moment for the trainer to propose challenging input, both because students are likely to be more accustomed used to the learning sequence, and because they still have time to settle down in the context of the training course.

From the above, it can be concluded that contextual complexity alone is not a trigger for development and learning, but also that when this complexity is faced is also relevant in terms of the individuals' resources for managing it. When discussing identity development, Kroger (1993) interestingly points out that a certain readiness is needed if a conflict is to induce change in individuals. This is consistent with cognitive structural theory and research, which have provided evidence to suggest that individuals have to be at a certain stage for an optimal period of time before change is possible. Accordingly, in order to explain a qualitative change in participants' emotional response to the training demands, we have to take into account the prior process of reorganization and its subsequent impact. In dynamic systems, this is termed feedback delay (Van Geert, 1994; Kunnen, 2012).

4.4. The apparent scarcity of turning points in the students' emotional trajectories

An issue arising from our findings that is also worth discussing is the apparent low number of turning points identified. We found 30 turning points in 272 emotional trajectories - 87% of which were positively trended. However, we believe that this number is reasonable, as turning points in participants' emotional trajectories are taken as evidence of the reorganization of participants' prior ways of meaning-making. First, it must be acknowledged that in general, more stability than change would be expected, especially among adult students. Second, sometime is needed for this re-organization to take place. According to the literature on developmental turning points (Rönkä, Oravala y Pulkkinnen, 2002), as they are associated with changes in trajectories and internal reorganizations, sometime is needed to process these changes. Regardless of the timeframe of the nature of the trajectories studied (as highlighted by Lichtwarck-Aschoff, Van Geert, Bosma, & Kunnen, 2008, for example), which could amount to years (as in identity changes, e.g. Stevens, 2012), months (in the case of beliefs, attitudes, values, or commitment orientations, as in Kunnen, Sappa, Van Geert, & Bonica, 2008) or even days (for specific patterns of behavior, creation of habits, and strategies, as in Siegler, 2006), turning points require some time to take place. We could therefore expect a low frequency of turning points.

Nevertheless, the number of exceptional points in the participants' emotional trajectories was quite high. There were 142 exceptional points in the 242 emotional trajectories analyzed, of which 70% were positively trended. Exceptional points provide also relevant information about the predominant shape of the emotional trajectories during the course. In this study, we have focused on the changes in the participants' emotional trajectories which were statistically significant, i.e. on turning points. However, as evidenced in the amount and quality of the exceptional points, the emotional orientation of most of the participants' trajectories is similar to the one signalled by the most common types of turning points: a positive orientation associated with points in time during the training which the participants perceived as particularly complex.

5. Educational implications

Educational interventions that challenge individuals' ways of meaning-making are usually associated with emotional arousal (Apte, 2009; Antonacopoulou & Gabriel, 2001; Cranton, 2002; Kegan, 1994; McEwen et al., 2010). A detailed tracking of students' emotional trajectories over time in search of transition points marked by discontinuities – the turning points in our study – could therefore enable teachers to identify periods in training that might mobilize or inhibit students' adaptation and learning (see Hayes et al., 2007 for the same argument in the context of therapy). Similarly, a skilled teacher should take into account the periods when students are more open to change, in order to provide appropriate new input that destabilizes their current ways of meaning-making and facilitates the emergence of more adapted and complex ones (see Seligman, 2005 and Thelen, 2005 for this argument in therapy contexts).

We therefore believe that learning contexts can be structured to support and guide students toward accommodation processes (for a similar argument on therapy, see Kunnen & Wassink, 2003), so that they become deliberately developmental learning contexts (Kegan & Lahey, 2016). An endeavour for teachers is to undertake a careful follow-up of how learners emotionally respond to the new demands during the training. Teachers must acknowledge that students may feel anxious, insecure or overwhelmed when immersed for the first time in a learning context which no longer provides them with the guidance they are used to. Awareness of the intra-individual variability of students, as evidenced in different emotional responses, is equally important in supporting individuals' learning. The same group may contain students who are able and willing to explore new learning approaches, and students who are reluctant and afraid to do so. An issue to bear in mind is how open individuals are when responding to new inputs, i.e. how dominant and strong their patterns of meaning-making are, and how they interact with the new situation (Thelen, 2005). Kunnen and Bosma (2000) argue that individuals differ both in their preference for either accommodation or assimilation, and in their skills to apply these in a satisfactory manner, which leads to different learning and developmental trajectories. Accordingly, we predict that students with a greater preference for accommodation would be expected to present more turning points in their emotional trajectories, and particularly positively-trended turning points. On the other hand, students with greater preference for assimilation would be expected to present a more stable emotional experience, i.e. fewer turning points, or none.

6. Limitations

This study has three main limitations: (1) the number and distribution of measurements; (2) the grouping of emotions into positive and negative; (3) the specificity of the sample. As regards the number of measurements, the shortcoming involved in asking the students to assess their emotions at a few points in time is that some of their emotional fluctuations during the training was inevitably lost. This limitation is inherent in the study of any developmental process. Although the questionnaires were strategically distributed in order to increase the probability of capturing expected emotional upsets, the students could have experienced other upsets which they may have overcome by the time they completed the questionnaire. One possible way of recording these would entail asking the students at the end of every training session about the emotions they experienced most strongly, when they felt them and what they were related to. It could also be argued that the distribution of measurements during the training course was not consistent. We agree that this is the case, but this was intentional since the goal was to obtain data from the students after the periods of the course that we expected would be most challenging for them. We therefore do not consider the issue of whether the follow-up questionnaires were filled in after a phase in which students had been sharing and reflecting on an experiential exercise, or the students had been doing an exploratory exercise, or the trainer had been giving instructions for the development of an exercise, to be a problem.

Secondly, we acknowledge that the grouping of emotions into positive and negative emotions is an oversimplification of the students' emotional experience, which might lead to nuances in the patterns of discrete emotions being overlooked. However, considering the aim of this study, we found that valence sufficed for grasping the main emotional patterns.

Finally, it can be argued that the specificity of the sample may mean that the generalization of the results is questionable. It is important to note that our aim was not to generalize these results to other samples, but rather to examine a training course in which a process-oriented experiential learning model was implemented. In fact, the trainer of the course, John McWhirter, was the developer of the experiential learning model applied. Nevertheless, further research with different samples and in different learning settings is recommendable in order to explore possible differences in how students manage complexity.

7. Directions for future research

This study can lead to the formulation of new research questions and hypotheses about how individuals manage contextual complexity. On the one hand, it is a first step in reviewing some of the traditional ideas about learning, such as the assumption that contextual complexity always leads to individuals' learning.

It also opens the door to further research on cognitive accommodation. This would require the inclusion of measures of students' learning performance. To do so, a learning setting in which performance could be followed over a much longer time span –several weeks at least– after potential turning points in students' emotional trajectories would be needed. Time is required before increases in individuals' performance become visible. In this study it was therefore not useful to include performance measures. From a dynamic systems perspective, transformations have to resettle, and often, there may be a short dip in performance shortly after the transformation, due to the system having to reorganize and getting used to new patterns.

The collection of qualitative data both throughout the learning experience and at the end of it is essential in an in-depth investigation on how different students make meaning of the challenging demands arising from a process-oriented experiential learning model. The collection of time series data on variables such as the duration of the emotions experienced, and the degree of challenge and support perceived during the training are also important for gaining greater insight into students' experience during a training course. This latter would provide more information than the variable of complexity used in this study.

Additionally, investigating traditional learning settings could show us whether the patterns in students' emotional trajectories differ from those found in a process-oriented experiential learning context. We anticipate that there would be no turning points in students' emotional trajectories, which would present a mostly flat shape. This would demonstrate that training based on didactic learning does not upset students and that it is therefore not a supportive context in terms of enhancing students' adaptation to complex contexts and providing greater opportunities for cognitive accommodation.

8. Conclusion

Using a dynamic systems approach, this study examined the emotional trajectories of the participants in an experiential learning course in order to investigate how these individuals managed conflicting training demands. The most frequent types of turning points identified –pre-increases in positive emotion trajectories and pre-decreases in negative emotion trajectories– coincided with particularly complex periods in the training. The positive trend found in emotional trajectories is taken as evidence of the participants' adapted responses to the demands of the challenging learning approach.

These findings are consistent with the ideas that development and learning occur in response to conflicting demands that challenge individuals' ways of meaning-making, and that cognitive conflict is usually associated with the experience of negative emotions. However, our main contribution is providing empirical proof of these former claims, by establishing a dynamic systems procedure that identifies turning points in developmental trajectories. This procedure offers an alternative to standard research methods focusing on the product of development and which overlook the process, and confirms that dynamic systems are a very robust approach for achieving this. This procedure could be applied to a range of longitudinal experiences that are very common in educational and developmental settings.

Our findings also support the idea that contextual complexity alone does not lead to individuals' adaptation and learning. Instead, in order to explain this adaptation, we need to consider the way in which individuals manage complexity. The quality and result of this management can be influenced by several factors, such as the individuals' self-management baseline, and the timing when the contextual complexity is faced in terms of the individuals' resources to manage it.

Finally, this study confirms that the process-oriented experiential learning model is particularly useful for supporting students in the process of managing contextual complexity. It provides students with a wide range of experiential variation and demands they engage in a different way of learning, in which exploration, curiosity and uncertainty are key factors. This is a potential opportunity for individuals to revise their previous ways of learning, which are usually rooted in didactic learning settings, and opens up the path to becoming more autonomous and creative learners.

9. Appendix

Appendix 1 Overview of the timeframe of the training course. The follow-up questionnaires are boldfaced.

	Day 1	Day 2	Day 3	Day 4	Day 5
	Course introduction	Students' revision	Students' revision	Students' revision	Students' revision
	Trainer's *sets* students *up* and then presents instructions for exercise 1	Students' sharing and reflection (*set-down*, consolidating learning)	Trainer's *set-up* and instructions for exercise 1	Students' sharing and reflection (*set-down,* consolidating learning)	Trainer's *set-up* and instructions for exercise 1
	Students do exercise 1	Trainer's *set-up* and instructions for exercise 1	**Questionnaire 5**	**Questionnaire 7**	Students do exercise 1
	Trainer's *set-up* and instructions for exercise 2	Students do exercise 1	Students do exercise 1	Trainer's *set-up* and instructions for exercises1 and 2	Trainer's *set-up* and instructions for exercise 2
10.00 – 11.30	Students do exercise 2	Trainer's *set-up* and instructions for exercise 2	Trainer's *set-up* and instructions for exercise 2 (for the break)	Students do exercises 1 and 2	Students do exercise 2
	Students' sharing and reflection (*set-down*, consolidating learning)	Students do exercise 2			Trainer's *set-up* and instructions for exercise 3	
	Trainer's *set-up* and instructions for exercise 3	Trainer's *set-up* and instructions for exercise 3		Students do exercise 3	
	Students do Exercise 3	Students do exercise 3			
	Trainer's *set-up* and instructions for exercise 4 (for the break)				
			Coffee break		
12.00 – 14.00	Students' sharing and reflection (*set-down*, consolidating learning)	Trainer's *set-up* and instructions for exercise 4	Trainer's *set-up* and instructions for exercise 3	Trainer's *set-up* and instructions for exercise 4	Trainer's *set-up* and instructions for exercise 3

	Trainer's *set-up* and instructions for exercise 5	Students do exercise 4	Students do exercise 3	Students do exercise 4	Students do exercise 3
	Students do exercise 5	Students' sharing and reflection (*set-down*, consolidating learning)	Trainer's *set-up* and instructions for exercise 4	Trainer's *set-up* and instructions for exercise 5	Trainer's *set-up* and instructions for exercise 4
	Trainer's *set-up* and instructions for exercise 6	Trainer's *set-up* and instructions for exercise 5	Students do exercise 4	Students do exercise 5	Students do exercise 4
	Students do exercise 6	Students do exercise 5		Students' sharing and reflection (*set-down*, consolidating learning)	Students' sharing and reflection (*set-down*, consolidating learning)
	Students' sharing and reflection (*set-down*, consolidating learning)	Students' sharing and reflection (*set-down*, consolidating learning)			Trainer's *set-up* and instructions for exercise 5
	Questionnaire 1	**Questionnaire 3**			Students do exercise 5
					Students' sharing and reflection (*set-down*, consolidating learning)
					Trainer's *set-up* and instructions for individual exercise
			Lunch break		*End of the course*
	Trainer's *set-up* and instructions for exercise 7	Trainer's *set-up* and instructions for exercise 6	Trainer's *set-up* and instructions for exercise 5	Trainer's *set-up* and instructions for exercise 5.2	
	Students do exercise 7	Students do exercise 6	Students do exercise 5	Students do exercise 5.2	
16.00 – 18.00	Students' sharing and reflection (*set-down*, consolidating learning)	Students' sharing and reflection (*set-down*, consolidating learning)	Trainer's *set-up* and instructions for exercise 6	Trainer's *set-up* and instructions for exercise 6	
	Trainer's *set-up* and instructions for exercise 8	Trainer's *set-up* and instructions for exercise 7	Students do exercise 6	Students do exercise 6	
	Students do exercise 8	Students do exercise 7	Students' sharing and reflection (*set-down*,	Students' sharing and reflection (*set-down*,	

			consolidating learning)	consolidating learning)
	Students' sharing and reflection (*set-down*, consolidating learning)	**Questionnaire 4**		
	Trainer's *set-up* and instructions for exercise 9 (for the break)			
	Coffee break			
18.30 – 20.00	Trainer's *set-up* and instructions for exercise 10	Students' sharing and reflection (*set-down*, consolidating learning)	Trainer's *set-up* and instructions for exercise 7	Students' sharing and reflection (*set-down*, consolidating learning)
	Students do exercise 10	Trainer's *set-up* and instructions for exercise 8	Students do exercise 7	Students do exercise 7 in life
	Questionnaire 2	Students do exercise 8	**Questionnaire 6**	Trainer's *set-up* and instructions for exercise 8
		Students' sharing and reflection (*set-down*, consolidating learning)		Students do exercise 8
				Questionnaire 8

Appendix 2 Distribution of turning points (t.p.) across participants and across measurement points (m.p.). Pre-increase turning points in positive emotions are shaded light grey and pre-decrease turning points in negative emotions are shaded dark grey.

Particip.	M.p.2 Pre-decrease Pos.Emo.	M.p.2 Pre-decrease Neg.Emo.	M.p.2 Pre-increase Pos.Emo.	M.p.2 Pre-increase Neg.Emo.	M.p.3 Pre-decrease Pos.Emo.	M.p.3 Pre-decrease Neg.Emo.	M.p.3 Pre-increase Pos.Emo.	M.p.3 Pre-increase Neg.Emo.	M.p.4 Pre-decrease Pos.Emo.	M.p.4 Pre-decrease Neg.Emo.	M.p.4 Pre-increase Pos.Emo.	M.p.4 Pre-increase Neg.Emo.	M.p.5 Pre-decrease Pos.Emo.	M.p.5 Pre-decrease Neg.Emo.	M.p.5 Pre-increase Pos.Emo.	M.p.5 Pre-increase Neg.Emo.	M.p.6 Pre-decrease Pos.Emo.	M.p.6 Pre-decrease Neg.Emo.	M.p.6 Pre-increase Pos.Emo.	M.p.6 Pre-increase Neg.Emo.	M.p.7 Pre-decrease Pos.Emo.	M.p.7 Pre-decrease Neg.Emo.	M.p.7 Pre-increase Pos.Emo.	M.p.7 Pre-increase Neg.Emo.	Total no. t.p.	N° m.p. with t.p.
1																										
2																										
3		1						1																	2	2
4																	1								1	1
5									2	2															4	1
6						1																			1	1
7																										
8										2															2	1
9																			1						1	1
10		1																							1	1
11		3																							3	1
12												2													2	1
13																										
14						2			1											3					6	3
15																			2	3					5	1
16	1																								1	1
17														1											1	
Total no. t.p.	1	5				3		1	3	4		2		1			1		3	6					30	
No. participants with t.p.	1	3				2		1	2	2		1		1			1		2	2						

Appendix 3 Trajectories of complexity scores for each student over the 8 measurement points. Three additional trajectories are displayed: 1) highest complexity score, 2) average scores of complexity, and 3) lowest complexity score.
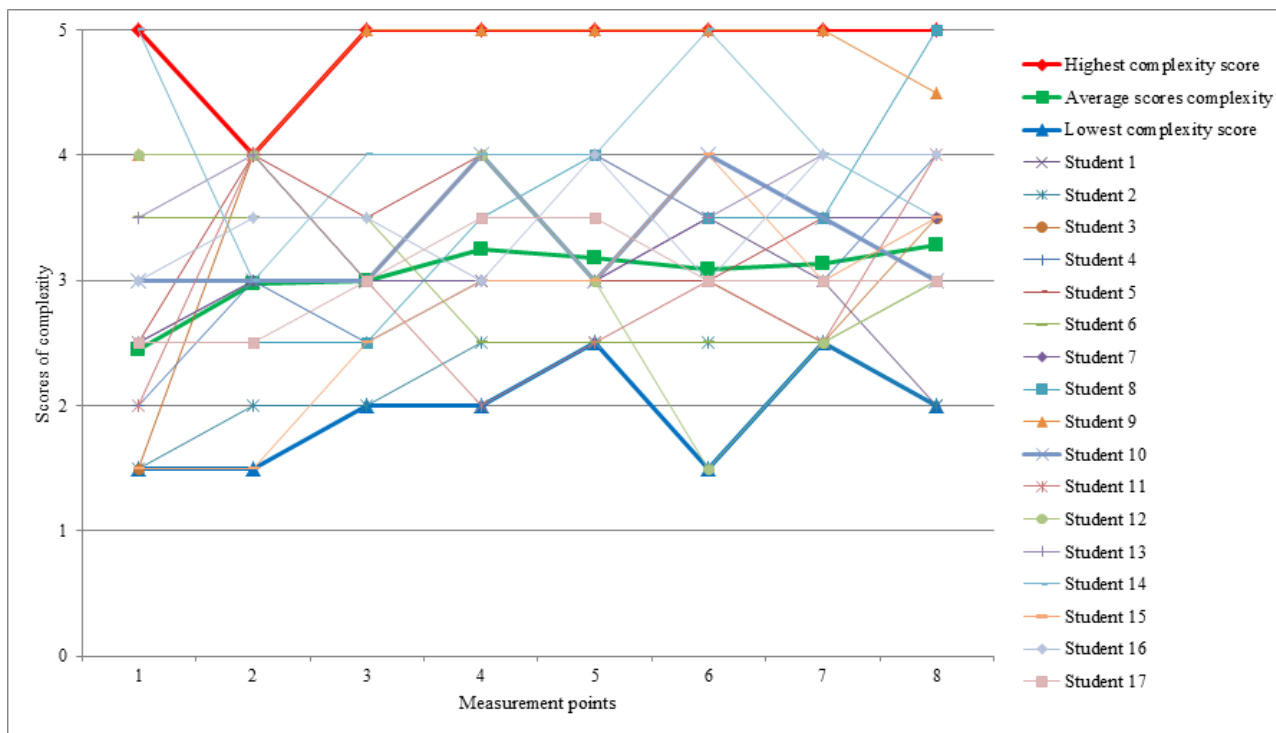
Transition
from the second to the third empirical study

The empirical study presented in the previous chapter investigated students' management of the complex demands arising from a course based on process-oriented experiential learning. The detection of positively-trended turning points in the students' emotional trajectories over the course and the relationship of such turning points with training complexity were taken as evidence of a successful management of the cognitive conflict arising from the clash between the students' prior ways of meaning-making and the challenging training demands.

Something that we acknowledged through this study was that time-series data were still insufficient to understand in depth students' process when managing destabilizations. With the intention to grasp that *how*, as well as to investigate *what* the outcomes of such processes could be, we started to design our third empirical study by acknowledging the needs to: 1) focus on students' discrete emotions – rather than organizing students' emotional experience into positive and negative– and provide students freedom when reporting the experienced emotions –i.e. not providing them a fixed list of emotions; 2) collect additional information on students' emotional experience over time, including the timing an duration of the emotions and what they were related to; 3) combine students' longitudinal accounts throughout the learning experience, as in the second study, with students' retrospective accounts after the learning experience, as in the first study; 4) replace the variable of complexity by the variables of challenge and support.

Likewise, we framed our third study within the transformative learning literature. Precisely within this framework the need to study transformative learning processes –against a predominance of studies focused on outcomes– and the need to do it beyond mere retrospective accounts of students' experiences, has been consistently claimed. As for our sample, we found that a case study would enable us to deepen in our comprehension of the processes of meaning-making and of the potential transformative learning outcomes in intentionally developmental learning contexts. Further details on how these emerging ideas evolved can be found in the next chapter, which encompasses the third empirical study of this thesis.

Chapter 4

Experiencing transformative learning in a counseling masters' course: a process-oriented case study with a focus on the emotional experience

Gloria Nogueiras,[1] Alejandro Iborra,[1] E. Saskia Kunnen[2]

1. Department of Educational Sciences, University of Alcalá (Spain)

2. Department of Developmental Psychology, University of Groningen (Netherlands)

Chapter 4

Experiencing transformative learning in a counseling masters' course: a process-oriented case study with a focus on the emotional experience

Abstract

This case study aims to investigate the transformative learning process and outcomes of a female master's student in a semester-long counseling skills training course based on experiential learning. The data included the student's longitudinal accounts (11 questionnaires on the emotions and challenges experienced in every training session and 3 blog posts) and retrospective accounts (a final reflective written activity and an in-depth interview) of her experience in the course. Through a thematic holistic analysis, we identified: 1) five phases in the student's learning process throughout the training, which illustrated her evolving meaning-making of the challenging training demands and related changes in her emotional experience; 2) two learning outcomes, including the student's new insights into the meaning of learning and her increasing self-awareness. The findings are discussed with an emphasis on the value of tracking learners' emotional experience over time to better understand their transformative changes, the contribution of experiential approaches to trigger such changes, and the potential of a process-oriented approach to investigate transformative learning.

Keywords: higher education, transformative learning, process-oriented approach, emotions, case study.

Introduction

Ideally, higher education should transcend its emphasis on the transmission of knowledge to support adult students in the transition towards increasingly sophisticated ways of meaning- making of reality, themselves and their relationships

(Kegan, 1994; Perry, 1970). This goal can be addressed by means of transformative learning theory. Transformative learning entails a process of examining, questioning, and revising our understandings, assumptions and expectations about the world –our frames of reference– in the light of new experiences that challenge such assumptions and enable us to understand the world from a more complex perspective (Mezirow, 1978, 2000). Over the last three decades, the large increase in research under the name of transformative learning has led to the existence of a wide array of conceptualizations of the construct, including cognitive (e.g. Mezirow, 2000), extrarational (e.g. Dirkx, 2001), and developmental (e.g. Kegan, 2000), as well as discussions on how learning should be to be taken as transformative (for this argument see Cranton & Taylor, 2012). This, in turn, has made it difficult to ascertain what is and what is not transformative learning, and has even led to discussion about whether it really exists (see Newman, 2012). In this context, Hoggan (2016) has suggested reconceptualizing transformative learning as a metatheory that encompasses the broad range of phenomena of people changing deeply. To do so, he has proposed a typology of transformative learning outcomes –changes in individuals' worldview, self, epistemology, ontology, behavior, or capacity– and three criteria for them to be considered transformative –depth, breadth, and relative stability.

When investigating transformative learning, a meaningful issue to focus on is students' emotional experience (Dirkx, 2014; Taylor & Laros, 2014). Transformative learning is likely to occur when individuals' long-held frames of references are challenged and thus susceptible to being noticed, questioned and reflected upon (Kegan, 2000; Mezirow, 2000). Such frames of reference provide us with a sense of stability, coherence and identity that enables us to understand our surroundings (Mälkki, 2010; Mezirow, 2000). Therefore, when these are threatened, it is very likely that individuals experience emotions such as confusion, uncertainty or anxiety (Dirkx, Mezirow, & Cranton, 2006; Formenti & Dirkx, 2014; Nogueiras & Iborra, 2017). These unpleasant emotions, however, can be the catalyst for individuals' transformative learning in that they might help us in the process of identifying our taken-for-granted and obsolete assumptions in such a way that they can be reconsidered and extended (Mälkki, 2010; Taylor & Jarecke, 2009). With this in mind, it is our belief that investigating students' emotional experience over time in educational settings intended to promote transformative learning might shed light on the quality of the potential transformative processes being undergone. Specifically, as emotions provide information on how individuals react to their learning

process, changes in the patterns of the experienced emotions might indicate the occurrence of inner reorganizations –transformations– in individuals' understandings of learning and how they conceive themselves as learners.

In relation with the former is the claim for the need for a more detailed study of individuals' transformative learning process (Mälkki & Green, 2014; Newman, 2012). This arises from a context where most studies have focused on individuals' transformative learning outcomes and yet have overlooked the key question of how such outcomes take place. As for the available research on transformative learning processes, so far, it has mostly relied on qualitative retrospective studies of learners' transformative experiences, primarily through interviews at the end of training programs (for this argument, see Cranton & Hoggan, 2012; Kasworm & Bowles, 2012; Merriam & Kim, 2012; Taylor & Laros, 2014). One exception worthy of mention is DeCapua, Marshall and Frydland's (2017) case study, which employed a qualitative approach to follow the transformational learning process of a novice ESL teacher through her reflective journaling over an eight-week training course.

In our view, a retrospective account of students' experiences at the end of a learning experience is insufficient to provide a comprehensive understanding of individuals' dynamic transformative processes and how they are shaped by the educational contexts (see also Taylor & Cranton, 2013). As a response to this limitation, and acknowledging the key role of emotions in transformative learning, we argue that a combination of longitudinal and retrospective accounts of students' emotional experiences in intentionally developmental training contexts may provide detailed insight into transformative learning processes.

Although any kind of individual account of an experience is necessarily retrospective, when we suggest collecting students' longitudinal accounts of their emotional experience, we refer to the identification and brief reflection on their emotions over the course of a training experience, particularly at the end of every training session. Gathering this kind of longitudinal data is thought to facilitate the follow-up of students' potential transformative processes over time, in a micro-scale, giving them the opportunity to register and reflect on their experience as soon as possible. These longitudinal accounts are different from the students' reflection on their experience of a training experience as a whole once the training has finished, which is what we refer to as a retrospective account. Thus, while the temporal scope of the longitudinal reflections is limited to the current training ses-

sion, the scope of the retrospective reflection is the whole training course, including also the moment where such reflection is developed. This retrospective reflection is thought to provide the chance for students to reflect differently –from a vantage point– on their micro-processes of change, as well as to report potential outcomes that they might be able to identify only after the training. The described longitudinal and retrospective reflections are closely connected to Schön's (1983) concepts of reflection-in-action and reflection-on-action. Reflection-in-action is "action present", and entails reflecting on the situation while it is still occurring, in such a way that the reflection can benefit the situation. Reflection-on-action, on its part, involves reflecting on a situation after it has taken place, what can help us to notice the contribution of knowing-in-action to the final outcome.

Within the previous framework, the present study is intended to achieve a comprehensive understanding of transformative learning processes and outcomes – which we consider as inseparable– by adopting a process-oriented approach that relies on the collection of both longitudinal and retrospective data, with a focus on learners' emotional experience. To this end, we develop a case study on a female master's student, Rose –a pseudonym– enrolled in a counseling skills training course based on process-oriented experiential learning (McWhirter, 2002). The training course was selected because process-oriented experiential learning has been shown to successfully contribute to students' transition toward more complex ways of meaning-making by challenging their prior ways and enhancing students' exploration. Rose was selected from a group of 10 students because, after an initial approach to the available data, she was considered to be a rich example of someone who had experienced transformative learning throughout the training. The specific research questions that we address are the following: 1) How does Rose emotionally respond to the challenging training demands over time? How is this related to her changing way of making sense of them? 2) What are the outcomes that Rose reports after the training course? Are they evidence of transformative learning? 3) How might process-oriented experiential learning be contributing to Rose's transformative learning process and outcomes?

2. Method

2.1.   Research context

The research context was a training course on counseling skills in a master's degree in secondary education. The course was held at a Spanish university and took place over 12 weekly sessions of 80 minutes each. The trainer was the second author. The first author attended as an active observer. The course aimed to facilitate students' development of exploration skills when leading a counseling session. It was based on a process-oriented experiential learning model (McWhirter, 2002), with collaborative and dialogic nuances (Iborra, García, Margalef & Pérez, 2009). The practice of exploration skills revolved around students' personal issues and was organized in exercises in groups of three with rotation of the roles of counselor, client and observer. After some sessions practicing natural exploration skills, three formal distinctions were introduced, adapted from the work of McWhirter (2011), who in turn created them inspired by the constructivist notions of *map* and *territory* used by Bateson (1991). According to McWhirter (2011), any model –map or representation– includes specific details. These details are scoped –numbered, sized, bounded and even qualified– in different manners. The details are connected within this scoping. The *Basic Fractal Language Model* (detail-scope-connection) describes eighteen integrated distinctions as a result of combining these three basic elements, which were employed to explore the subjective representations of the participants' personal issues in the experiential exercises throughout the course. The presentation and practice of the model –first, detail, scope and connection were practiced sequentially; later, they were all applied in two integration exercises– was related to the notions of *spiral curriculum*[1] (Bruner, 1960) and *epigenesis*[2] (Van Geert, 2003) in that every session was built on previous ones and entailed an increasing degree of complexity. To promote the students' reflection and self-assessment throughout the training, the teacher suggested that they create a personal blog and participate in a collaborative wiki. The students' participation in both activities was voluntary.

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[1] The concept of *spiral curriculum* was coined by Bruner (1960) and involves an iterative revisiting of topics over time at increasing levels of difficulty, where every encounter builds on previous ones.

[2] According to the epigenetic explanation of development, the form of a structure is literally constructed by the construction process itself, as every step creates the conditions for the next step (Van Geert 2003).

Third empirical study. Experiencing transformative learning in a counseling course: a process-oriented case study

2.2.   *Participants*

The participants in the training course were 10 graduate students (8 women, mean age 25, age range 22-35). In the first session of the course, they were informed by the trainer about the research purpose and design, asked for their voluntary participation in the study, and given guarantees of confidentiality, after which they signed an informed consent form. All the students participated in the research providing information about their experience throughout and at the end of the training (see the next section for more details about data collection). With the aim of understanding transformative learning in depth, this article focuses on a specific instrumental case (Stake, 2005): a 24-year-old female Psychology graduate named Rose. She was selected at the end of the training course due to the richness of the information that she had provided through the data collection process. This method furnished evidence of her being a model example of someone who had potentially experienced transformative learning. Although all of the course participants experienced a change to some extent, Rose had provided a much more detailed and complex description of her experience. This could potentially provide a more comprehensive account of transformation, which was complemented by further data collection.

2.3.   *Data collection*

In order to grasp students' experiences in the training with as much detail as possible, we collected data both during and upon completion of the course.

2.3.1. *Longitudinal data*

Follow-up questionnaires. At the end of every training session, from the second to the twelfth, students filled in a questionnaire that included time-series data and qualitative data. The inclusion of time-series data was thought to facilitate grasping students' micro-processes of change. First, the students registered the emotions experienced during the session –some emotions were suggested, but the list was blank to promote free expression–, indicating when they experienced them and their intensity on a Likert scale from very low (1) to very strong (5), and described what they related the emotions to. Second, the students indicated their position on a security–insecurity scale and a boredom–challenge scale, and described the most challenging aspect of the session. Unlike other studies that collect participants' data through a limited number of questionnaires spread over time, in this

study, the high frequency of questionnaires aimed to measure more potential change in learners and follow their process in detail. The questionnaire can be found in the Appendix.

Blog posts. Students were encouraged to reflect on their ongoing learning experience and to share these reflections in a personal blog. 8 out of the 10 students created a personal blog and wrote on it throughout the training. Rose published three posts on her blog: "Thinking about what I learn" (2nd week), "We reflect not only in the blog" (3rd week), "Accuracy" (5th week).

As part of the data collection throughout the course, the training sessions were documented with audio recordings and summaries written by the first author.

2.3.2. Retrospective data

Final reflective activity. Once the training sessions ended, all of the students carried out an individual written activity in which they were asked to: a) elaborate a self-assessment, b) reflect on: b.1) the counseling exploration with an unknown client conducted in the last session; b.2) the personal issues explored in the practical exercises throughout the course; b.3) connections between a text on dialogic therapy and their process throughout the course; b.4) the questionnaires filled out over the training. The activity guidelines can be found in the Appendix.

Interview. Three out of the ten course participants, who were considered information-rich cases, were selected and requested to participate in an individual interview about their experience in the course. As for the particular student who is the focus of this study, six weeks after the training ended, Rose met the first author to discuss and reflect on her experience. The interview was conducted at the faculty where the training had taken place and lasted one hour and forty minutes. It was recorded using a digital audio recorder and transcribed verbatim. Prior to the interview, the data collected so far had been revised in detail to identify areas of interest. During the interview, an open-ended structure prevailed. It started by asking Rose to talk freely about her experience in the course. Subsequent interviewer's interventions entailed questions or prompts to encourage Rose to go into depth about certain topics. At some points during the conversation, the interviewer made reference to data found to be of interest, such as issues highlighted by Rose in her

blog posts and her final reflective activity, and other remarkable information that she had reported in the follow-up questionnaires.

2.4. *Data analysis*

The analysis was carried out by the first author and supported by the second and third authors, who played the role of *critical friends* (Foulger, 2009) by reviewing and discussing the ongoing analysis with the first author. The analysis developed over three stages. In the *first stage,* which started after the course ended, the data collected so far –students' follow-up questionnaires, blog posts, and final reflective activities– were explored in search of information-rich cases. This review, together with our knowledge of the students' process over the training, led us to select three students whom we interviewed in depth about their experience in the course. After these interviews, we selected Rose for the present study due to the reasons provided earlier. The *second stage* of the analysis involved two interrelated tasks. In order to obtain more detail about Rose's process over the training, we analyzed her posts and the information that she provided in the follow-up questionnaires, and also reviewed the summaries of the training sessions. This information was organized and represented sequentially in a timeline which depicted Rose's emotional experience throughout the course (see figure 1). Likewise, we reviewed and analyzed the qualitative information reported in the final reflective activity and in the transcribed interview. This retrospective account of Rose's learning experience was subjected to a thematic analysis with a holistic oriented approach (Braun & Clarke, 2006; Lieblich, Tuval-Mashiach, & Zilber, 1998). Both analyses, longitudinal and retrospective, were combined to obtain a double verification of meaningful topics. The *third stage* of the analysis entailed the process of writing our insights, which led to the findings report.

3. Findings

The findings are organized around Rose's learning process throughout the training and the learning outcomes that she identified once the training finished. In this section, these two themes are presented and illustrated by Rose's excerpts and complemented by the teacher's excerpts.

3.1. *Rose' learning process throughout the course*

Five phases were identified in Rose's process over time according to her qualitatively different way of making sense of the training demands and of responding emotionally to them. The first four phases –represented in figure 1– correspond to the face-to-face training period. The fifth phase encompasses the period after the course ended, when Rose had the opportunity to reflect on her process both in the final reflective activity and in the interview.

3.1.1. Phase 1. Becoming familiar with the teaching methodology

This phase encompasses the first two training sessions. During this phase, Rose reported being both curious and interested while she was becoming familiar with the teaching methodology, which she described as very new in comparison to previous learning experiences. In this connection, despite feeling insecure when using new technologies, Rose followed the teacher's suggestion of creating a personal blog as a space to reflect on her learning process. She wrote a first post, published after session 2, in which she elaborated on a couple of elements of the course methodology. On the one hand, Rose acknowledged her surprise about being requested to make explicit her emotions through the follow-up questionnaires. On the other hand, she wrote about her experience of both confusion and curiosity with regards to the concept of "personal issue", which had been covered in an introductory class exercise: Apparently it was an easy task, but it took me a long time to start writing. First, I had to try to define the term "issue" and I thought that it could be "something that I must do", "something that I must investigate about", or "topics that interest me". Later, I wrote a list of four issues, that I was incapable of ordering according to their priority. I did not even know if what I had written were issues or not.

The initial information provided by Rose enabled us to appreciate in her a sense of commitment towards learning, as illustrated by her opting to create a blog in which to actively engage in reflection. Likewise, the report of emotions such as interest and curiosity are relevant as far as they might be supporting Rose when addressing the demands of the new methodology.

Figure 1. Timeline representing Rose's emotional experience throughout the training sessions of the counseling course organized around four phases. The three posts that Rose wrote in her personal blog and four key class events are located within the timeline

3.1.2. Phase 2. Encountering difficulties: learning conception and sense of competence challenged

This phase encompasses course sessions 3 to 6 and entails the beginning of counseling practice. In this phase, Rose reported the following challenges: 1) reflecting on her personal issues and gaining new insights into them (s.3)[3]; 2) understanding "correctly" the conceptual distinctions proposed by the teacher to be used in the exploration processes during the counseling exercises (s.4, s.5, s.6), which was uncertain and confusing; 3) applying "correctly" these conceptual distinctions (s.5), which was coupled with a sense of responsibility; 4) understanding the experiential methodology proposed to do the exercises (s.6), which Rose found confusing. Likewise, in her second post, published after s. 3, Rose acknowledged reflection as a challenging process that students were requested to develop. Interestingly, in that post, Rose provided evidence of self-reflection, highlighting insights about her performance in the course: *My involvement had been greater in the blog than in the wiki (...). Now I become aware that there is a great difference: responsibility. While in the blog the responsibility is exclusively mine, in the wiki the responsibility is shared. I cannot delegate in any other person the activity in the blog, therefore I assume it and I engage in the task.*

As a way of managing the aforementioned challenges, Rose dared to share her concerns with her classmates and with the teacher in two class sessions. In session 4 she elaborated on her difficulty to understand the new conceptual distinctions "correctly*"* and in session 6 she described her difficulties when trying to apply these distinctions during the counseling explorations: *I have a problem that I must share. I feel overwhelmed while paying attention to so many things: quantificators, qualificators, detail... If I do it in an explicit manner I do it wrong (...) I have the impression that now I do it worse than when I explored in a natural way.* As an additional elaboration on her concerns, Rose published a third post in her blog, after session 5, in which she reflected on how her sense of accuracy was being challenged.

In light of Rose's concerns, the teacher did several interventions aimed at helping her to address these concerns. In session 4, he introduced the idea of understanding as a process, and not as a static or digital outcome (*either understand or*

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[3] Hereinafter, "s." will be used as an abbreviation for "session".

not understand). During session 6, he reframed what Rose considered to be "wrong" as something natural in learning, as can be noted in his next intervention: *You are noticing it as wrong because it is not your natural way (…) You will be making it more natural and moving to a greater degree of competence (…). It is a natural part of learning.* Likewise, in response to Rose's third post, the teacher reframed Rose's use of the term "failure" when describing her learning process: *There are no failures during learning. There are mistakes that inform us about corrections that we must make, which are in themselves a big part of what we learn. Calling them failures adds a judgment which is not always useful.*

Apart from the unpleasant emotions linked to the challenges experienced, throughout this second phase, Rose also reported a consistent interest. Additionally, she reported positive emotions when she started to get insights after having shared her concerns in class and receiving support from the teacher. Specifically, she described satisfaction when she realized that her thoughts were neither "good" nor "bad" (at the end of s.4), and relief when she managed to better understand the former training sessions (at the end of s.6).

Thus, after a phase of familiarization with the training context, Rose's encounter with new demands that challenged her previous ideas on learning and her sense of competence, led her to experience emotions such as confusion, uncertainty and feeling overwhelmed. Rose's sharing of her concerns with the group enabled her to receive some support from the teacher, whose interventions aimed to help her move from a static and digital conception of learning to a more processual and analogical one. Likewise, during this phase, Rose's consistent interest kept her engaged in the course despite the difficulties. The incipient changes in Rose's conception of learning continued to be consolidated in the next phases.

3.1.3. Phase 3. Gaining insights into the meaning of learning

This phase encompasses course sessions 7 and 8. During these sessions, Rose was particularly concerned with the application of the new conceptual distinctions throughout the counseling explorations, which led her to experience anxiety (s.7) and concern (s.8) before the practical exercises, and insecurity and frustration while performing them (s.8). As a counterpart to these emotions, Rose reported relief when she was able to recognize different levels of exploration during one of the exercises (s.8). In this phase, as in the previous ones, Rose consistently re-

ported curiosity and interest about the activities carried out (s.7), which could be contributing to her stable engagement in the course despite the challenges experienced.

This phase also entailed Rose's acknowledgment of progress in conceptual understanding (s.7) and in her response to challenge (s.7 and s.8). Already initiated in the previous phase, these changes were supported by two class conversations in which the students shared with the teacher their concerns about how they would be assessed (s.7) and about their experience of "feeling lost" (s.8). The teacher responded to these concerns by noting that "it was still early" (s.7) and by stressing that feeling lost was part of any deep learning process (s.8): *The creation of any habit or learning requires emotions of uncertainty and discomfort… something that does not flow. That is part of the process of learning. We are in a society that emphasizes security, certainty… but as we are promoting experiential learning, uncertainties are common. This is evidence that you are progressing.*

Following the teacher's interventions, Rose started to provide evidence of revisited learning conceptions. In particular, she reported satisfaction when noticing that mistakes could be made and when understanding her learning process (at the end of s.7) and tranquility when she realized that uncertainty was "normal" while learning (at the end of s.8). This can be noted in the following comment in the questionnaire: *We started to talk about how we felt with regards to our learning process, and I am reassured to know that it is still soon, and that uncertainty is part of the process. This has made me to (…) have less rush to get complete comprehension.*

3.1.4. Phase 4. Acknowledging progress as counsellor

This phase encompasses the last training sessions: s.9, s.10 and s.12 (Rose could not attend s.11 for personal reasons). During this phase, the most challenging aspect for Rose was carrying out "good" counseling explorations, for which she reported as having made a great effort. Rose identified unpleasant emotions, such as concern linked to her wish to perform explorations "correctly" (s.9) and anxiety at the beginning of two exercises that aimed to integrate the management and application of distinctions which had been practiced separately in former exploration exercises (s.10, s.12). In both cases, Rose reported having overcome her anxiety by "letting herself go" (s.10) and by "focusing on doing things correctly" (s.12). This

is new evidence of Rose going beyond the conception of learning and understanding as something digital or polarized, and accepting its ongoing nature. The former responses led Rose to experience security (s.10), enthusiasm and enjoyment (s.12). On the other hand, at the end of the sessions, she acknowledged her good counselor performance, expressed her desire to keep improving it, and reported satisfaction (s.9, s.10, s.12), enthusiasm (s.9) and joy (s.9, s.12). As an illustration, in the questionnaire filled in at the end of the last session (s.12), Rose expressed satisfaction and joy *for having carried out the counseling session, knowing that I can improve but that I have known to "manage" the session.* This is further evidence of Rose having revised her conception of learning as something static and digital. As in the former phases, Rose remained curious (s.9, s.10) and interested (s.9, s.10, s.12).

3.1.5. Phase 5. Rose's retrospective reinterpretation of her experience throughout the training

In connection with the phases described, when Rose elaborated on her experience throughout the course in the final activity, she summarized it by highlighting her experience of confusion until the last part of the training: *It has been a confusing and insecure process, since it has been an exploration and intervention method completely new for me. These emotions have remained throughout the process, until the last sessions when the confusing learning process gave way to a greater understanding of what we had worked on, which became evident in the good self-assessment of my interventions as counselor in the practical exercises.* The positive self-assessment that Rose mentions is something new, and entails an illustration of a new relationship with herself, measuring her performance in a more continuous way, beyond polarized or static distinctions. Also in the context of the final activity, Rose found the text on dialogic therapy, which had been proposed to be read (Anderson, 1997), very helpful for making meaning of her transformative experience in the course: *The authors claim that "the students usually live that transformation before having the words that enable them to understand it" and I completely agree. In fact, it has been this text what has let me understand perfectly my own transformation process.* Delving into her learning process, in the interview, Rose highlighted the difficulties that, paradoxically, she found when experiencing as a student a learning model that she agreed with intellectually: *Despite I thought that I was a person who worked on those values, then, in the moment of truth, I felt… a bit... not uncomfortable, but it shocked me at the beginning, and that initial shock surprised me and I said: "let's see, what is happening to me,*

I mean, if I do really want this, why now it is difficult…? (…) Now I understand that the change might be easy in theory but very difficult in the practice.

The previous excerpts illustrate how the final reflective activity and the interview, in connection with her previous experience over the course, enhanced Rose's more complex meaning-making, including a critical revision of her process and demonstrating some insights.

3.2. Rose's learning outcomes from the course

Rose's reflection in the final activity and in the interview enabled us to identify two types of learning outcomes achieved that were grounded by events reported in her longitudinal accounts, namely: a) insights into the meaning of learning; b) an increasing self-awareness.

3.2.1. Insights into the meaning of learning

Rose acknowledged gaining insights into her way of understanding learning, including the processual nature of learning, the value of uncertainty, the informational role of emotions such as insecurity, the importance of students' activity through reflection, or the role of the teacher as a facilitator. The phases described and illustrated in the previous section reveal what experiences contributed to the emergence of Rose's new learning conceptions. These insights emerged through a process in which Rose had the opportunity to compare herself at different moments in the training in the different spaces for data collection. This enabled her to generate differential information about her learning process, leading to a more dynamic evaluation of her process as a learner, as opposed to the typical evaluation in traditional learning settings, which occurs at the end of the learning experience and focuses on contents. In this regard, Rose reported that the questionnaires helped her to move from a static to a processual learning conception, as illustrated in the next excerpt from her final activity: *I thought that I could not progress in my learning if I did not master what had been worked before. Therefore, the questionnaires have helped me to understand better what a "learning process" is, that it is continuous, and that insecurity is positive.* "Continuous" can be taken as a synonym of "processual", which entails going beyond bipolar and static judgments when evaluating one's learning.

Rose's insights into learning were also demonstrated by her ability to identify and reflect upon features of the teaching methodology that were "light years away" from the educational practices that she was familiar with. Related to the promotion of students' reflection, which she described as a key competence boosted in the course, Rose emphasized the promotion of students' autonomy and self-direction, which is linked to a more complex learning conception: *Here you set the pace, you reflected as much as you wanted, and anyone told you how much* (interview). Interestingly, this became obvious for Rose during a conversation in which the students shared with the teacher their puzzlement about assessment: *(Name of classmate) asked: "The interventions in the blogs, in the wiki: will they be graded?" The teacher answered: "No, no, this is for you". I had not even thought about it... that it was really for... us, neither for him nor for a grade (...) This is a very important difference, the autonomy to say: "it is your process"* (interview). Furthermore, Rose described the training as the first real example of collaborative learning that she had experienced in her own flesh. In this connection, she associated the spaces for dialogue generated in the course with the promotion of one's own reflections: *Everyone has his own perception of things, that's why I think that this "process" gives value to that: to my own interpretation, to reflect on what I think and on what I "feel"* (interview). Finally, in the next excerpt, Rose provides evidence of having acknowledged the fine-tuning nature of the teaching methodology: *[Name of teacher] saw that after the practical exercises we missed discussion, and I think that his way to solve this was when me and [name of classmate] went in front of the class to do it* [counseling exploration] *(...) Wow! This is what you need in learning: someone who comments, who does not judge but comments on what you are doing* (interview).

3.2.2. Increasing self-awareness

In the light of the destabilizing demands of the training, there were three personal features that became salient –as they posed a challenged– for Rose, namely her natural tendencies to 1) understand and do things "correctly", 2) reflect thoroughly in her personal experiences and, 3) be accurate in her use of language. This became evident in the posts that Rose wrote and in the class interventions in which she expressed her threatened competence. Such spaces enabled Rose to objectify and reflect on her challenged personal features, as can be noted in the next excerpt from her third post (after s.5): *I thought I was a quite accurate person when talking (...) Now, after these two tough sessions, I realize that I can "shoot" my words*

with more accuracy. (...) It challenges me because I have realized that I can be even more demanding, and I do not know if I will be able to do it. It concerns me because evaluate continuously my linguistic productions entails a great mental exhaustion (...). What makes me exhausted is doing all this in an explicit, intentional and conscious manner. This excerpt is evidence of an incipient reexamination of Rose's previous standards when evaluating herself. Interestingly, Rose pays attention to the complexity of doing new things in a conscious manner, which is connected with some of the aforementioned fine-tuning teacher's interventions, specifically the typical difficulties associated with integrating processes that we are not used to.

Rose provided a more thorough reexamination of her personal features in the final activity and in the interview. For instance, in the next excerpt from the interview, Rose refers to the awareness of her cited natural tendencies, and to the new acquired possibility of acting upon them: *If I did those things already without noticing them, now I am going to do them being aware, then I think, or I expect, that I will try to do them better.* Something that seemed useful for raising Rose's self-awareness was the regular attention paid to the experienced emotions and to the source of these emotions while filling-in the follow-up questionnaires. This is illustrated in the next interview excerpt, in which Rose connects an increasing emotional awareness with self-reflection: *You feel all the time, but making it explicit makes you feel even more and realize what you are feeling (...). It is very positive because it helps you for self-reflection and self-assessment.* What Rose is expressing is the new possibility of objectifying her emotions while participating in an experience. This enables her to go beyond an automatic reaction to those emotions, taking decisions on how to manage them.

4. Discussion

As Formenti and Dirkx (2014) state, "when we experience transformative learning we are fundamentally different somehow in some small way" (p. 127). Rose's reports at the end of the training furnished evidence of her becoming different on two levels: on the one hand, she had several insights into the meaning of learning, which enabled her to move towards a more complex conception of learning; on the other hand, she demonstrated an increasing degree of self-awareness. The occurrence of these transformations required Rose's active engagement (Kegan, 1994) throughout a process in which she became aware of and dared to

express her unpleasant emotions. These emotions arose from her assumptions about learning and about herself being challenged by the unexpected training demands, which were "light years away" from the educational settings that she was familiar with (for related results see Sohn et al., 2016). Rose's acknowledgment of and reflection on her emotions, together with the fine-tuned teacher's interventions, helped her to embrace the unpleasant emotions and thereby reexamine her challenged assumptions (Mälkki, 2010). This process, which evolved through different phases, was also facilitated by the availability of reflective spaces both throughout the course –follow-up questionnaires and blog– and at the end –final reflective activity and the in-depth interview. They gave Rose the opportunity to reflect on her ongoing experiences and to compare herself at different points in time, becoming aware of changes.

As for Rose's outcomes, they can be considered as transformative since they entailed changes in her form of thinking and acting which enabled her to better respond to the contextual demands (Mezirow, 2000). This might be taken as evidence of Rose's increasing sensitivity to self-learning through the new distinctions developed in the training. Hoggan's (2016) typology of transformative learning outcomes can help to frame Rose's changes.

On the one hand, Rose's insights into the meaning of learning, such as starting to accept uncertainty (see also McCusker, 2013), are examples of transformative outcomes in epistemology (Hoggan, 2016). According to Van Rossum and Hamer's (2010) epistemological model, these insights are evidence of Rose's transition toward learning conception 4, which is labeled "thinking for oneself". Unlike a less sophisticated conception of learning as reproductive application of knowledge (learning conception 3), from this fourth learning conception, understanding and constructing meaning become core processes, which requires students to think for themselves. Thus, students moving toward this learning conception move from understanding knowledge as an objective product to understanding knowledge as a subjective outcome that is attained depending on the quality of the process. An illustration of this fourth learning conception is that Rose was able to notice and elaborate on the distinctive features of the training methodology, which suggests a qualitative change when understanding the new contextual demands (Nogueiras, Herrero, & Iborra, 2017).

On the other hand, Rose's increasing self-awareness entails, according to Hoggan's (2016) typology, a transformative change in the level of self. This kind of change encompasses a more complete self-knowledge, including a clearer perception of one's beliefs and emotions, as in her case. In this connection, Rose was notably concerned with her destabilized learner identity, which is at the level of ontology. Interestingly, the two kinds of outcomes reported by Rose are in line with Beard and Mälkki's (2013) assertion that the "edge-of-knowing" required for transformative learning to happen is not only connected with epistemological issues, but also with ontological aspects related to the self being challenged and open to revision.

Shedding light on how Rose's transformative outcomes were attained, we identified five phases associated with Rose's changing way of interpreting and responding to the training demands over time, which were linked to her changing emotional experience (Damasio, 1999). These phases acknowledge the dynamic nature of Rose's transformative experience and might be related to the phases typical of any developmental process according to dynamic systems literature (see Kunnen & Van Geert, 2012): initial stability, destabilization, transition, resettlement. Thus, the first two training sessions (phase 1: becoming familiar) could be taken as a phase of initial stability, followed by a destabilization period (phase 2: encountering difficulties) and a transition (phase 3. gaining insights) and ending with a resettlement (phase 4. acknowledging progress, and phase 5. retrospective interpretation).

Throughout these phases, Rose's process can be depicted through the different types of emotions that she experienced and to which we have attached labels. These different emotions can be taken as evidence of distinct processes taking place: 1) the experience of *upsetting emotion*s such as confusion and uncertainty in phase 2 were evidence of Rose's cognitive destabilization arising from her challenged learning conceptions and sense of competence; 2) the stable experience of *supportive emotions* such as interest and curiosity over the training enabled Rose to keep engaged in the course despite the inherent challenges; 3) the experience of *integrative emotions* such as satisfaction and relief are taken as evidence of micro-processes of cognitive restabilization, associated at the beginning of the training with Rose's resolution of confusion and at the end to her positive evaluation of her performance as a counselor; 4) the experience of *generative emotions* such as joy,

enjoyment or enthusiasm at the end of the training functioned as an additional motivator that strengthened Rose's commitment to continuous learning.

Delving into Rose's *upsetting emotions*, they arose when her learner identity, particularly her sense of competence, was questioned by the unexpected training demands (for related findings, see Fullana, Pasillera, Colomer, Fernández Peña, & Pérez-Burriel, 2016). In Mälkki's (2010) terms, these "edge emotions" would be signaling challenges to Rose's ways of knowing and to her identity. Knowing that these emotions are natural and functional when asked to move from one's comfort zone may help the student to undergo the typical *liminal space* preceding transformation with more security and understanding, welcoming emotions and letting them go (Mälkki & Green, 2014). On the one hand, examining one's assumptions might be facilitated by the teacher by encouraging students to recognize and acknowledge discomfort and uncertainty, and by resisting the desire for premature closure (Dirkx, Pratt, & Taylor, 2002). On the other hand, the conscious participation of the learner is needed to reexamine one's assumptions and manage one's unpleasant emotions (Cranton & Hoggan, 2012; Formenti & Dirkx, 2014). In Rose's case, the latter was obvious in that she dared to express and elaborate on her concerns both in class conversations and through her blog. The former is illustrated in the teacher's fine-tuned interventions, which aimed to reframe students' uncertainty and discomfort as evidence of their learning in process.

As a fruit of Rose's reflective processes supported by the teacher, it is possible to appreciate a turning point in her emotional trajectory, indicating the beginning of a *transition* phase. The metaphor of "letting herself go" used by Rose can be taken as an illustration of this turning point, when Rose decided to *trust* both the teacher and her learning process (Iborra, García, Margalef, & Pérez, 2009). It signaled a qualitative shift –a transformation– in her way of managing the course demands. Specifically, she reported changes in her way of evaluating her progress as a learner –going beyond what was "correct"–, reframed what learning meant – moving from considering mistakes as a sign of lack of competence to considering mistakes as a proof of learning– and what emotions in a learning process meant – moving from being afraid of uncertainty to embrace it as an adaptive measure to the context (Larson & Fay, 2016; Mälkki, 2010). These changes, in turn, were associated with the experience of *integrative emotions,* which became more stable in the phase of *resettlement* in association with *generative emotions* arising from Rose's positive evaluation of her performance.

The described positive orientation of Rose's emotional trajectory throughout the training, with a predominance of unpleasant emotions at the beginning –as evidence of Rose's destabilized assumptions– and a predominance of pleasant emotions at the end –as evidence of her revised assumptions– is in line with previous findings (Arpiainen, Lackéus, Täks, & Tynjälä, 2013; Nogueiras, Kunnen, & Iborra, 2017). We take the positive emotional shift occurring from the sixth session of the training onward, together with Rose's related behavioral responses, as evidence of Rose's increased ability to cope with the initially challenging training demands, and hence, as a sign of transformative learning.

On this point, it must be noted that the challenging training demands themselves facilitated Rose's process of reexamination of her taken-for-granted assumptions (for related findings, see McAuliffe, 2002). On the one hand, the teaching methodology transferred the authority to the students, who were encouraged to explore their personal issues and were asked to make meaning of new and complex conceptual distinctions that they had to apply. This is in line with Murrell's (2004) assertion that experiential learning challenges learners to take in and process information in new ways. On the other hand, the emphasis on students' reflection through spaces such as the blog enabled Rose to express and objectify her tough process. In this connection, the dialogic and collaborative nuances of the course helped Rose to freely express her concerns and emotional vulnerability, which enabled her to step outside the experience of a situation beyond her comfort zone, exploring her conflictive ideas (Kasworm & Bowles, 2012). In this context, the teacher provided a balanced system of challenges and support from his role as a *provocateur*, generating contextual conditions that challenged students' assumptions to encourage them to be critically questioned (Slavich & Zimbardo, 2012), and as a *learning companion,* creating a safe and trusting environment, being responsive and helping students to overcome their fears (Cranton & Wright, 2008).

We believe that this case study contributes in several ways to the transformative learning arena. On the one hand, it depicts transformative learning as a process of stability - destabilization - transition - resettlement. These phases are related to the student's changing way of making sense of and emotionally experiencing the challenging training demands. In this sense, we identified four types of emotions: *upsetting, supportive, integrative* and *generative*. Particularly relevant in this emotional dynamic is the existence of a phase of confusion and uncertainty (see Piaget, 1952, and his concept of *cognitive disequilibrium*), which is considered

as a trigger for transformative learning, and the stable experience of pleasant emotions such as interest and curiosity, which acted as supporters of Rose's commitment to learning. These findings provide more detail on the claim that transformative learning is related to emotional responses (Dirkx, 2006) and entail a first step in providing a processual classification of the different types of emotions that can be experienced throughout transformative experiences. Likewise, they sustain the need that learners develop emotional awareness as they engage in transformative learning (Taylor & Cranton, 2013).

This study also provides support for process-oriented experiential learning approaches to be taken as an effective way to promote transformative learning. Spaces of exploration, such as the one proposed in the practical counseling exercise, enhanced Rose's awareness of her own assumptions on learning and on herself as a learner. Likewise, the conceptual distinctions provided throughout the training provided her with specific tools to address a more detailed reflection on her learning process.

In terms of methodology, the contribution of this study lies in providing ideas to grasp the dynamics of students' transformative learning processes and outcomes by combining longitudinal follow-ups of students' processes with retrospective interpretations, which might further trigger such processes and outcomes. The daily questionnaires on the experienced emotions and Rose's posts enabled her to externalize and become aware of her challenged assumptions, which were open to reexamination. The final activity and the interview enabled Rose to reflect on her experience about the training from a broader perspective than she had at the beginning (Nogueiras, Herrero, & Iborra, 2017). Both contexts enabled her to compare herself in different moments of the training, helping her to integrate her progressive *reflections-in-action* during the course with a more holistic *reflection-on-action* after the course (Schön, 1983), and thereby making her more aware of her transformation. Likewise, the reading on dialogic therapy, which was provided in the final activity, proved to be meaningful for Rose to better understand her learning process throughout the training.

As for the decision of focusing on a single case, it has enabled us to get a more detailed approach to transformative learning processes and outcomes. Both the undergoing of phases and the experience of meaningful changes were found, with different nuances, in most participants in the course. Rose's case, however,

was the one that best illustrated these issues due to the greater level of detail that she provided. Furthermore, selecting this information-rich case might enhance future generalization of our findings, particularly naturalistic generalizability (readers' connection between findings and their particular experiences) and transferability (case-to-case generalization). For these types of generalizability to be possible, rich descriptions of participants' experiences, including the inclusion of sufficient evidence and contextual details, are required (see Smith, 2017).

5. Limitations

One of the limitations of this study is that of focusing on a student's transformative process during a relatively short time frame, which precludes the follow-up of a change that typically takes a longer period to stabilize. Likewise, by illustrating a student's successful trajectory in an intentional transformative learning context, it leaves out other possible trajectories of students that might not undergo a transformation.

6. Directions for future research

The findings of this study lead us to identify three future research directions. First, the follow-up of students who provided evidence of transformative learning in short training experiences would enable researchers to explore the long-term effects of such experiences by looking for evidence that the achieved outcomes are indeed transformative in terms of depth, breadth and relative stability (Hoggan, 2016). Second, the focus on unsuccessful students' trajectories in learning contexts aimed at promoting transformative learning would be useful to identify potential barriers to transformation. Third, the investigation of students' experiences in learning settings promoting mere *informative learning* (Kegan, 2000) would allow for comparison with those experiences in settings that foster transformative learning and thus help to gain a better understanding of effective adult teaching (Taylor & Laros, 2014).

7. Conclusion

In our view, the present study has three main strengths. First, it suggests the integration of students' longitudinal and retrospective accounts to obtain a more detailed comprehension of their transformative learning processes. In this way, it contributes to moving away from the traditional focus on transformative outcomes achieved (Mälkki & Green, 2014; Newman, 2012). In addition, this study addresses a relevant area in transformative learning research: students' emotional experience as a path to better understand their transformation (Dirkx, 2014; Taylor & Laros, 2014). In this regard, it sustains the role of unpleasant emotions, as a means to help learners identify and reexamine their taken-for-granted assumptions (Mälkki, 2010), and provides a novel processual classification of emotions. Finally, this study elaborates on the transformative potential of a process-oriented experiential learning methodology by highlighting some of the changes that it can facilitate in students.

8. Appendix

Appendix 1. Follow-up questionnaire filled by the students at the end of every training session. This is the translated version from Spanish.

Follow-up questionnaire   Date: Name and surnames:

- Identify the emotions experienced throughout the session, from the suggested ones or other ones, and write them down.

- Mark on the graphic (which represents periods of 10 minutes) in what moment of the session did you experience those emotions, as well as specify their intensity: on a scale from 1 to 5, being 1 very low and being 5 very high.

Boredom   Joy   Relief   Anxiety   Confusion
Curiosity   Enjoyment   Anger   Enthusiasm
Hope   Happiness   Frustration   Interest
Fear   Pride   Satisfaction   Overburden
Surprise   Sadness   Embarrassment

Example: "interest" | 4 | 3 | | | | | | 1 | 5 | 5 |

Emotion	Intensity of the emotion and moment of the session 0´ 20´ 40´ 60´ 80´	Now that you are evaluating this emotion, what do you relate this emotion with?

- Where do you see yourself in relation to the next scales?
Indicate this on one of the five marks.

Security |———|———|———|———| Insecurity

Tedium /
Boredom |———|———|———|———| Challenge

- What was challenging in today´s session? On what terms was it challenging?
_____
_____
_____
_____
_____

Third empirical study. Experiencing transformative learning in a counseling course: a process-oriented case study

Appendix 2. Guidelines of the final reflective activity that the students were asked to elaborate after the end of the training course. This is the translated version from Spanish.

<div align="center">Final Reflective Activity</div>

1) With regards to the counseling exploration that you have done in the last training session: How do you think that such exploration would have been if you had done it at the beginning of the course? After having made the exploration and reflecting on it: what are the aspects of it that you most? Was there anything lacking? What would you add? Would you change anything?

2) With regards to the personal issues that you have addressed throughout the course, and particularly at the end in connection with the activity on the isomorphic metaphors: of you think on them from the perspective of a counsellor, how do you understand them now?

3) Taking into account the development of the training course: How has been your process throughout it? What have you done? What haven´t you done? Why? What do you consider that your main learnings are? What are the issues that you are in the process of learning?

4) After reading the attached text, "Beyond a Postmodern Therapy" (Anderson, 1997): What did draw your attention? What aspects of the text can you connect with your process throughout the course?

5) Finally, and in relation to the questionnaires (initial, follow-up, final) that you have been filling out throughout the course: did they contribute anything to you? Specifically, about the follow-up questionnaires: What emotions have you identified as the most meaningful in your process? Have they remained throughout the course? Have they changed? What about their intensity? What were they related to? Have you noticed any change with regards to your sensitivity to the emotions and your way of evaluating them? Do you find any relationship between the distinctions "security - insecurity" and "tedium/boredom - challenge" and the emotions that you identified and their intensity?

Part III

General discussion and conclusion

Chapter 5

General discussion and conclusion

Chapter 5

General discussion and conclusion

An educational process is an open process, and we are going to close it progressively. We haven't started to close anything yet. It would be premature. Maintaining something open entails managing it actively. It is life. We like controlling. We like feeling confident about everything. For some issues, this cannot be the case.

Alejandro Iborra, 20th April 2015[1]

Paraphrasing my thesis supervisor, the elaboration of this doctoral thesis has been an open, and therefore very challenging process that I have had to learn to manage over time. After a long, uncertain, and nurturing journey, it is now the time to close the thesis progressively. To this end, the present final chapter aims to provide an overview of the research motivation and context of the thesis, summarize the empirical findings of the three studies that conform it, and discuss them in an integrated manner. Likewise, this chapter aims at pointing out educational and methodological implications of the thesis, addressing its limitations, indicating future possible research lines, and making some concluding remarks.

1. Research motivation and context

One of the starting assumptions of this doctoral thesis was that higher education can foster adult students' epistemological development (Kegan, 1994; Perry, 1970), and specifically their shift toward a self-authoring mind that enable them to manage optimally the complex demands arising from current society (Kegan & Lahey, 2009). To do so, training contexts can challenge students' typical socialized minds by demanding them to take responsibility of their learning processes through

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[1] Oral intervention of my thesis supervisor in the 8th session of the counseling skills training course investigated in the third empirical study of the present thesis –chapter 4–, in which he was the trainer.

constructivist educational proposals (Slavich & Zimbardo, 2012). As this demand usually contradicts students' expectations of learning contexts –built often in transmissive learning settings–, they can initially feel threatened and become confused, anxious or frustrated (Formenti & Dirkx, 2014; Poutiatine, 2009). Interestingly, unpleasant emotions can trigger students' epistemological development, as far as they might help them to identify and revise their taken-for-granted and obsolete understandings of reality (Mälkki, 2010). In this sense, we assumed that changes in the initially unpleasant emotional response of students could be taken as evidence of changes in their ways of meaning-making of the challenging training demands and, likewise, as evidence of their increasing epistemological complexity.

Within the previous framework, this thesis aimed to shed light on: 1) how higher education students emotionally experience and manage the challenging demands arising from constructivist learning contexts attempted to facilitate their epistemological development; 2) what kind of epistemological changes do these students undergo; 3) how experiential and collaborative learning models might support students in their transition toward increasingly complex meaning-making.

In the pursuit of these aims, we developed three empirical studies framed in three higher education training contexts that attempted to facilitate students' epistemological development through collaborative and process-oriented experiential learning: 1) two semester-long courses on developmental and educational psychology in undergraduate and master teacher education programs; 2) a five-day summer course on self-created learning; 3) a semester-long course on counseling skills in a master's degree in secondary education. The number of participants in the studies were eight, seventeen, and a unique case respectively.

To develop our studies, we resorted to qualitative methods (e.g. Denzin & Giardina, 2015) and dynamic systems methods (e.g. Van Geert, 1994), which in our view are very suited to investigate, from a process-oriented approach, the dynamic nature of individuals' meaning-making and emotional experiences. Likewise, we took advantage of what we learnt in one study to design the subsequent studies. The first study, based on retrospective qualitative accounts of students' experiences over the training, led us to see the need to focus on students' emotional experiences and on their perception of training complexity, and to do it through the collection of time-series data. The first and the second study helped us to notice the potential of combining longitudinal and retrospective accounts of students' training experiences to investigate transformative learning processes and outcomes.

2.   Key findings

In the first empirical study – chapter 2– we found three themes in the self-assessments elaborated by the eight selected students at the end of the training courses under research: 1) students' initial emotional upset in the face of demands for internal authority; 2) the support of the teacher and peers in managing that upset; and 3) the students' shift toward more complex conceptions of learning and teaching, including evidence of increasing self-direction. These findings have two implications. On the one hand, they supported the contribution of intentionally designed learning contexts for promoting students' epistemological development. On the other hand, the similarities found between freshman and master's students' experiences when managing the demands of internal authority emphasized the underutilization of the most extended teaching practices in higher education.

In the second empirical study – chapter 3– we found, through Monte Carlo permutation tests, positively-trended turning points in the seventeen students' emotional trajectories over the training course under research and we confirmed the relationship of such turning points with the training complexity as perceived by students. These findings were taken as evidence of students' successful management of the cognitive conflict arising from the clash between their prior ways of meaning-making and the challenging training demands. Likewise, the findings enabled to sustain the claim that contextual complexity can trigger learning when individuals manage successfully such complexity. This study also contributed to provide evidences of the developmental potential of a process-oriented experiential learning model.

In the third empirical study –chapter 4– a thematic holistic analysis of one student's longitudinal and retrospective data collected throughout and after the training course under research enabled to identify: 1) five phases in the student's transformative process throughout the training, which illustrated her evolving meaning-making of the challenging training demands and related changes in her emotional experience; 2) two transformative outcomes: new insights about the meaning of learning and an increasing self-awareness. The study also emphasized the potential of a process-oriented approach to study transformative learning, the value of tracking learners' emotional experience as a path to better understand their transformation and the contribution of experiential learning methodology as a trigger for students' transformation.

3.   General discussion

After the former contextualization, it is now an appropriate time to approach the key question of what have we learned from the three empirical studies that compose this thesis. In what follows, a general discussion of the findings is provided, by addressing our three research aims.

The first question that this thesis attempted to answer was *how* higher education students undergo epistemological development. In this quest, the focus was specifically on *how* they responded emotionally to educational settings in which their ways of understanding learning, teaching and even themselves, were challenged. Through the three studies we have learned more about this topic.

3.1.   Initial upset and unpleasant emotions: some initial reflections

A first insight goes in the line of acknowledging, from the researcher's perspective, something that we had acknowledged from the teacher's perspective: that it is usual that students experience an initial upset when first immersed in constructive developmental learning contexts that challenge their expectations (see also Formenti & Dirkx, 2014; Mezirow, 2000; Poutiatine, 2009). This is particularly the case when students are used to educational contexts based on the reproduction of knowledge and organized around hierarchical relationships between teachers and students. These kinds of learning settings reinforce students' passive and dependent attitude to external sources of authority –teachers– and preclude the possibility for students to develop autonomy, responsibility, creativity and an exploratory drive (McWhirter, 2002). This situation is regretful, because it greatly limits students' development and contributes to generating conforming adults who are not able to create an optimal response to the demands that they will find not only in the professional area, but also in other areas of life. In this regard, Kegan's (1982, 1994) studies have interestingly showed that a large proportion of the adult population could be located in a third order of consciousness according to his developmental model. From this stage, individuals are psychologically dependent –subject, if using Kegan terms– of their relationships with others. This external dependence entails limitations when it comes to develop a full and successful life, particularly when we acknowledge the changing demands of today's society, which require adults to be self-authored. This leads us back to the paradoxical fact that the extended traditional educational models perpetuate that students keep externally driven.

A fundamental challenge that students in a socialized developmental stage might find when first immersed in constructive developmental educational settings entails understanding and responding successfully to teaching methodologies that request them to assume responsibilities of their own learning, be open to uncertainty and take risks (Fullana, Pasillera, Colomer, Fernández Peña, & Pérez-Burriel, 2014; Lysaker & Furuness, 2011). When encountering these demands, students used to content-based educational settings can feel threatened and ask themselves questions such as: "What is this? What is going on?" (Apte, 2009; McEwen, Strachan, & Lynch, 2010). According to Kegan (1994), the referred claims for internal authority lead typically students to feel "in over their heads" and to experience emotions such as confusion, insecurity or frustration (e.g. Dirkx, Mezirow, & Cranton, 2006). According to Mälkki and Green (2014) these unpleasant emotions – which they label edge-emotions– arise when individuals are asked to move from their comfort zones, built on stable understandings and expectations of reality.

Certain researchers have argued that students' unpleasant emotions should be avoided as much as possible because they preclude learning (e.g. Lepper & Henderlong, 2000; Noddings, 2003). This is in line with a very spread "inspirational quote" that is nowadays circulating on internet: "Whatever makes you feel bad, drop it. Whatever makes you feel good, keep it. Simple as that."2 Albeit in principle this might be an appealing motto, it entails great limitations. If our life's philosophy consists of "dropping" the unpleasant emotions that we experience and pursuing merely pleasant emotions, we will be overlooking very valuable information. What kind of valuable information…? In general terms, unpleasant emotions indicate a mismatch between our expectations, understandings or personal models of the world and the actual experiences that we have (Frijda, 1986; Inzlicht, Bartholow, & Hirsch, 2015). In this sense, if we face unpleasant emotions with a sense of curiosity, embracing them instead of dismissing them, they might support us in the process of identifying our obsolete understandings and models of the world –those which were challenged by the environment– and in our transition toward more accurate ones (Kunnen & Wassink, 2003; Mälkki, 2010).

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2 See: https://me.me/i/whatever-makes-you-feel-bad-drop-it-whatever-makes-you-6460717

3.2. Students' emotional trajectories and meaning-making processes over time in constructive-developmental learning contexts

The former idea leads us the way to address students' changes in their emotional experience –and in their meaning-making processes– throughout the training courses under research. In the three studies, and through different methods, we found evidences of an initial period of the training during which students underwent unpleasant emotions such as confusion, uncertainty and disorientation. In the study 3 we formally labelled these emotions as *upsetting emotions*, although we had already used this term in the previous studies. These emotions were linked to a d*estabilization* of the students arising from demands of the training settings that challenged their assumptions, expectations and understandings of what a learning context was and what they were expected to do as learners. Whereas in the study 1 and in the study 2 we took this destabilization phase as an initial phase in students' experiences, the focus on the unique case in the study 3 enabled us to be more accurate about the temporal location of this phase. In such case, we noticed that the student's *destabilization* began after a short phase of acclimatization to the new learning environment, which we labelled *initial stabilization*.

As for the *destabilization* phase, both the participants in the study 1 and in the study 3 reported that the teacher asked them to do things they were not used to. Participants in the study 1 used often the adjective "different" to refer to the training course. In Rose's case in the study 3, the course was defined as being "light years away" from the educational settings that she was familiar with (for related results see Sohn et al., 2016). The former issues made students feel confused, uncertain and concerned about the appropriateness of their learning performance.

For both freshmen and master students in the study 1, it was particularly noticeable that they were waiting for the teacher to provide them with clear guidelines on what to do and how to proceed in the training course. This is likely something that they had learnt to expect throughout their previous experiences in content-based learning settings (for related findings, see Cranton, 2002; Devís-Devís & Sparkes, 1999) and furnishes evidence of the students' need for external guidance and approval typical of a socialized mind (Kegan & Lahey, 2009). In this connection, one of the four themes identified through the thematic analysis of students' self-assessments at the end of the training was named "Initial upset. Why doesn't the teacher tell me clearly what I am expected to do?".

In Rose' case in the study 3, however, it is interesting to note that her destabilization was very much related to her sense of competence being threatened by the unexpected training demands (for related findings, see Fullana, Pasillera, Colomer, Fernández Peña, & Pérez-Burriel, 2016; Mälkki & Green, 2014). Specifically, she started to notice that areas in which she had been previously quite competent in (such as using language accurately) were now more difficult to cope with. The former leads us to notice that Rose would be probably more advanced epistemologically in terms of internal authority than the participants in the study 1, as far as her more acute concerns throughout the training came from her own self-evaluation of her performance, rather than from her attention paid to the teacher's evaluation.

The initial trend consisting of students' experiencing unpleasant emotions at the beginning of the training was also found in the study 2. Specifically, in this study the turning points detected in students' emotional trajectories illustrated the existence of an initial pattern consisting of the experience of increasingly intense unpleasant emotions.

As for *how* the students' initial phase of *destabilization* and emotional discomfort developed over time, the three studies provided different degree of detail.

In the study 1 we found indirect evidences that students had surpassed the initial upsetting phase as they reported changes in their ways of interpreting the learning demands at the end of the learning experiences. Also, students' report of the support of both teacher and peers –a topic which will be discussed further– gave us clues on resources that they found useful when responding to the initial upset. However, in general we did not get insights on the specific emotional and meaning-making evolution of students throughout the training. As an exception of detail about such process, we have the example of a master student who made reference to a "turning point" that she experienced in her way of understanding the training when, while watching a film at home, she started to make connections between what was shown there, and theoretical distinctions learned in the course. Any participant in the study 1, however, provided detail on how their emotional experience had evolved throughout the training.

In the study 2 we focused specifically on the quantitative identification of the emotions experienced by the students in different points throughout the training. In this sense, although we did not count on any evidence of *how* changes in such

trajectories occurred, we had the opportunity to identify *when* such changes happened. This enabled us to find a common pattern consisting of the transition from the experience of intense negative emotions and low positive emotions at the beginning of the training toward the emergence of inverse emotional trends. We also found that the turnings points that indicated such changes coincided with particularly complex periods of the training as perceived by the students. This led us to assume that high levels of contextual complexity could have acted as a catalyst for students' new and more adapted emotional responses to the novel training context, which is in line with constructivist assumptions (e.g. Piaget, 1975/1985). However, in the study 2 we did not collect qualitative data that enabled us to get more insights on the underlying motivators of the described emotional trends, which left us with gaps of understanding as for *how* those changes had occurred.

In order to provide more detail on the students' process of meaning-making of challenging training demands and on the related emotional experience, the study 3 happened to be enormously helpful. After the student's phase of *destabilization* and the associated *upsetting emotions*, Rose's trajectory was characterized by a *transition* phase. This phase, which occurred around the middle of the training –as it was the case with the turning points detected in the study 2–, entailed the beginning of meaningful changes in Rose' understanding of the training demands as well as of her learning processes and her emotional experience. This *transition* phase, which as in the case of study 2 –transition indicated by the turning points– was characterized by a decrease of unpleasant emotions and an increase in positive emotions, is in line with previous research findings (Arpiainen, Lackéus, Täks, & Tynjälä, 2013). Specifically, the detailed follow-up of Rose's trajectory over time enabled us to grasp more detail on this trend: *upsetting emotions*, such as confusion and insecurity, which had been dominating during the *destabilization* phase, led the way to a higher predominance of pleasant emotions such as satisfaction and relief, which we labelled *integrative emotions*. In line with the sources of these emotions as reported by Rose, in previous research relief has been found to be evidence of individuals' resolution of confusion (Pekrun, 2006) and satisfaction has been related to individuals' positive evaluation of their own understanding and performance after a former period of confusion (Frederickson, 2004).

The referred qualitative change in students' emotional dynamics around the middle of the training, both in the study 2 and in the study 3, was taken as a manifestation of the student's increasing understanding of the demands of the training

context and, most importantly, of their transition toward a more complex way of understanding learning. As for the timing of this change, it has to be noted that moving toward a constructivist conception of learning after having been an advocator of a reproductive learning conception, requires necessarily a time of quality. This time of quality encompasses that students have opportunities not only to question their previous conceptions, but also to see meaning in the new conception. This is a matter which is not only intellectual, but which also requests students to do things differently as learners, such as engaging in open discussions, listening to classmates' perspectives, acknowledging theirs and starting to take responsibilities. In this regard, the expression of "letting herself go" used by Rose in the study 3 around the middle of the training is a beautiful metaphor that refers to the emerging process of *trusting* (Iborra, García, Margalef, & Pérez, 2009), which opened her the door to objectifying and reviewing previous comprehensions and in such a way to creating more complex ones. In Rose's case, this could be taken as a turning point in her way of experiencing, understanding, and managing the training demands.

After Rose' *transition* phase, we found a phase of *resettlement* during which her predominant emotions were satisfaction, already discussed, but also enthusiasm, joy, and enjoyment, which we labelled *generative emotions*. These emotions were taken as source for additional motivation, in such a way that they encouraged Rose to keep committed with further learning. The motivators of these *generative* emotions, as described by Rose, are related to previous research. For example, it has been shown that individuals' experience of enjoyment is related to pleasure with the outcomes of an activity (Ainley & Hidi, 2014) or to the positive self-evaluation of one's competence (Pekrun & Stephens, 2010). Joy, on its part, has been associated to a feeling of fulfilment after understanding something difficult (Barnett, 2004). As for individuals' experience of both interest and joy, it has been connected with an expansion of ideas and knowledge (Izard 2007).

As a trigger for Rose's *resettlement*, counting with spaces in which to reflect on the lived experiences from a vantage point of view, such as the final reflective activity and the interview, enabled her to gain new insights and understandings about the changes initiated within the training course. These changes, although taking place in a micro-level time scale, were acknowledged in her complete complexity only at the end of the training, through retrospective reflections in which Rose had the opportunity to establish connections between the "raw" isolated specific experiences and in such a way create a holistic and more complex meaning of

such experience. This retrospective reflective stance described in Rose's case is something which was also experienced by participants in the study 1 through the elaboration of their self-assessments at the end of the training. In this sense, we consider that the period after the face-to-face training sessions ended have to be taken as a necessary part of the students' *resettlement* phase.

To complete the student's emotional dynamics described in the study 3, something that was found to be key in Rose's active and stable engagement in meaning-making across the different phases of the training, was her consistent experience of interest and curiosity, despite –or together with– the typical unpleasant emotional experience of confusion or uncertainty. We labelled these emotions *supportive emotions*. As for interest, it has shown to be useful when it comes to engage and sustain individuals' exploration and learning even in face of challenging tasks, as it was Rose's case (Hidi, 2006; Izard, 2007; Renninger, 2000). Curiosity, on his part, has been defined as a desire for information in response to uncertainty that triggers individuals' exploratory attitude (Grossnickle, 2016; Loewenstein, 1994). This is something very well illustrated in Rose's experience.

As pointed out in the study 3 –chapter 4– itself, the emotional dynamics described above, which we relate with the typical phases of any developmental process according to dynamic systems literature (see Kunnen & Van Geert, 2012), was linked to Rose's distinct meaning-making processes over the training, namely: 1) the experience of *upsetting emotions* was evidence of Rose's cognitive destabilization arising from her challenged learning conceptions and sense of competence; 2) the stable experience of *supportive emotions* over the training enabled Rose to keep engaged in the course despite the inherent challenges; 3) the experience of *integrative emotions* are taken as evidence of micro-processes of cognitive restabilization; 4) the experience of *generative emotions* at the end of the training functioned as an additional motivator that strengthened Rose's commitment to continuous learning. This is the closest that we have gotten as for shedding some light on the issue of *how* do students respond emotionally, over time, to learning settings that challenge their initial epistemic positions, and on *how* changes on such emotional dynamics might be illustrating meaningful changes in the students' ways of making meaning of the learning environment and of themselves as learners.

To conclude this section, we would like to come back to the idea that an active and engaging response from individuals is essential for them to manage suc-

cessfully upsetting situations (Kegan, 1994). In face of a disorienting experience, individuals must make a choice between either ignoring the dissonant contextual information or engaging constructively in the process of making meaning of it (Piaget, 1975/1985). The students under research in this thesis were examples of the latter. This is something illustrated both in the study 1 and particularly in the study 3. Making decisions such as using a blog to elaborate on their unpleasant experience, sharing with their classmates and teacher such discomfort in an open and sincere manner and participating in exploratory and collaborative exercises were evidences of such constructive engagement. Underlying the cited initiatives is the students' commitment with critical reflection. This is at the core of epistemological development and transformative learning, as far as it enables individuals to question the assumptions on which their frames of reference are grounded (Mezirow, 2000). In the study 3 we showed how Rose's acknowledgment of and reflection on her emotions, together with the fine-tuned teacher's interventions, helped her to embrace the unpleasant emotions and in such a way reexamine her challenged assumptions (Mälkki, 2010). Likewise, Rose dared to express publicly her concerns and emotional vulnerability, what helped her to step outside of such concerns and explore her conflictual ideas (Kasworm & Bowles, 2012). We will elaborate further on these ideas in the subsequent sections.

3.3.   Students' epistemological changes

The question of *what* kind of epistemological changes do students in intentionally developmental learning settings undergo was addressed in the study 1 and in the study 3. As the most fundamental change that students reported from the vantage points of view of the final self-assessment (in the study 1) and the final reflective activity and the in-depth interview (in the study 3), was their transition toward more sophisticated understandings of learning and themselves as learners. This arose from them questioning their preference for transmissive learning environments, what led them to be more flexible and open to investigation in the experiential and collaborative learning activities that were proposed in the training courses. According to Van Rossum and Hamer's (2010) model of teaching and learning conceptions, in their most complex instances –more detail on this is provided below– the students seemed to have moved progressively toward the fourth learning conception of *thinking for oneself*, which entails the shift from conceiving learning as the reproduction and application of knowledge to conceiving learning as the construction of knowledge, and which is related to the transition toward a

self-authoring mind (Kegan & Lahey, 2009). Something essential within this learning conception is the acknowledgement of the constructive and processual nature of learning. This might lead the way to students to accept not-knowing, as well as to appreciate the related experience of unpleasant emotions such as uncertainty and confusion as evidences of gaps of understanding of the contextual demands, no matter if they were new concepts to grasp, new tasks to be performed or new competences to be developed. Likewise, the processual nature of learning puts the focus on the necessary activity of the learner, who has to engage actively in the creation of understanding and who, in doing so, is more likely to acknowledge that closed conclusions might not be directly reached and that there are comprehensions that need time to emerge. Associated to this shift toward more complex learning conceptions, it is also to highlight students' gained ability to objectify the particular features of the methodology of the courses under research. This is taken as evidence of students' qualitative change when understanding the new contextual demands (Nogueiras, Herrero, & Iborra, 2017).

To go into greater detail on the previous ideas, in the study 1 students furnished great evidence of a specific transition in their learning conceptions. According to Van Rossum and Hamer's (2010) model, they consolidated in a conception of learning understood as the *application of knowledge* (learning conception 3). In this regard, the students stressed the value of making connections between the theoretical content addressed in the training courses and everyday situations. Likewise, students gave evidence of having become aware that learning was not simply an externally imposed activity to be assessed by quantifiable products, but that it resembled more an active process. In this line, students gave also evidence of an increasing self-direction, including a tendency toward self-examination, and an engagement in self-assessment processes. This is related to the transition toward the learning conception labelled *thinking for oneself* (learning conception 4; Van Rossum & Hamer, 2010). Although they were much less than expected, we can cite a couple of differences that were found between freshman and master students' epistemological complexity. On the one hand, master students demonstrated a more internalized and subjective application of theoretical distinctions to understand not only external situations but also themselves as individuals in evolution. On the other hand, master students' use of the peer group to support their learning processes was more sophisticated than freshman students', as shown in their creation of a community of learners which provided them with more independence from the teacher (Baxter Magolda, 2000).

In the study 3, Rose's insights into the meaning of learning, such as becoming accepting of uncertainty (see also McCusker, 2013), or reframing her ideas about the meaning of "correctness" and "mistakes" in learning processes, are examples of transformative outcomes at the level of epistemology (Hoggan, 2016). According to Van Rossum and Hamer's (2010) epistemological model, these insights might be taken as evidence of Rose's transition toward learning conception 4, "thinking for oneself". Students going toward this learning conception move from understanding knowledge as an objective product to understanding knowledge as a subjective outcome that is attained depending on the quality of the process. In clear connection with the former, another change found in Rose was her transition toward an increasing self-awareness (Hoggan, 2016), materialized as result to her sense of competence being challenged. This was a likely product of her previous socialization in traditional educational settings where she had learnt to do things "right" and in such a way enabled her to build a stable sense of identity as a competent learner. Experiential learning settings that invalidated her previous sense of knowing opened the way for her to revise such previous ideas. In this sense, it is interesting to note that transformative learning processes are usually related to ontological aspects (self) being challenged and open to revision (Beard & Mälkki, 2013). We believe that this was Rose's case.

As for the issue whether the students' changes described above were evidence of epistemological development or transformative learning, if we take the assertion that transformative changes are those that enable a better management of our environment (Mezirow, 2000), we could respond affirmatively. Both in the study 1 and in the study 3 –and in the study 2 more indirectly– we found evidences of a change in students' initial responses to the challenging training contexts that ended up in their successful management of the new demands. In a recent literature review, Hoggan (2016) proposed a model of different categories to distinguish the different kinds of learning that the wide label of "transformative learning" might encompass: worldview, self, epistemology, ontology, behavior, capacity. Although this classification might be considered limiting in that some of the categories are, in our view, overlapping, we could frame our students' changes within the categories of epistemology and self. If we resort to the criteria of depth, breadth and relative stability that Hoggan raises that students' changes should fulfil in order to be taken as fully transformative, the scope of our studies, framed in relatively short-time periods, would not enable to answer this question yet, as far as we would need to do a follow-up of students' changes.

3.4. Supportive learning environments

Students' transition toward increasingly complex ways of making meaning was clearly facilitated by the training contexts under investigation. In this sense, Gravett and Petersen (2009) highlight that "educators need to create the conditions under which learners are pushed toward their learning edge, where they are challenged and encouraged toward critical reflection" (p. 107). In this connection, Kasworm and Bowles (2012) pose that the teacher has to act as a facilitator or a "catalyst for learner examination of knowledge, emotion, and experiences, as well as offer quiet moments and supports for reflection and redirection in the transformative learning process" (p. 394). Thus, apart from the proposal of challenges, helping students to work throughout the extensively addressed emotional upset is one of the key tasks for teachers promoting transformation (Ettling, 2012). For the former to be possible, there is the need for building a safe and trusting environment that enables students to overcome their fears (Cranton & Wright, 2008). This can be attained by the teachers modelling openness to dialogue and willingness to self-disclosure, a sense of engagement and authenticity, and an attitude of calm and confidence in the face of uncertainty (Cranton, 2002).

We found illustrations of the former supporting strategies both in the study 1 and in the study 3. On the one hand, the participants in the study 1 highlighted teachers' facilitating attitude, as shown by his ability to generate a context of confidence, empathy, and symmetry and by his respect for students' individual differences. Likewise, they highlighted that the teacher acknowledged their initial ways of making meaning, which is in line with a developmentally-tiered approach to education (Baxter Magolda & King, 2004; Kegan, 1994).

On the other hand, in the study 3 we had the opportunity to grasp specific teachers' fine-tuned interventions intended to reframe Rose's conception of understanding (as something in process, rather than as something static), of mistakes (as something helpful in learning), and on the digital distinction between "right" and "wrong", as well as to encourage students to accept uncertainty and the feeling of "being lost". Something underlying all these teacher's interventions is that they were aimed to help students to acknowledge and accept their unpleasant emotions and to become aware of their informational nature (Mälkki & Green, 2014).

In what follows, we provide more detail on how the different learning proposals within the training courses under research might have been promoting students' reflective process as well as the revision of their taken-for-granted assumptions, an essential step for epistemological development and transformative learning to take place.

Collaborative activities that involve dialoguing with others might enable students to step outside of their individual perspectives and understandings, explore conflictual ideas and identify alternative assumptions and worldviews, what enables them to move from a socialized mind to a self-authored mind (Apte, 2009; Baxter Magolda, 2000; Feller, 2009; Kasworm & Bowles, 2012; King & Siddiqui, 2011). In the study 1, the participants highlighted the support of peers in collaborative activities in their transition toward more complex meaning-making.

On the other hand, students' participation in process-oriented experiential exercises entailed an exploration of personal issues and others' personal issues. Thus, their interaction with a wide range of experiential variation might have enabled them to objectify and acknowledge potentially obsolete models of the world and revise them. Likewise, experiential exercises were intended to encourage students' openness and curiosity about novelty, what potentially supports them in the process of becoming more autonomous learners (McWhirter, 2002). This is in line with Murrell's (2004) assertion that experiential learning challenges learners to take in and process information in new ways.

Finally, the instruments that were used for data collection in the three studies were relevant for helping students to become more aware of their emotional experiences and of their changing meaning-making process over time, triggering their reflection. In fact, students demonstrated to have become particularly sensitive to the issues that they were asked to pay attention to and to evaluate. Reflective spaces provided throughout the training courses, such as the blog and the follow-up questionnaires, promoted students' *reflection-in-action*, or in other words, during the learning experiences themselves (Schön, 1983). As for retrospective alternatives for data collection, such as the self-assessment in the study 1 and the final reflective activity and the interview in the study 3, they were thought to provide students the opportunity to reflect on their past experiences throughout the training from a vantage point of view, facilitating the *reflection-on-action* after their experiences (Schön, 1983).

4. Educational implications

As higher education teachers we firmly believe in the need for higher education to move from the exclusive promotion of *informative learning* to the facilitation of students' *transformative learning* (Kegan, 2000). Therefore, in this thesis we have both provided the theoretical foundations for such convincement and we have provided examples of real experiences aimed to enhance that kind of learning. The three empirical studies furnish evidence on how intentionally developmental learning contexts, in this case based on collaborative and process-oriented experiential methods, can play a fundamental role in the promotion of students' transition toward increasingly complex ways of meaning-making. We might then consider the training courses under research as deliberately developmental learning contexts (Kegan & Lahey, 2016).

Our findings show that, regretfully, these kind of developmental learning contexts are still rare (for this argument, see also Barber, King, & Baxter Magolda, 2013). On the one hand, the first study showed more similarities than expected between the way in which freshman and master's students managed demands of self-direction, which is for us a prove that several years socializing in higher education are not guarantee of students' development of increasing autonomy. On the other hand, the master student in the third study referred to the training context under research as being "light years away" from the educational settings that she was used to. These insights, in our view, might be taken as a call of attention for both individual teachers and for higher education institution as a whole, and support the claim for the need of an ontological turn in higher education (Barnett, 2004; Dall'Alba & Barnacle, 2007).

Also, these findings bring to the foreground the question of whether "isolated" developmental learning experiences can be meaningful in students' academic and personal trajectories. In this regard, it is interesting to recall Apte's (2009) argument that it is usually challenging for students to maintain the epistemological advance that they might have experienced in specific learning contexts once they come back to their usual social environments and, more precisely, to content-based learning settings. Put in other words, we wonder whether students will move from an *optimal level* of performance toward a *functional level* of performance once the supportive context is not there anymore (Fischer & Yan, 2002). This is in line with an idea widely acknowledged in the present thesis: the key role of supportive envi-

ronments when it comes to promote, and we add now to maintain, individuals' transition toward more complex meaning-making. On this point, it is also important to note that, as the specific epistemological transition that we are trying to promote in our students is the one towards self-direction, self-authorship or transformative learning (Kegan, 1994, 2000; Kegan & Lahey, 2009), there might be more probabilities for the students to become independent of external supports and in such a way keep developing by themselves.

The findings of this thesis also acknowledge the importance of doing a close follow-up of students' learning processes, which can be made by focusing on how they respond emotionally to challenging demands of internally-driven meaning-making. In this regard, teachers must acknowledge that students may feel insecure, confused, anxious or overwhelmed when immersed for the first time in a learning context which no longer provides them with the guidance they are used to. This makes obvious the need for the students being supported in the quest of managing the complex contextual demands. In this sense, from our findings we infer that the teacher's epistemology has to be necessarily more complex than the students' so that they can be in the position to generate developmental challenging situations (Keeney, 1983; Van Rossum & Hamer, 2010). Specifically, it means that teachers themselves should be located beyond a self-authored stage of development, so that they could be able to promote their students' transition from a socialized to a self-authored mind. In this line, we resume an open question that we posed in the study 1, and is to what extent higher education teachers might be *developmentally* ready to enhance their students' epistemological shift towards self-direction.

As for the study of emotions in learning contexts, in the last years there has been an increasing interest on the topic, as can be appreciated in the publication of several handbooks (e.g. Hall & Goetz, 2013; Pekrun & Linnenbrink-Garcia, 2014; Schutz & Pekrun, 2007; Zembylas & Schutz, 2016) and journals' special issues (e.g. Efklides & Volet, 2005a; Linnenbrink, 2006; Schutz & Lanehart, 2002). Likewise, both in newspapers and on television references to the importance of emotions in education and learning are increasingly spread, mainly in relation to issues such as students' engagement and motivation. Despite the undoubted interest and value of such claims, the underlying discourse is often vague and ethereal, failing to address the fundamental key issue on *how* emotions can play a role in learning. In this regard, the main contribution of this thesis consists of being more

specific in our claims about the role of emotions in learning processes by: 1) studying learners' emotional experience as a way to understand the management of challenging learning contexts; 2) systematizing such study by paying specific attention to the moment and sequence in which students experience such emotions. This has led us to two interesting insights. First, we have got evidences of the value of tracking learner's emotional experience as a way to better understand their epistemological development. Specifically, the positive emotional trend identified in students' experiences over the training settings under research can be understood as an evidence of their changing and more adapted ways to give response to the training demands (for similar findings, see Arpiainen, Lackéus, Täks & Tynjälä, 2013). Second, the referred emotional dynamics supports the idea that it is the dynamic patterns of positive and negative emotions over time, in connection with individuals' changing ways of managing contextual complexity, which can be considered beneficial or not for learning (Sansone & Thoman, 2005). Third, we have provided a tentative classification of different emotions that can play a key role in transformative learning processes, namely *upsetting*, *supportive*, *integrative*, and *generative* emotions. In general terms, our findings confirm the idea that emotions play a key role in learning processes, since they might support us to make meaning of our experiences and adapt to our environment (Damasio, 1999; Frijda, 1988; Lazarus, 1991). Specifically, our findings contribute to support the idea that, in situations where our ways of meaning-making are challenged, managing both the destabilization and the associated unpleasant emotions is necessary if learning is to occur (Taylor & Cranton, 2013).

As for previous research on epistemological development in higher education settings, there has been plenty of it in longer time frames, such as throughout students' college years (for a recent example see Barber, King, & Baxter Magolda, 2013) or the first year of college (for a recent example see Baxter Magolda, King, Taylor, & Wakefield, 2012). Whereas within the transformative learning arena studies on shorter time frames such as specific training courses are more common, most of them have focused on individuals' transformative learning outcomes and not in transformative learning processes (for this argument see Mälkki & Green, 2014; Newman, 2012) and those focused on processes have mostly relied on retrospective accounts of students' experiences of change (for this argument, see Cranton & Hoggan, 2012; Kasworm & Bowles, 2012; Merriam & Kim, 2012; Taylor & Laros, 2014). Within this framework, the main contribution of the present thesis is that we studied epistemological development or transformative learning within

short time frames and that we did so by focusing on students' processes of change over time. This was fruit of our dynamic and constructivist conception of learning and developmental processes –epistemological level–, which led us to take specific decisions in order to study them –methodological level–. This leads us directly to the methodological implications of the thesis.

5. Methodological implications

At the beginning of this thesis we argued that in order to understand learning and development, a process-oriented approach that focuses on how they unfold over time at the individual level was needed (Overton, 2013; Van Geert & Van Dijk, 2015). This is related to the dynamic systems principle known as *iterativity*, that raises that any system –including human-beings– is at any moment affected by its own previous state and by its environment (Van Geert, 2003). Among other issues, this thesis has entailed a progressive attempt to grasp such iterative process in the field of individuals' epistemological development, with the conviction that "it is moment-to-moment, day-to-day direct experiences, repeated over many occasions, that 'grow' developmental outcomes" (Granic, 2005, p. 391). This has been particularly noticeable in the study 3, which inspired by both qualitative and dynamic systems principles, combined longitudinal and retrospective accounts of one students' training experience in order to get a more comprehensive understanding of her change process. On this point, we would like to quote Flyvbjerg (2006), who claims that "good social science is problem-driven and not methodology-driven, in the sense that it employs those methods that for a given problematic best help answer the research question at hand" (p. 402). Coming back to our intention to understand processes, a process-oriented approach, no matter the specific methodology adopted, is required (Valsiner, 2014).

With regards to the qualitative research approach, we confirm its unquestionable value when it comes to investigate how do students' experience developmental challenging learning demands and how they move toward increasingly complex meaning-making (Lim, 2011). Not in vain, it is within the individuals' words where we can find the most reliable approach to the meanings that they create (Avis, 2005). The most relevant learning in this regard is the significance of going beyond the collection of retrospective qualitative accounts of students' experiences, like we did in the study 1, to incorporate a qualitative tracking of such experiences while they are occurring, like we did in the study 3.

With regards to the dynamic systems research approach, following Van Vondel, Steenbeek, Van Dijk, and Van Geert (2016) distinction between "hard" and "soft" complex dynamic systems research in education, we frame ourselves within the "soft" one as far as we are "inspired by basic, qualitative features of a complex dynamic systems view on education" (p. 227). In the thesis, this is materialized in the focus on the variability of students' emotional trajectories and more generally in our emphasis on the transactional and iterative nature of meaning-making (see also Kunnen & Bosma, 2000). From the premise that learning is a dynamic process between individuals and their contexts, we claim that this dynamic systems approach must be more broadly considered when investigating learning (se also Kolodner, 2004; Lemke & Sabelli, 2008; Stamovlasis, 2014).

As one specific methodological contribution inspired in dynamic systems principles, in the study 2 we developed a relatively simple procedure for identifying turning points –qualitative changes– in students' emotional trajectories over time. This procedure, in our view, can be helpful for researchers interested in investigating a wide array of longitudinal experiences that are very common in educational and developmental contexts. Specifically, this procedure could be useful for educators or therapists interested in tracking their students' or clients' trajectories over time in various possible contents (to cite a possible example, the degree of individuals' commitment and exploration in the field of identity research) in search of change points that could be taken as optimal for intervention (see Hayes, Laurenceau, Feldman, Strauss & Cardaciotto, 2007 for a similar argument in therapy).

When it comes to the design of data collection procedures, something to point out is the creation of the follow-up questionnaire implemented in the study 3. We are particularly satisfied with it in that it was the result of our commitment to find the best way to grasp in detail students' experience throughout the training course under research. To do so, we took into account what we had learnt in the study 2, in which we had also used a questionnaire.

Likewise, we could highlight our attempt to find ways to represent information of a qualitative processual nature, as we did in the empirical study 3. While in the study 2 it was reasonably easy to represent student's emotional trajectories through simple line graphics, in the study 3 we found the challenge of conveying the rich information that we had collected throughout the follow-up questionnaires on the student's emotions in such a way that it could be meaningful for potential readers. In this quest, we depicted both time-series and qualitative information in a

figure that indicated also the phases on the student's process found in our data analysis as well as relevant events occurring in the training that were relevant in order to understand her emotional experience over time.

In general terms, the process-oriented approach adopted in the present thesis gives response to the claims for methodological changes posed in two areas of relevance for us. On the one hand, from the field of research on emotions there have been consistent claims for the need to find ways to study within-person emotional patterns across time (D'Mello & Graesser, 2011; Efklides & Volet, 2005b; Pekrun, 2005; Sansone & Thoman, 2005). We think that both the study 2 and the study 3 provide good examples on how to approach such dynamic nature of emotions by focusing on individual trajectories over time. On the other hand, transformative learning literature has claimed for the need to study transformative learning processes by going beyond mere retrospective qualitative accounts of students' experiences (Cranton & Hoggan, 2012; Kasworm & Bowles, 2012; Merriam & Kim, 2012; Taylor & Laros, 2014). This is something that we specifically addressed in the study 3.

To finish, we would like to point out that when focusing on students' transformation processes over time in intentionally developmental learning settings we did it in several time levels, something which was merged in the study 3. As Lichtwarck-Aschoff, Van Geert, Bosma and Kunnen (2008) highlight, development can be conceptualized in several time scales. Whereas a micro-level or a real-time level encompasses specific experiences, actions and interactions taking place throughout minutes, hours or days, a macro-level entails long-term representations, generalizations or summaries of the former daily flow of phenomena. Different than the micro-level, the macro-level enables individuals' reflections and abstractions of their developmental processes. Although within relatively short periods of inquiry in the three studies, we associate the former two time-scales with our longitudinal and retrospective approach to students' experiences respectively. In this sense, coming back to Schön's (1983) distinction between individuals' *reflection-in-action* –during an experience– and *reflection-on-action* –after an experience–, we very much appreciate the value of integrating micro- and macro-approaches to the research on students' epistemological development.

6. Limitations

Aside from the specific limitations that have been mentioned in the separate empirical studies, on this point we address what we acknowledge as the two main limitations of this thesis as a whole. These limitations are related to the necessary decisions that, as researchers, we took when delimiting the scope of our research.

On the one hand, it is to point out that our research participants were students who were optimal examples of the transition toward increasingly complex meaning-making in intentionally developmental learning contexts. This decision necessarily led us to overlook a wide variety of other possible students' trajectories –e.g. students with different degrees of change and achievement– and prevented from detecting further critical points of developing experiential and collaborative educational experiences. As well as posed as a limitation, this decision can also be taken as one of the strengths of this thesis, as much as it has enabled us to deep on the quality of successful students' trajectories, which shed light on issues that teachers could intentionally move toward when promoting epistemological development.

On the other hand, we studied students' epistemological changes within very short time-frames. This precludes the possibility of following the development of such changes, which cannot be completely accomplished in such short periods of time. In this sense, it might be questioned whether the evidences of change that we found in the students under research are enough to support rightfully such transformations in terms of their depth, breadth and relative stability. The focus on short time periods, nevertheless, enabled us to grasp individuals' micro-processes of change, which are the necessary building blocks for long-term changes to emerge.

7. Directions for future research

The present thesis could be conceived as a concluded piece of research work, but also as an ongoing work, as an initial step in my research trajectory indicating future possible research paths that arise from what we have learnt up to now. Thus, emerging from this thesis we conceive three possible future research lines.

The first would consist of investigating higher education students' epistemological development over longer periods of time. On the one hand, it would be interesting to do a follow-up of the trajectories of students who display evidence of

increasingly complex ways meaning-making at the end of deliberately developmental learning experiences. We wonder to what extent the changes undergone by these students might be long-lasting or might weaken once they come back to non-developmental learning and social settings. On the other hand, it would be stimulating to investigate students' epistemological development throughout longer intentionally developmental training experiences, such as a whole university degree. For this to be possible, we would need to find or to create ourselves such environments, which is a very appealing long-term challenge toward which to strive.

Second, it would be meaningful to deepen in a systematic follow-up of students' experiences throughout intentionally developmental learning experiences. Such monitoring could be carried out by gathering both time-series and qualitative data on students' perceived complexity, usefulness, interest, comfort and fun during the training. The resulting time-series trajectories could be explored in search of turning points –as in the second study– in order to identify relevant change periods on which gaining more insight through qualitative data. Likewise, the comparison of this kind of students' motivational trajectories with such trajectories for students in traditional –content-based– learning settings could provide additional evidence on the potential of teaching methodologies attempted to support adults' engagement with knowledge construction.

Finally, we believe that moving the focus of inquiry from the students to the teacher would enable to deepen in the educational strategies which are successful when promoting students' epistemological development. Paying attention to the *what*, *how* and *why* of the educators' actions and decisions throughout constructive learning experiences would provide helpful insights on the complex task of supporting development. In this regard, we find that resorting to both longitudinal and retrospective accounts of teachers' experiences would be particularly enlightening.

8. Concluding remarks

It is at the end of the thesis when I start to have the impression to know *what* is *this* of researching, as well as a more comprehensive understanding of the phenomenon that I decided to approach some years ago. From this position, which would have been impossible to reach earlier, I conclude the chapter by highlighting what I consider to be the key contributions of the present thesis, hopefully helpful for educators and researchers:

- It provides insights on *how* is the experience of higher education students in short-term constructivist training contexts attempted to facilitate their epistemological development.

- Specifically, it operationalizes the approach to students' transition toward increasingly complex meaning-making by focusing on students' emotional experience over the training experiences under research.

- It furnishes evidences of *what* type of epistemological changes might be experienced by students in intentionally developmental learning contexts by resorting to examples of optimal trajectories.

- It sustains the key role of constructive-developmental learning approaches, and particularly the assets of experiential learning and collaborative learning, when it comes to support higher education students in their shift to increasingly complex ways of making meaning.

- It points out the value of integrating qualitative and dynamic systems research approaches in order to obtain greater insight into individuals' change processes over time.

- Likewise, it provides evidence of the potential of combining the collection of longitudinal data and retrospective data when it comes to achieve a more comprehensive understanding of individuals' transformative experiences.

Epilogue

Date menos importancia, dásela más al mundo

Think lightly at yourself and deeply of the world

Musashi Miyamoto, 1645[1]

And... this is the end, isn't it? I had fantasized several times with this moment. I am writing this epilogue. And now I can devote some time to reflect about the last years, since I first thought of embarking in this project. I can notice how my relationship with the thesis has evolved over time. I can remember the different emotions experienced. I can discover myself both engaged and frustrated.

Apart from the issues addressed in the last chapter... what have I learnt from this experience? A few days ago I was able to put into words something crucial: I think that I have become a little bit more tolerant and sensitive with myself. For a long time, I conceived this thesis as "the work of my life", as if in my early thirties I could be ready for such grandiloquent achievement. This thought was problematic, since it did not give room for accurate ways of measuring my accomplishments. How does one evaluate something as broad and as vague as the "work of his life"? Not counting on clear personal standards and playing down external encouraging feedback on my progress, I can see myself in some past periods striving tirelessly to approach an undefined ideal of performance.

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[1] Musashi Miyamoto (1584-1645) was an expert Japanese swordsman and rōnin. The quote provided is the fourth of the twenty-one precepts included in its short work "Dokkōdō" ("The Path of Aloneness"), composed in his last week of life as he gave away his possessions in preparation for death. This precept was read by Alejandro, my thesis supervisor, in the last session of a training course called "Developing five educational attitudes: a proposal for modelling transformational learning" that he taught in July 2010 and in which I participated.

At the present time, I would like to keep reflecting and working on the standards that I use to evaluate my performance, which I have discovered that is an issue of great impact on how we experience life. Still, over the last months I think that I have undergone a change that has contributed to make this issue less dominant. More specifically, I have been able to relativize my relationship with the thesis, by framing it within a longer academic and professional trajectory which is to come and which I have been already creating.

As Rose in the third empirical study of this thesis –chapter 4–, this retrospective account of my experience allows me to make sense of my trajectory as a PhD student in an integrated way which would not have been possible earlier. I can now see myself in different moments of the past and, for the first time, grasp a more comprehensive understanding of such trajectory. I acknowledge both helpful and futile thoughts and questions, both pleasant and unpleasant emotions. I have been subject to them for a long time, being both delighted by wonderful experiences lived in the research world and disheartened when I encountered what I took as unbridgeable difficulties. And all this... I have created it.

At the end of this part of the journey I wonder curiously how I will manage the transition from being a PhD student to becoming a PhD. Even though I have been combining research and teaching for the last few years, the thesis has occupied a key area of my attention and my commitment, permeating also my personal life. The thesis was present when I was explicitly working on it, reading, thinking, writing or discussing about it. However, it was also present in my way to schedule my daily routine, in my interactions with the people surrounding me, and above all, in my embodied identity as a –still– student. So, from now on… how will it be to keep teaching? How will it be to keep researching? How will it be to keep living?

Marbella, 31 July 2017

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About the author

I was born in Madrid (Spain) in 1986. My educational background encompasses a BSc in English Teacher Training (2004), a BSc in Educational Psychology (2007), a MS in Communication and Learning in the Digital Society (2012), and a MS in Psychological Intervention with Developmental Behavioural Modelling (DBM) [1] (2015). Likewise, over the last years I have participated in several training courses based on a process-oriented experiential learning methodology, covering topics such as transformational learning. I am a language enthusiast, being proficient in English and having learnt some French, German and Italian.

My professional background has been always related to the educational field and has had a strong international component. To begin with, throughout my college years as an English Teacher Training student (2004/2007) at the University of Alcalá (Alcalá de Henares, Spain) I worked as a leisure time monitor and coordinator in different extra-curricular programs addressed to children aged 3 to 12. Likewise, I was a research assistant at the English Philology Department, working in a project studying discourse in the genre identity formation. At that time, I was also a student's representative in the Subject Committee Teacher Training of the institution Campus Europae, and participated in meetings held in Hamburg (Germany) and Orëbro (Sweden). Later, during the 2007/2008 academic year, I was an Erasmus student at the University of Vienna (Austria) and I worked as a Spanish language assistant in secondary education. Once back in Spain, while I was studying my degree in Educational Psychology (2008/2010) at the University of Alcalá, I worked as a teacher in a training programme for gifted students and as a research assistant in projects aimed to investigate the educational potential of videogames.

Since 2010 my professional trajectory has been linked to higher education. I have been awarded with various research scholarships, the most relevant being

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[1] DBM® stands for Developmental Behavioural Modelling, created by John McWhirter (2002, 2011)

the *FPU* [2] (2012/2016) through which I worked at the Department of Educational Sciences at the University of Alcalá under the supervision of Dr. Alejandro Iborra.

In the area of teaching, I have taught several courses in Bachelor Degrees in Teacher Training at the University of Alcalá (2010-2015) and at the University Centre Cardenal Cisneros (2016/2017), both in Alcalá de Henares: Educational Psychology, Developmental Psychology, Didactics, Early Intervention, and Pedagogical Diagnosis. I have been also part of the teaching team of training proposals such as a module on learning-teaching processes addressed to novel university teachers. Furthermore, I have participated in the elaboration of the teaching materials for a module on psychology included in a Teacher Training Programme for Saharawi teachers, through a cooperation project held by the University Autónoma (Madrid, Spain). Nowadays I am a university lecturer at Marbella International University Centre (Marbella, Spain), where I teach courses addressed to freshmen Psychology students and a Research Methods course addressed to master students.

In the area of management, I can note my contribution in the organization of three Meetings on Innovation in Higher Education Teaching held at the University of Alcalá (2012, 2013, and 2016) and of a Tribute to Gregory Bateson (2011).

As for the research area, I would like to mention that apart from the research line developed in the present doctoral thesis, I am also interested in: (a) investigating my own teaching practice, in which the promotion of self-direction is a key element, (b) investigating the development of competences in primary education students. In this context, I have participated in a research project aimed to develop the reflective competences for learning, and in a research project intended to investigate the educational potentialities of the development of oral skills.

With regards to international experiences, I have been awarded with three scholarships (2012, 2014, and 2015) to develop three-month long international research stays. Through them, I have had the opportunity to work at the Department of Educational Psychology at the University of Groningen (the Netherlands) under the supervision of Dr. E. Saskia Kunnen, who is a co-author of two of the three publications that compose the present thesis. Furthermore, I have participated in several international conferences, where I have presented my research findings.

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[2] The *FPU Scholarship* (from Spanish, "Formación del Profesorado Universitario"), four-years-long, is aimed at the training of Higher Education teachers and researchers.

Publications[3]

Publications in English

Nogueiras, G., Herrero, D., & Iborra, A. (2017). Teaching for epistemological change: Self-direction through self-assessment. In E. Cano & G. Ion (Eds.), *Innovative practices for higher education assessment and measurement* (pp. 207-225). Hershey, PA: IGI Global. doi: 10.4018/978-1-5225-0531-0.ch011

Nogueiras, G., & Iborra, A. (2017). Understanding and promoting self-direction in freshman and master's students: A qualitative approach. *Behavioral Development Bulletin, 22*(2), 394-404. doi: 10.1037/bdb0000024 [4]

Nogueiras, G., Iborra, A., & Kunnen, E. S. (2017?). Experiencing Transformative Learning in a Counseling Masters' Course: A Process-oriented Case Study with a Focus on the Emotional Experience. Pre-accepted for publication (revised version of the manuscript after positive reviewers' and editor's feedback waiting for approval). *Journal of Transformative Education* [5]

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Herrero, D., Iborra, A., & Nogueiras, G., (2016). *Oral presentation skills for elementary education students: peer group as a resource for development.* EAPRIL 2015 Proceedings (Luxembourg). Issue 2 - March (pp. 465-475).

Publications in Spanish

Nogueiras, G. (2017). Aprendizaje transformacional en una asignatura de Habilidades de Counselling que promueve la exploración personal: una aproximación cualitativa. En G. Ros et al. (Eds.), *Sextas Jornadas de Jóvenes In-*

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[3] Publications can be found at: https://www.researchgate.net/profile/Gloria_Nogueiras2
[4] This publication is Chapter 2 of the present thesis.
[5] This publication is Chapter 4 of the present thesis.
[6] This publication is Chapter 3 of the present thesis.

vestigadores de la Universidad de Alcalá: Humanidades y Ciencias Sociales (pp. 351-363). Alcalá de Henares: Servicio de Publicaciones UAH [7]

Nogueiras, G., Iborra, A., & Herrero, D. (2017). Podcasts dialógicos en Educación Superior: una invitación a la auto-dirección. En H. del Castillo & G. Nogueiras (Eds.), *Nuevas apuestas educativas: Entre la docencia presencial y la innovación tecnológica* (pp. 67-81). Alcalá de Henares: Servicio de Publicaciones de la UAH.

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[7] Publication of preliminary results of the empirical study in the Chapter 4 of the present thesis.
[8] Publication of preliminary results of the empirical study in the Chapter 2 of the present thesis.

Conferences[9]

Oral presentations in English

Iborra, A., Herrero, D., & Nogueiras, G. (2016, September). *Cognitive Development really matters in Oral Presentation Skills Programs: Preadolescents becoming Abstract Thinkers*. Paper presented at the 15th Biennial Conference of the European Association of Research on Adolescence. Cádiz, Spain.

Nogueiras, G., Herrero, D., & Iborra, A. (2015, November). *Dialogical podcasts to promote reflection and self-direction in higher education.* Paper presented at the 4th Conference of the European Association for Practitioner Research on Improving Learning in education and professional practice. Luxembourg, Luxembourg.

Herrero, D., Iborra, A., & Nogueiras, G., (2015, November). *Oral presentation skills for elementary education students: peer group as a resource for development*. Paper presented at the 4th Conference of the European Association for Practitioner Research on Improving Learning in education and professional practice. Luxembourg, Luxembourg.

Nogueiras, G., Kunnen, S., & Iborra, A. (2014, September). *What about the role of turning points in learning trajectories? Clues to promote optimal development*. Paper presented at the symposium "The meaning of variability" at the 14th Biennial Conference of the European Association of Research on Adolescence. Izmir, Turkey.[10]

Nogueiras, G., Kunnen, S., & Iborra, A. (2013, September). *Learning and development over time: emotional trajectories in an experiential learning context.* Paper presented at the 16th European Conference on Developmental Psychology. Lausanne, Switzerland.

Iborra, A., & Nogueiras, G. (2013, July). *Draw yourself as a Teacher: Exploring professional identity from three different cultural and educational backgrounds*. Paper presented at the 22nd Auto/Biograpy Summer Conference. Picturing the Self and Identity. Barcelona, Spain.

Nogueiras, G., & Iborra, A. (2013, May). *Development of emerging adults in higher education: a qualitative approach to students' narratives*. Paper pre-

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[9] Conference presentations can be found at: https://www.researchgate.net/profile/Gloria_Nogueiras2

[10] Presentation of preliminary results of the empirical study in the Chapter 3 of the present thesis.

sented at the 3rd Symposium of the European Society for Research in Adult Development. Freiburg, Germany.[11]

Iborra, A., Nogueiras, G. & McWhirter, J. (2012, September). *Individual trajectories during a methodological experiential challenging learning experience.* Paper presented at the13th Biennial Conference of the European Association for Research on Adolescence. Spetses, Greece.

Iborra, A., & Nogueiras, G. (2010, November). *Emotional processes and individual trajectories during a methodological experiential challenging learning experience.* Paper presented at the 4th International Conference of Education, Research and Innovation. Madrid, Spain.

Oral presentations in Spanish

Nogueiras, G. (2016, Diciembre). *Aprendizaje transformacional en una asignatura de Habilidades de Counselling que promueve la exploración personal: una aproximación cualitativa.* Comunicación presentada en las VI Jornada de Jóvenes Investigadores de la Universidad de Alcalá. Alcalá de Henares, España.[12]

Nogueiras, G., Iborra, A., & Herrero, D. (2016, Abril). *Podcasts dialógicos en Educación Superior: una invitación a la auto-dirección.* Comunicación presentada en el VIII Encuentro de Innovación en Docencia Universitaria de la Universidad de Alcalá. Alcalá de Henares, España.

Iborra, A., Herrero, D., & Nogueiras, G. (2016, Abril). *Explorando las posibilidades de los cuestionarios online para la evaluación formativa en Educación Superior.* Comunicación presentada en el VIII Encuentro de Innovación en Docencia Universitaria de la Universidad de Alcalá. Alcalá de Henares, España.

Nogueiras, G. (2014, Diciembre). *Turning points en las trayectorias emocionales de estudiantes en un contexto desafiante de aprendizaje experiencial: una aproximación dinámica.* Comunicación presentada en las V Jornada de Jóvenes Investigadores de la Universidad de Alcalá. Alcalá de Henares, España.[13]

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[11] Presentation of preliminary results of the empirical study in the Chapter 2 of the present thesis.
[12] Presentation of preliminary results of the empirical study in the Chapter 4 of the present thesis.
[13] Presentation of preliminary results of the empirical study in the Chapter 3 of the present thesis.

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Resorting to a key idea on the present piece of work, the elaboration of a doctoral thesis is a challenging process in which contextual support is required for the PhD student to be in a better position to manage optimally the diverse demands arising on the way. I would like to begin by acknowledging four people who have been key in my learning and developmental process over the last few years.

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One year later I had the pleasure to encounter David. You have been a stimulating travel companion with whom I have been able to learn more, and in qualitatively different ways, about the world and about myself and to appreciate more subtle aspects of life. As for the elaboration of this thesis, you have been an enthusiastic discussant, a thorough and critical reader and a constant support. I am looking forward to read yours and to see you learning and developing further.

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My visits to Groningen allowed me to get familiar with several researchers and PhD students, who very kindly invited me to be part of their lively research meetings. I am particularly grateful to Paul Van Geert, who devoted some of his time to help me with my data analysis. Likewise, I would like to thank Marlenny, who became such a great friend, for all her support. I know that we will encounter again. Wieke, Naomi and Mandy (and Nena in my first stay), thanks for teaching me interesting particularities of the Dutch culture and for sharing with me amusing experiences at conferences.

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*

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Gloria.

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<p style="text-align:center">*</p>

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Resumen

(Spanish summary)

1. Contextualización

La presente tesis doctoral parte de tres premisas fundamentales: 1) la educación superior puede jugar un papel fundamental a la hora de facilitar la transición de los estudiantes hacia formas más complejas de dar sentido a sus experiencias, es decir, a la hora de facilitar su desarrollo epistemológico (Kegan, 1994; Perry, 1970); 2) el cambio epistemológico de los adultos hacia lo que se conoce como una *mente auto-dirigida* es esencial a la hora de gestionar las demandas que caracterizan a la sociedad de hoy, y que implican, entre otras cuestiones, el desarrollo del pensamiento crítico, la iniciativa personal o la autoevaluación (Kegan & Lahey, 2009); 3) para que las personas desarrollen formas más complejas de dar sentido al mundo, un requisito indispensable es que sus formas actuales de hacerlo sean desafiadas y, así, objeto de revisión (Kunnen & Bosma, 2000; Piaget, 1975/1985).

El fomento de la transición de los adultos hacia formas más sofisticadas de dar sentido se ha investigado ampliamente tanto desde el marco de teorías constructivistas-desarrollativas (Baxter Magolda, 2004; Kegan, 2000) como desde el marco de la teoría conocida como *aprendizaje transformacional* (Mezirow, 2000). Los hallazgos generados desde ambas corrientes ponen en relieve la necesidad de que la educación superior genere intencionalmente contextos que desafíen y apoyen a los estudiantes en su transición hacia una mayor complejidad mental (Baxter Magolda, 1999, 2004; Cranton, 2002). En este sentido, se ha mostrado cómo entornos de aprendizaje de cariz constructivista que promueven que los estudiantes se responsabilicen de su aprendizaje a través de metodologías como el aprendizaje colaborativo y el experiencial son esenciales (Slavich & Zimbardo, 2012).

Los contextos de aprendizaje basados en principios constructivistas suelen desafiar la forma en que la que habitualmente los estudiantes se han desempeñado en entornos educativos, que por norma se caracterizan por un modelo basado en la transmisión reproducción de conocimiento y que proporciona pautas externas muy

concretas acerca del *qué* y *cómo* hacer las cosas. Así, contextos de aprendizaje que requieren una mayor autonomía por parte de los estudiantes suelen suponer inicialmente cierta "amenaza", lo que suele ir de la mano de emociones como confusión, ansiedad o frustración (Formenti & Dirkx, 2014; Poutiatine, 2010). Interesantemente, emociones en principio desagradables como las mencionadas pueden ser muy útiles a nivel de aprendizaje y desarrollo en cuanto a que potencialmente pueden: a) ayudar a los estudiantes a que identifiquen y revisen aquellas asunciones y comprensiones obsoletas acerca de lo que es un contexto de aprendizaje y lo que se espera de ellos como aprendices (Mälkki, 2010); b) motivarles para que intenten reducir la discrepancia entre sus formas habituales de dar sentido y esas nuevas demandas del contexto que las desafían (Kunnen & Wassink, 2003).

En vista de lo anterior, esta tesis se propuso investigar el desarrollo epistemológico de estudiantes universitarios a lo largo de propuestas formativas intencionalmente desarrollativas poniendo el foco en su experiencial emocional. Nuestra expectativa era que la típica tendencia inicial a experimentar emociones desagradables como fruto del descoloque entre las expectativas de los estudiantes y las demandas de una mayor autodirección, iría cambiando a lo largo del tiempo a medida que los estudiantes refinaran sus formas de dar sentido y así fueran capaces de gestionar satisfactoriamente dichas demandas. En concreto, esta tesis tenía la intención de aportar luz en las siguientes áreas: 1) *cómo* es que los estudiantes universitarios experimentan emocionalmente y gestionan las demandas desafiantes de contextos de aprendizaje que pretenden facilitar su desarrollo epistemológico; 2) *qué* tipo de cambios epistemológicos experimentan estos estudiantes en dichos contextos de aprendizaje; 3) *cómo* modelos de aprendizaje experiencial y colaborativo, basados en principios constructivistas, pueden ayudar a los estudiantes en su transición hacia formas más complejas de dar sentido.

Guiados por estos objetivos, desarrollamos tres estudios empíricos enmarcados en tres experiencias formativas universitarias en las áreas de la educación y la psicología dentro de programas de formación de profesores. Metodológicamente, adoptamos un enfoque "centrado en el proceso", recurriendo tanto a la metodología cualitativa (Denzin & Giardina, 2015), que pretende comprender cómo las personas damos sentido a nuestras experiencias partiendo de nuestras propias narrativas, como a una metodología propia de los sistemas dinámicos (Kunnen, 2012), que permite hacer un seguimiento de trayectorias de aprendizaje y desarrollo mediante la toma de datos cuantitativos en medidas repetidas a lo largo del tiempo.

El primer estudio[1] –capítulo 2– investigó cómo cuatro estudiantes de grado y cuatro estudiantes de máster vivieron la transición hacia la autodirección en dos asignaturas cuatrimestrales de psicología del desarrollo y psicología de la educación, así como las diferencias en dicha transición entre ambos tipos de estudiantes. Así mismo, exploró cómo las metodologías de aprendizaje experiencial y colaborativo adoptadas en dichas asignaturas podrían haber facilitado la transición epistemológica de los estudiantes. Para hacer esto, se realizó un análisis temático de las autoevaluaciones escritas por los estudiantes al final de las asignaturas.

El segundo estudio[2] –capítulo 3– adoptó un enfoque basado en los sistemas dinámicos para investigar cómo los diecisiete participantes en un curso de cinco días en "aprendizaje auto-creado" gestionaron la complejidad contextual inherente a la metodología experiencial planteada. Así mismo, exploró el potencial desarrollativo de dicha metodología docente. Específicamente, se siguió la trayectoria emocional de los estudiantes a lo largo de ocho puntos de medida durante el curso. Dichas trayectorias se analizaron a través de técnicas de muestreo aleatorio en busca de turning points –puntos de giro–, explorándose también la relación de dichos turning points con la complejidad formativa percibida por los estudiantes.

El tercer estudio[3] –capítulo 4– investigó tanto el proceso como los resultados de aprendizaje transformacional de una estudiante de máster a lo largo de una asignatura cuatrimestral en habilidad de counselling. Así mismo, investigó el potencial desarrollativo de un modelo de aprendizaje experiencial. Para ello, se tomaron datos longitudinales (a través de 11 cuestionarios de seguimiento sobre las emociones experimentadas a lo largo de las sesiones; y de 3 posts escritos por la estudiante en su blog personal) y retrospectivos (una actividad reflexiva final, y una entrevista) que se analizaron mediante un análisis temático holístico.

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[1] El primer estudio ha sido publicado como: Nogueiras, G., & Iborra, A. (2017). Understanding and promoting self-direction in freshman and master's students: A qualitative approach. *Behavioral Development Bulletin, 22*(2), 394-404. doi: 10.1037/bdb0000024

[2] El segundo estudio ha sido publicado como: Nogueiras, G., Kunnen, G., & Iborra, A. (2017). Managing contextual complexity in an experiential learning course: a dynamic systems approach through the identification of turning points in students' emotional trajectories. *Frontiers in Psychology, 8,* 667. doi: 10.3389/fpsyg.2017.00667

[3] El tercer estudio ha sido pre-aceptado para publicacion (la version revisada del manuscrito tras el feedback positivo de los revisores y el editor está pendiente de aprobacion) en el *Journal of Transformative Education* bajo el título de: Experiencing Transformative Learning in a Counseling Masters' Course: A Process-oriented Case Study with a Focus on the Emotional Experience.

2. Resultados

En el primer estudio empírico identificamos tres temas en las autoevaluaciones de los ocho estudiantes: 1) un descoloque emocional inicial de los estudiantes como respuestas a las demandas de autodirección; 2) el apoyo del profesor y de los compañeros a la hora de gestionar dicho descoloque; y 3) la transición de los estudiantes hacia concepciones de aprendizaje más complejas, incluyendo evidencias de una mayor autodirección. Estos resultados tienen dos implicaciones fundamentales. Por un lado, confirman la contribución de contextos de aprendizaje diseñados intencionalmente para promover el desarrollo epistemológico. Por otro lado, las similitudes encontradas entre los estudiantes de grado y de máster a la hora de gestionar las demandas de autoridad interna ponen en relieve las consecuencias del modelo transmisivo más extendido a nivel universitario.

En el segundo estudio empírico encontramos, a través de técnicas de muestreo aleatorio, turning points de cariz positivo en las trayectorias de los diecisiete estudiantes a lo largo del curso. Así mismo, confirmamos la relación de dichos turning points con la complejidad de la formación según era percibida por los estudiantes. Estos resultados se tomaron como evidencia de que los estudiantes habían gestionado exitosamente el conflicto cognitivo procedente del choque entre sus anteriores maneras de dar sentido y las demandas desafiantes de la formación. Así mismo, estos resultados confirman la idea de que la complejidad contextual puede desencadenar aprendizaje y desarrollo. Este estudio también contribuyó a discutir el potencial desarrollativo de un modelo de aprendizaje experiencial.

En el tercer estudio, el análisis temático holístico de los datos longitudinales y retrospectivos permitieron identificar: 1) cinco fases en el proceso transformacional de la estudiante a lo largo de la asignatura, organizadas en torno a su cambiante manera de responder emocionalmente y dar sentido a las demandas formativas; 2) dos resultados de aprendizaje transformacional: una concepción de aprendizaje más compleja y una mayor autoconciencia. Este estudio también enfatizó el potencial de: a) adoptar un enfoque de investigación centrado en el proceso a la hora de estudiar el aprendizaje transformacional, b) hacer un seguimiento de la experiencia emocional de la estudiante como vía para comprender su transformación; c) un modelo de aprendizaje experiencial para generar dicha transformación.

3. Discusión

3.1 Trayectorias emocionales y procesos de dar sentido de los estudiantes en contextos de aprendizaje constructivistas-desarrollativos

En los tres estudios encontramos evidencias de un periodo inicial en la formación durante el cual los estudiantes experimentaron *emociones descolocantes.* Estas emociones estaban vinculadas a una desestabilización producida por el desafío a las asunciones, expectativas y comprensiones de los estudiantes acerca de lo que era un contexto de aprendizaje y de lo que se esperaba de ellos como aprendices (véase Formenti & Dirkx, 2014; Mezirow, 2000; Poutiatine, 2009). Tanto los participantes en el primer estudio como los participantes en el tercer estudio enfatizaron que el profesor les pedía hacer cosas a las que no estaban acostumbrados (para resultados similares, véase Sohn et al., 2016), lo que les hizo sentir confusos, inciertos y "perdidos" así como preocupados por lo apropiado de su desempeño de aprendizaje. Que tanto los estudiantes de grado como los estudiantes de máster del primer estudio estuvieran esperando que el profesor les proporcionara guías claras acerca de cómo proceder proporciona evidencias de la necesidad de los estudiantes de una dirección externa típica de una *mente socializada* (Kegan & Lahey, 2009). En el caso de Rose en el tercer estudio, su desestabilización estuvo más relacionada con cómo su sentido de competencia se vio desafiado por las demandas de la formación (para resultados relacionados, véase Fullana, Pasillera, Colomer, Fernández Peña, & Pérez-Burriel, 2016). La tendencia a experimentar emociones desagradables al principio del a formación se identificó también en el segundo estudio, en el que el tipo de turning points más común en las trayectorias emocionales de los estudiantes demostraba la existencia de una fase inicial caracterizada por la experiencia de emociones negativas intensas.

En cuanto al *cómo* de la evolución de la fase inicial de *desestabilización* e incomodidad de los estudiantes, los tres estudios proporcionaron un diferente grado de detalle. En el primer estudio encontramos evidencias indirectas de que los estudiantes habían superado el descoloque inicial en cuanto a que reportaron cambios en sus maneras de interpretar las demandas al final de las experiencias de aprendizaje. En el segundo estudio encontramos un patrón común en las trayectorias emocionales de los estudiantes a lo largo del tiempo, que consistía en la transición desde experiencias emocionales negativas intensas y emociones positivas bajas, a la emergencia de patrones inversos. En este estudio también encontramos que los

turning points que indicaban tales cambios en las trayectorias coincidían con perio-
dos de la formación particularmente complejos para los estudiantes. Esto está lo en
línea con el principio constructivista de que la complejidad contextual puede desen-
cadenar respuestas adaptadas de los individuos a su entorno (Piaget, 1975/1985).
Sin embargo, la mera recogida de datos de medidas repetidas lo largo del tiempo en
este segundo estudio no nos permitió acceder a los posibles motivadores específicos
que podían explicar los cambios en las tendencias emocionales.

En este sentido, el tercer estudio nos permitió obtener más detalle sobre el
proceso de una estudiante a la hora de dar sentido y responder emocionalmente a un
contexto de aprendizaje desafiante. Después de la típica fase de *desestabilizació*n y
de las *emociones descolocantes* asociadas, identificamos una fase de *transición en*
la trayectoria de Rose. Esta fase, que tuvo lugar en torno a la mitad del curso –
como en el caso de los turning points detectados en el segundo estudio–, estuvo
relacionada con el comienzo de cambios significativos en la manera en que Rose
comprendía las demandas del contexto de aprendizaje y su propia respuesta emo-
cional a dichas demandas. Esta fase de *transición*, como en el estudio 2, estuvo
caracterizada por una disminución de las emociones desagradables y un aumento de
las emociones agradables (para resultados relacionados véase see Arpiainen, Lac-
kéus, Täks, & Tynjälä, 2013). Concretamente, *emociones descolocantes*, como
confusión e inseguridad, que habían sido dominantes durante la fase de *desestabili-
zación*, dieron paso a una predominancia de emociones agradables como satisfac-
ción y alivio, a las que dimos el nombre de *emociones integrativas*. Los cambios
cualitativos referidos en la dinámica emocional de los estudiantes en torno a la
mitad del periodo formativo, tanto en el segundo estudio como en el tercer estudio,
se tomó como una manifestación de una mayor comprensión de las demandas del
contexto formación. En cuanto a la temporalización de este cambio, transitar hacia
una concepción constructiva del aprendizaje requiere un tiempo para que los estu-
diantes se involucren en las actividades de tipo colaborativo y experiencial propues-
tas en la formación, lo que potencialmente facilita que comiencen a objetivar y
revisar sus asunciones y comprensiones. En el caso de Rose, hubo un momento
clave en el que decidió "dejarse llevar", lo que le abrió la puerta a una nueva mane-
ra de relacionarse con el contexto de aprendizaje, vinculado con procesos de *con-
fiar* en el docente y en su propuesta (Iborra, García, Margalef, & Pérez, 2009).

Después de la fase de *transición* de Rose, identificamos una frase de
reasentamiento en su trayectoria. Durante esta fase las emociones predominantes

fueron la satisfacción, ya referida y también el entusiasmo, la alegría, y el disfrute, a las que llamamos *emociones generativas*. Estas emociones se entendieron como una fuente adicional de motivación, de tal manera que animaron a Rose a mantenerse comprometida con su proceso de aprendizaje. Los motivadores de estas *emociones generativas*, tal y como fueron descritos por Rose, se relacionan con investigaciones que han asociado el disfrute con una evaluación positiva de la propia competencia (Pekrun & Stephens, 2010) y la alegría con un sentimiento de completud tras haber entendido algo difícil (Barnett, 2004) o con la expansión de conocimiento (Izard 2007). Como parte de este periodo de *reasentamiento*, también consideramos el periodo después de que las clases presenciales de la asignatura terminaran, cuando Rose tuvo la oportunidad de sumergirse en un proceso de reflexión a través de la actividad final y la entrevista que la ayudaron a crear un significado más holístico y complejo de sus experiencias. Esto es algo que también ocurrió en el primer estudio, en el que la autoevaluación proporcionó un espacio para que los estudiantes reflexionaran sobre sus experiencias de aprendizaje en las asignaturas.

Para completar la dinámica emocional de la estudiante identificada en el tercer estudio, hay que mencionar la consistente experiencia de interés y curiosidad de Rose a lo largo de la asignatura. A estas emociones las llamamos *emociones de apoyo* en cuanto a que facilitaron el compromiso activo y estable de Rose en su proceso de dar sentido a lo largo de las diferentes fases de la formación. En esta línea, interés ha mostrado ser útil a la hora de sostener el aprendizaje de las personas frente a desafíos (Hidi, 2006; Renninger, 2000), y la curiosidad se ha entendido como un aliciente para el desarrollo de una actitud de curiosidad frente a situaciones de incertidumbre (Grossnickle, 2016; Loewenstein, 1994).

La dinámica emocional descrita más arriba, que se relaciona con las típicas fases de cualquier proceso de desarrollo según la literatura en sistemas dinámicos (véase Kunnen & Van Geert, 2012), se mostró claramente relacionada con los distintos proceso de dar sentido de Rose a lo largo de la formación, específicamente: 1) la experiencia de *emociones descolocantes* fueron evidencia de la desestabilización cognitiva de Rose ante la amenaza a sus concepciones de aprendizaje y su sentido de competencia; 2) la experiencia estaba de *emociones de apoyo* a lo largo de la formación permitieron a Rose mantenerse comprometida con su aprendizaje en la asignatura a pesar de los desafíos encontrados; 3) la experiencia de *emociones integrativas* se tomó como evidencia de micro-procesos de restabilización cogniti-

va; 4) la experiencia de *emociones generativas* al final de la formación funcionaron como un motivador que reforzó el compromiso de Rose con el aprendizaje.

Los estudiantes investigados en esta tesis, y específicamente los del primer estudio y el tercer estudio, son ejemplos de cómo una repuesta activa es esencial a la hora de que las personas gestionemos de manera exitosa situaciones descolocantes (Kegan, 1994). Tomar decisiones como usar un blog para escribir sobre experiencias emocionales descolocantes o participar en ejercicios experienciales y colaborativos fueron evidencia de esa implicación activa. Algo que subyace a las citadas iniciativas es el compromiso de los estudiantes con proceso de reflexión crítica, algo que se encuentra en el centro del desarrollo epistemológico y el aprendizaje transformacional en cuanto a que permite a las personas cuestionar las asunciones en las que se engarzan sus marcos de referencia (Mezirow, 2000). En el tercer estudio mostramos cómo el hecho de que Rose reconociera y reflexionara sobre sus emociones, algo facilitado por el profesor, la ayudaron a aceptar esas emociones desagradables de modo que pudiera reexaminar sus asunciones (Mälkki, 2010).

3.2.   Cambios epistemológicos de los estudiantes

En cuanto al cambio fundamental experimentado por los estudiantes encontramos su transición hacia formas más complejas de entender el aprendizaje. Este cambio puede considerarse transformativo en cuanto a que permitió a los estudiantes gestionar el entorno formativo de manera exitosa (Mezirow, 2000). En el primer estudio los estudiantes dieron evidencia de su consolidación en una concepción de aprendizaje entendida como la *aplicación de conocimiento,* la concepción de aprendizaje 3 según el modelo de desarrollo epistemológico propuesto por Van Rossum y Hamer (2010). Estos estudiantes también dieron evidencia de una autodirección creciente, incluyendo una tendencia hacia la autoevaluación. Esto se relaciona con la transicón hacia la concepción de aprendizaje 4, llamada *pensar por uno mismo* (Van Rossum & Hamer, 2010). Aunque menos de las esperadas, encontramos algunas diferencias a nivel de complejidad epistemológica entre los estudiantes de grado y de máster. Los estudiantes de máster demostraron una aplicación de las distinciones teóricas más internalizada y subjetiva, así como un uso más sofisticado del grupo de iguales como vía para generar más independencia con respecto al profesor (Baxter Magolda, 2000). En el tercer estudio, las nuevas comprensiones de Rose acerca del significado de aprender, como aceptar más la incertidumbre o reenmarcar sus ideas sobre qué significan "lo correcto" y los "errores"

en los procesos de aprendizaje, son ejemplos de resultados de aprendizaje transformacional a nivel de epistemología (Hoggan, 2016). Según el modelo de Van Rossum y Hamer (2010), estos cambios pueden tomarse como evidencia de la transición de Rose hacia la concepción de aprendizaje 4, de *pensar por uno mismo*. Rose también dio evidencia de una mayor autoconciencia (Hoggan, 2016), que resultó de su sentido de competencia desafiado por las demandas de la formación. En este sentido, es interesante apuntar que los procesos de aprendizaje transformacional están normalmente relacionados con aspectos ontológicos (del *sí mismo*) que son cuestionados y de ese modo susceptibles de revisión (Beard & Mälkki, 2013).

3.3.   Contextos de aprendizaje desarrollativos

Los contextos de aprendizaje propuestos en los estudios investigados fueron fundamentales a la hora de facilitar la transición de los estudiantes hacia formas más complejas de dar sentidos. Además de proponer desafío, ayudar a los estudiantes a que atraviesen la típica fase inicial de descoloque es una de las tareas fundamentales de todo profesor interesado en promover la trasformación (Ettling, 2012). Para hacerlo, construir un entorno seguro y confiable que facilite el diálogo y una actitud de calma frente a la incertidumbre es algo esencial (Cranton, 2002; Cranton & Wright, 2008). En esta línea, los participantes en el primer estudio destacaron cómo el profesor había generado un contexto de confianza, empatía y respeto por sus formas iniciales de entender (Baxter Magolda & King, 2004; Kegan, 1994). En el tercer estudio pudimos aproximarnos en más detalle a las intervenciones del profesor destinadas a reencuadrar la manera en la que la estudiante tenía de entender la incertidumbre y los errores en el aprendizaje, así como a ayudarla a revisar una concepción estática de los procesos de comprensión y a valorar la naturaleza informativa de las emociones desagradables (Mälkki & Green, 2014).

Las actividades colaborativas y experienciales propuestas en los cursos permitieron a los estudiantes que objetivaran y revisaran críticamente sus perspectivas y comprensiones iniciales. Junto al fomento a una mayor apertura a la novedad y la incertidumbre, estos espacios se mostraron especialmente útiles a la hora de facilitar la transición de los estudiantes de una *mente socializada* a una *mente autodirigida* (Apte, 2009; Baxter Magolda, 2000; Feller, 2009; Kasworm & Bowles, 2012; King & Siddiqui, 2011).

Finalmente, los mismos instrumentos utilizados para la recogida de datos ayudaron a los estudiantes a tomar una mayor conciencia de sus experiencias emocionales y de sus cambiantes formas de dar sentido a lo largo de las asignaturas. En este sentido, espacios propuestos a lo largo de la formación, como el blog y los cuestionarios de seguimiento, facilitaron la reflexión de los estudiantes a lo largo de dichas experiencias, algo que Schön (1983) ha llamado *reflexión-en-acción.* En cuanto a espacios retrospectivos como la autoevaluación, la actividad final y la entrevista, proporcionaron a los estudiantes la oportunidad de reflexionar sobre sus procesos a lo largo de la formación desde una perspectiva aventajada, facilitando su *reflexión-sobre-la-acción* o después de la experiencia (Schön, 1983).

4. Implicaciones educativas

En línea con investigaciones previas (Baxter Magolda, 1999, 2004; Cranton, 2002; Drago-Severson, 2011; Taylor, 2008), los tres estudios que componen esta tesis proporcionan evidencia de cómo contextos de aprendizaje constructivistas, en este caso basados en metodología experiencial y colaborativa, pueden jugar un papel fundamental a la hora de promover la transición de los estudiantes hacia formas más complejas de dar sentido (Kegan & Lahey, 2016).

Nuestros resultados ilustran que, lamentablemente, este tipo de propuestas de aprendizaje son todavía una excepción en la educación superior (para este mismo argumento véase Barber, King, & Baxter Magolda, 2013), como puede apreciarse de las ligeras diferencias encontradas entre los estudiantes de grado y los estudiantes de máster a la hora de responder a las demandas de autodirección en el primer estudio, y en los testimonios de gran novedad de la estudiante de máster en el tercer estudio. Esto puede entenderse como una llamada a la acción dirigida tanto a profesores individuales como a las instituciones universitarias en general.

Los resultados también enfatizan la importancia de hacer un detallado seguimiento de la respuesta emocional de los estudiantes en contextos de aprendizaje que desafían sus expectativas de dirección por parte del profesor, así como de la necesidad de ofrecerles un apoyo en su transición hacia nuevas formas de apropiarse de sus procesos de aprendizaje. Esto requiere que la complejidad epistemológica de los profesores sea mayor que la de los estudiantes, de tal modo que estén en disposición de generar contextos de aprendizaje desarrollativos (Van Rossum & Hamer, 2010).

En cuanto al papel de las emociones en el aprendizaje, la mayor contribución de esta tesis consiste en concretar el estudio de la relación entre ambos –que a menudo es descrita en términos vagos- mediante: 1) el estudio de la experiencia emocional de los estudiantes como una manera de entender cómo dan respuesta a contextos educativos desafiantes; 2) la sistematización de dicho estudio a través del foco en el momento y la secuencia de las emociones de los estudiantes. En esta empresa hemos encontrado tres hallazgos fundamentales. En primer lugar, la tendencia emocional positiva identificada en las trayectorias de los estudiantes se entiende como una evidencia de sus formas más adaptadas de responder a las demandas de los contextos formativos (para resultados similares véase Arpiainen, Lackéus, Täks, & Tynjälä, 2013). En segundo lugar, esta tendencia apoya la idea de que son los patrones dinámicos de las emociones positivas y negativas a lo largo del tiempo los que pueden considerarse beneficiosos o no para el aprendizaje (Sansone & Thoman, 2005). En tercer lugar, hemos propuesto una clasificación de diferentes emociones que pueden jugar un papel importante a lo largo de procesos de aprendizaje de tipo transformacional, específicamente, *descolocantes*, *de soporte*, *integradoras*, y *generativas*.

En cuanto a investigación previa en desarrollo epistemológico en educación superior, en general ésta se ha realizado en marcos temporales más largos, como cursos académicos o programas universitarios completos (véase por ejemplo Barber, King, & Baxter Magolda, 2013). Mientras que en el área del aprendizaje transformacional los estudios en marcos temporales más cortos son más comunes, la mayoría de ellos se han centrado en los resultados de aprendizaje transformacional de los estudiantes (para este argumento véase Mälkki & Green, 2014; Newman, 2012) y aquellos que se han centrado en los procesos de aprendizaje lo han hecho principalmente partiendo de narrativas retrospectivas de las experiencias de cambio de los estudiantes (para este argumento véase Kasworm & Bowles, 2012; Taylor & Laros, 2014). Considerado lo anterior, la contribución principal de esta tesis es que ha estudiado el desarrollo epistemológico o aprendizaje transformacional de estudiantes en periodos de tiempo cortos y que lo ha hecho poniendo el foco en los procesos de cambio y aprendizaje a lo largo del tiempo, y no sólo en los resultados.

5. Implicaciones metodológicas

Esta tesis ha supuesto un intento progresivo de aproximarse a los procesos de cambio a lo largo del tiempo. Esto ha sido particularmente notable en el tercer

estudio, en el que, inspirados por principios cualitativos y dinámicos combinamos datos longitudinales y retrospectivos acerca de la experiencia de una estudiante para conseguir una mayor comprensión de su proceso de cambio a lo largo de la asignatura en la que se enmarcaba la investigación. En cuanto al enfoque cualitativo, confirmamos su valor a la hora de investigar cómo los estudiantes transitan hacia formas más complejas de dar sentido (Lim, 2011). El aprendizaje fundamental en este área ha sido el de comprobar la riqueza de combinar datos cualitativos de carácter longitudinal y retrospectivo, como hicimos en el tercer estudio. Con respecto al enfoque en sistemas dinámicos, podríamos enmarcarnos en lo que ha venido en llamarse una corriente "blanda" (Van Vondel, Steenbeek, Van Dijk, & Van Geert, 2016) en cuanto a que nos inspiramos en principios propios de los sistemas dinámicos para entender los procesos educativos. En la tesis, esto se ha materializado en nuestro interés en la variabilidad de las trayectorias emocionales de los estudiantes y en nuestro énfasis en la naturaleza transaccional e iterativa propia de los procesos de dar sentido (véase también Kunnen & Bosma, 2000).

Como una contribución metodológica específica inspirada en principios de los sistemas dinámicos, en el segundo estudio ideamos e implementamos una técnica para identificar turning points en las trayectorias emocionales de los estudiantes. Esta técnica puede ser de utilidad para investigadores interesados en explorar la gran variedad de experiencias longitudinales tan propias de los contextos educativos, y para educadores y terapeutas interesados en seguir las trayectorias de sus estudiantes o de sus clientes en búsqueda de periodos favorables para realizar intervenciones (Hayes, Laurenceau, Feldman, Strauss, & Cardaciotto, 2007).

En términos generales, creemos que el enfoque de investigación centrado en el proceso adoptado en esta tesis da respuesta a las demandas de cambios metodológicos planteadas desde dos áreas. Por un lado, investigadores en el área de las emociones han demandado la necesidad de desarrollar vías que permitan evaluar su naturaleza dinámica. Pensamos que tanto el segundo estudio como el tercero proporcionan buenos ejemplos de cómo hacerlo. Por otro lado, la literatura en aprendizaje transformacional ha reclamado la necesidad de estudiar los procesos de aprendizaje transformacional yendo más allá de tomas de datos retrospectivas de las experiencias de los estudiantes (Cranton & Hoggan, 2012; Kasworm & Bowles, 2012). Esto es algo que abordamos en el tercer estudio mediante la inclusión de tomas de datos longitudinales que complementen los retrospectivos.

6. Limitaciones

Son dos las limitaciones principales que pueden atribuírsele a esta tesis como un todo. Como una primera limitación, el foco en ejemplos óptimos de la transición hacia formas más complejas de dar sentido implicó necesariamente no investigar trayectorias de estudiantes menos exitosas, lo que podría haber ayudado a detectar puntos críticos a la hora de desarrollar experiencias educativas que pretenden provocar intencionalmente el desarrollo epistemológico de los estudiantes. Esto puede tomarse también como una de las fortalezas de la tesis en cuanto a que permitió incrementar nuestra comprensión de casos de desempeño óptimos. Como una segunda limitación, en esta tesis estudiamos cambios epistemológicos durante periodos de tiempo relativamente cortos. Esto ha cerrado la posibilidad de seguir el desarrollo completo de dichos cambios, que por su complejidad no pueden ser totalmente completados en franjas de tiempo reducidas. El foco en periodos de tiempo cortos, sin embargo, permitió identificar micro-procesos de cambio, que son los elementos fundamentales para generar cambios consolidados a largo plazo.

7. Líneas de investigación futura

Hay tres líneas de investigación futura que emergen de esta tesis. En primer lugar, nos planteamos investigador el desarrollo epistemológico de estudiantes a lo largo de periodos de tiempo más largos. Esto permitiría comprobar si los cambios experimentados son duraderos o si se debilitan una vez que los estudiantes vuelven a socializarse en contextos de aprendizaje no desarrollativos. En segundo lugar, nos gustaría hacer un seguimiento más detallado de las trayectorias de los estudiantes a lo largo de experiencias de aprendizaje constructivistas, tomando datos sobre la complejidad, utilidad, interés, comodidad o diversión de la formación desde la perspectiva de los estudiantes. Estas trayectorias podrían compararse con aquellas de estudiantes en contextos de aprendizaje tradicional para seguir indagando en las potenciales contribuciones de metodologías constructivistas a la hora de generar cambio en los estudiantes. Finalmente, mover el foco de la investigación de los estudiantes al profesor permitiría profundizar en cuáles son las estrategias educativas más significativas a la hora de promover el desarrollo epistemológico.

8.   Consideraciones finales

En retrospectiva, esta tesis hace cuatro contribuciones fundamentales:

- Contribuye a generar una mayor comprensión acerca de *cómo* es la experiencia emocional y los procesos de dar sentido de estudiantes universitarios a lo largo de propuestas formativas que pretenden fomentar su desarrollo epistemológico.

- Proporciona evidencias de *qué* tipo de cambio epistemológico es experimentado por los estudiantes, recurriendo a ejemplos de trayectorias de aprendizaje óptimas.

- Contribuye a sostener el papel fundamental de principios de aprendizaje constructivistas, y particularmente los puntos fuertes de metodologías de tipo experiencial y colaborativo, a la hora de acompañar a los estudiantes en su transición hacia formas más complejas de dar sentido

- Pone a la luz el valor de integrar enfoques de investigación cualitativos y basados en sistemas dinámicos, así como el de combinar datos longitudinales y retrospectivos a la hora de facilitar una mayor comprensión de la transición epistemológica de los estudiantes.