

Action research through lesson study. A space for learning in the initial teacher training

Pérez Granados, Laura
Alcaraz Salarirche, Noelia
Fernández Navas, Manuel
Postigo Fuentes, Ana Yara

The purpose of this paper is to explore the influence of lesson study (LS) on reconstructing students' practical knowledge during initial training as prospecting teachers. This case study sets out the voice and opinions of a student taking part in an LS process. The aim was to further understand how the student's opinions around teaching change both during and after her involvement in the different phases of LS. Information was obtained through semi-structured interviews, observations, photo and video records, document analysis and field diaries. We were also interested in understanding the student's perception of the influence of mentoring and tutoring on her professional development while accompanying her in her reflection about teaching. The results show that LS, as a cooperative curriculum creation process, provides prospecting teachers with opportunities to build their identity as professionals within a network of peers in which they interact in order to learn together. Focused on the context of initial teacher training, this article could lead to a new approach to LS as a strategy that can bring about more relevant transformations while teachers' beliefs, values and dispositions are still at an early stage of construction. Moreover, there is a dearth of studies on the influence of LS in the context of initial teacher training in both the Spanish context and internationally.

Keywords: Lesson study; practical knowledge; tacit knowledge; pre-service teacher training; academic and professional practice; final degree project.

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1. Introduction

This study is part of a research project entitled *"Lesson Studies, School and University: Researching the Reconstruction of Practical Knowledge in Initial Teacher Training"* and was supported by supported by the Ministry of Economy, Industry and Competitiveness of Spain, within the framework of the National Project of I+D under Grant (EDU2017-86082-P). The main purpose of this project is to further understand knowledge and practical thinking around teaching, along with its dimensions, pedagogical attributes and possibilities for transformation, with a view to improving initial teacher training. The main focus of the research is the development of the collaborative action research modality known as Lesson Study (LS). A range of case studies and multi-case studies is used to investigate its implementation in initial training in academic subjects and courses where it is part of teaching practice, together with an analysis of how its development affects practical knowledge reconstruction processes among prospecting teachers.

In particular, the case study developed here focuses on understanding the practical knowledge reconstruction process of a student on the Early Childhood Education degree course, who is taking part in an LS experience in the subjects Academic and Professional Practice III and Final Degree Project (FDP) at the Faculty of Education Sciences at University of X, X. Specifically, our goal was to better understand the keys of the transformations in her practical knowledge through her participation in the different phases of the LS. We also studied the impact of the teacher's mentoring/tutoring on the student's dispositions, knowledge and skills. The study is motivated by the need to analyse new training processes that move away from the traditional academic approach, by researching and developing contents and processes for training that are more closely linked to the dimensions and attributes of

practical knowledge, to its construction processes, and to its possibilities for analysis, reflection and reconstruction.

2. Rethinking teaching: from Action Research to LS in initial training

LS as a strategy for improving teachers' teaching and learning, originated in Japan in the 1990s and has since been gradually adopted in Asia, the USA, Canada and Europe (Fernandez 2002). It refers to the process of work and inquiry that groups of four to six teachers develop to work on the design, development, testing, critique and improvement of an experimental didactic proposal (lesson) (Pérez Gómez and Soto, 2011). According to Lewis (2002), LS is a system of teacher learning, a set of practices, habits of mind, interpersonal relationships, structures and tools that help teachers to work collaboratively and improve their practice. A process in line with action research: action for change and research for understanding.

Certainly because of the need to legitimise it scientifically as a research process as mentioned by Stylianou and Zembylas (2019), years later Takahashi and McDougal (2016) define LS as a strategy with a clear research purpose, which includes the design of a lesson, and which involves the discussion and sharing of results about it. As Rué (2016) suggests, LS has incorporated new nuances, knowledge and criteria that appeal to the professional, linking meaning and system; it is thus proposed as a means to improve learning and, therefore, teaching (Dudley, 2015).

Another relevant aspect in the updated dimension of LS is the consideration of LS as processes of experimentation and inquiry into pedagogical knowledge. As Elliott (2015) points out, the knowledge produced in the process of experimentation has a singular character, which prevents its generalisation, although in the design and assessment phases teachers use their own or other people's theoretical pedagogical

concepts to interpret the concrete evidence that contributes to reconstructing their practical knowledge.

LS could be understood as a concrete form of Cooperative Action Research specifically designed to improve teaching (action) through research and teacher education. In our understanding, and as we can see from the results of the present study, one of the most outstanding aspects of LS as Action Research lies in the collaboration, the balance between research and action, and the prioritisation of future professional learning. Research Action and LS therefore share a number of common features that illustrate processes of reform and change linked to educational practice. For example, both include systematic cycles of planning, action, observation and reflection (Kemmis and McTaggart, 2000). However, Elliott (2019) assumes that LS contains a cycle of enhanced repetition with the aim of improving the quality of instructional design. Nevertheless, beyond these similarities or differences with currently very blurred boundaries, some authors describe them as one part or form of another. In this sense, Dudley (2014) states that Lesson Study is a specific form of classroom action research that focuses on developing knowledge of teaching practice (p.2).

LS as a Research Action process includes the following steps (Pérez Gómez and Soto Gómez, 2011):

1. Define the problem.
2. Cooperatively design an experimental lesson and the process of observing it.
3. Teach and observe the development of the proposal.
4. Collect evidence and discuss its significance.
5. Analyse and revise the proposal.
6. Develop the revised project in another classroom by another teacher and observe again.

7. Discuss, evaluate and reflect on the new evidence and disseminate the experience in a wider context.

This fits with the vision of professional development and action research advocated by Stenhouse (1975), that focuses on a spiral process that generates change through reflection.

2.1 From Practical Knowledge to Practical Thinking through LS

Developing an LS process means embarking on a journey that engages the essence of the teacher, their values, beliefs, emotions, as well as their knowledge, skills and attitudes (Soto, Serván, Peña and Pérez Gómez, 2019). The key step introduced by Korthagen (2010) on Schön's (1987) thinking, and which our research group has been developing, expanding and structuring with an LS proposal, is the convergence of two complementary processes that must necessarily be present in teacher training:

theorisation of practice and *experimentation of the theory* (Pérez Gómez, Soto and Serván, 2016). The theorisation of practice (Hagger and Hazel, 2006) is the process in which teachers identify, review, question and recreate the images, ideas and practices they develop in their daily lives. The experimentation of the theory is the process of translating the reformulated personal theory and reflection on our practice into new schemas and operational habits that build on our newly informed Gestalt to govern practice (Korthagen, 2010).

In relation to initial teacher education models, Farrell (2006) argues that these should evolve towards less technical approaches to focus more on teaching what it means to be a teacher. LS distinguishes itself from other training strategies by focusing on collective rather than individual work (Stigler & Hiebert, 1999; Stepanek, Appel, Leong, Mangan & Mitchell, 2007). Among the emerging contributions on this subject that underpin our research, it is worth highlighting the work of Rodríguez and

Fitzpatrick (2014) on the need to broaden the focus of inquiry in the field of initial teacher training, bearing in mind that teachers' practical thinking (Schön, 1998) is not directly related to their academic knowledge and therefore it is necessary to undertake training processes that connect theory and practice so that future teachers are able to make decisions in the complexity and uniqueness of practice. In this sense, we look at the LS as a strategy that creates spaces, facilitates and stimulates the trainee teacher to develop as an autonomous professional capable of designing and planning teaching in a reflective way, seeking the interrelation between theory and practice.

3. Methodology

This study falls within the framework of qualitative research, the purpose of which is "to understand experience as closely as possible to how its participants feel or experience it" (Sherman and Webb 1988, 7). This case study is also part of the sample consisting of eight studies, comprising a total of 50 students from the Bachelor's Degrees in Early Childhood Education, Primary Education and Pedagogy and eight tutors from the same degrees who act as LS advisors. It seeks to understand in depth the key points of the case study in order to promote transferability to other contexts, since qualitative research focuses on internal rather than external generalisation as a way to foster transferability (Maxwell 2020; Author 2020).

3.1. Focus and aims

This study aims to explore the different possibilities offered by LS to question beliefs, attitudes and values around teaching prospective teachers in relation to tutored curriculum creation processes. Specifically, this research aims to:

- (1) Is Lesson Study a methodological strategy that allows Estrella to establish bridges between theory and practice when designing, developing and experimenting with educational activities?
- (2) Does the Lesson Study allow Estrella to improve her formative processes in the design of the experimental lesson?
- (3) Does LS help to promote the reconstruction of Estrella's practical knowledge in her initial teacher training?

3.2. About the participants

Estrella is a 22-year-old student who is currently on the final year of an Early Childhood Education Degree at the University of X. As she reveals in the interviews, she is a hard-working, committed student who acknowledges some difficulty in managing uncertainty. She declares herself very family focused, and, when faced with situations she does not know how to respond to, she asks for advice from her parents, who provide her with emotional and professional support. She is a cheerful, friendly person with an excellent predisposition to collaborate in whatever she is asked to do. She is very expressive in her explanations and addresses all important aspects clearly, thus making reflection and inquiry around her school background much easier.

Adela is a non-tenured lecturer with 12 years' experience in university teaching, the last 4 at this university faculty. Committed to her profession, she shows permanent interest in helping her prospecting teachers and is also observant, reflective and a good listener. These attributes, according to Stenhouse (1998), bring her closer to the model of a teacher who researches his or her own practice in order to change, modify and improve it. She is a generous, approachable person who is very confident in her professional decisions and knows how to earn the respect of her students through the relationship she builds with them based on transparency and trust. In the informal conversations held with

her, she says that she is a professional who is consistent in her pedagogical convictions, which she has been building throughout her training and which undoubtedly guide her didactic decisions and her actions with her students.

3.3. Sample and research instruments

The research was conducted at the Faculty of Education Sciences at University of X during the academic year 2018/2019. Specifically, the study focuses on a student enrolled in the subjects Practicum III and Final Dissertation (FD), part of the Degree in Early Childhood Education. It also concentrates on the teacher who had accompanied and tutored this student since Practicum I. The student designs, develops and experiments an LS cycle with an experimental lesson and an improved lesson alongside a group of 5 other students.

The lesson design is aimed at a group of 24 children aged 3 and 4 years old. This group is part of an early childhood classroom in a public school in a small town near X. The focus of the didactic design is on psychomotor skills, since during the observation period our prospective teacher observes that the methodology used in the classroom forces the children to remain seated for most of the school day, so the group agrees to focus their intervention on psychomotor skills sessions.

The data for this research were collected over an 8-month period using semi-structured interviews, informal conversations, observations, and document analysis.

The following table shows the research process over time, as well as the different information collection strategies employed:

Table 1. Summary of the research framework

Activity			
Access to the field and initial negotiation	Data collection	Data preparation	Data analysis and report writing
-Student -Tutor -Students group	- Group interview -Individual interview -Informal conversations -Observation in seminars and in the experimental lesson -Researcher's diary	- Interview transcription -Initial reading of all the information -Return of the transcripts to the protagonists	-Emerging categories -Identification of extracts for the construction of evidences -Creation of categories -Report writing -Return of the Report -Incorporation of the assessment of the participants on the initial report
October 2018	November 2018 to June 2019	October 2019-August 2020	

During this period of time and in order to provide us with a detailed, rich and triangulated understanding of the possibilities for transformation of the student's subjective dispositions and the impact of the tutoring teacher's practical knowledge on them, we used the following data collection strategies:

- **Semi-structured group and individual interviews.** There were two individual interviews with Estrella, one at the beginning of Practicum III and the other after the

elaboration of her Autonomous Intervention Project¹ at the end of her practicum period and. There was also one group interview with all the students involved in the design of the LS.

The interviews were transcribed and categorised (Flick 2007; Maxwell 2012) for the analysis and triangulation of information (Gibbs 2012; Simons 2011).

-Researcher's diary. The personal notes on the study progress have been a constant support that have enriched and reoriented the development of the research and the subsequent analysis of the information gathered.

-Observations. The observation records were carried out in two work seminars of Practicum III and also during the experimentation of the lesson that Estrellas developed. These observations were the main source of data to understand the changes in the student as she participated in the LS. It also helped us to contrast first-hand the tutor's practical knowledge with the information obtained in the interviews and the way Estrella acted in relation to the Lesson group and the tutor, and to capture the dimensions of the student's practical knowledge.

-Document analysis: We had access to her diaries and portfolios from Practicum I to Practicum III and to her improved Final Degree Project design, which provided an excellent opportunity to see how the student has evolved from the beginning to the end of her training as a teacher.

-Informal conversations with the tutor. Informal conversations with the tutor during the fieldwork provided the opportunity to enrich the data. Hammersley and Atkinson (2007) argue that these conversations often produce more authentic data where the

¹ An Autonomous Intervention Project is a coherent educational intervention proposal developed by the students independently under the guidance and supervision of their tutors.

dialogue takes place in a more everyday context in a more natural and less artificial way. In this sense, it has provided us with very valuable information regarding Adela's understanding of the teaching-learning process, the reasons that lead her to make certain decisions when organising seminars, providing materials, managing time, etc., in short, the way she accompanies the learning process of her students.

4. Results and discussion

Below we briefly present a synthesis of the findings in relation to the three main lines of inquiry, in order to understand how a trainee teacher experiences the learning process when taking part in the LS methodology. These lines refer mainly to her changes in attitudes and beliefs, how her participation in LS was and which changes in knowledge and understanding produced her participation in LS.

In accordance with the case study methodology used for the research, the results and their discussion are presented together. We would understand that there are no "pure" results, but that they always depend on the context as well as being related to it. This is what Flyvbjerg (2006) explains when he speaks of the broad possibilities of case studies for the generation of situated knowledge. This explains the linking of the results to their discussion, since without the integration of both sections we would have sacrificed part of the overall understanding of the study.

4.2. Changes in attitudes and beliefs

Estrella describes herself as having been a dedicated, consistent child who devoted many hours to studying and homework. As a consequence of the time she spent memorising content, Estrella developed great capacity to mechanically and superficially reproduce and repeat data. That is a form of lower-order knowledge (Pérez Gómez, 2012) that is rewarded in traditional schooling, which relates academic success with obtaining

good grades. These study routines and the type of teaching model she received during her time in the education system have promoted in her, possibly unconsciously, a passive attitude towards learning and a lack of critical attitude.

I studied by learning by heart, which I found tough, although if you spend enough time on it then it is impossible not to get an "A". (Individual Interview, 19/02/2019)

In this sense, some authors (Beard and Hartley 1984; Brown and Atkins 1988) point to the fact that certain methodological strategies, as well as the teacher-centred unidirectional model, may, despite widespread use, lead to limited critical and creative thinking among pupils. It is sad that, when asked how she would define her time at school, she said "Tell me what to do and I'll do it", given that in her account she insists that she faced enormous difficulties in progressing in those subjects which involved higher order skills and abilities, such as arguing, creating and transferring (Author 2014) and was unable to adapt to the teaching methodology.

In her statements, she explicitly praises teachers who followed models which, according to the categorisation made by Trillo (1996), were closer to the profile of technical professionals, while at the same time she judges and questions teachers who carried out more active, pupil-centred methodologies. This vision of teaching has been strongly conditioned by the models of teachers she has had as references, and, when asked about whether school prepared her for life, she says that she does not retain any learning that could be considered valid in her day-to-day life.

Learning by heart has not really helped me at all [...] There are people who learn by heart and maybe it stays with them, but not me... If you ask me two days later then and I don't remember it any more. (Individual Interview, 19/02/2019)

She admits that the most positive aspect is to have managed to get to university and recognises that this merit has been achieved thanks to her effort in studying steadily and with the idea of obtaining the best grades. This thus demonstrates the important role played by her beliefs in terms of what she considers academic success to be.

Estrella acknowledges that when she arrived at the university, the stifling teaching model she had received previously did nothing to help her adapt to this new stage. However, it seems that she has gradually been able to recognise and be critical of the teaching received, and, in contrast to her beliefs about the traditional role of the teacher and transmitting content, she stresses the need to develop a pedagogy based on inquiry and construction that will allow the transformation of individuals (Carr and Kemmis 1986).

This change in discourse, after having participated in the LS process, possibly offers a first glimpse of nuances in the reconstruction of how she conceives the teaching profession and her didactic knowledge, consciously questioning the teaching model received. However, when analysing her diaries we find some elements that show certain discrepancies between what she says the work of an early childhood teacher should be and her beliefs about what it is to be a teacher, i.e. between her espoused theories and her theories-in-use.

When talking to Estrella about the teaching role and the positive and negative traits she highlights in the teachers she had throughout her school years, she instantly recalls those who made her feel confident in the subject and states that teachers should be

evaluated according to the effects they produce on the pupil, largely conditioned by their personal attributes. She therefore demonstrates once again how her beliefs are anchored in good professional performance.

I would highlight two teachers who were approachable and explained things with examples and epigrams... they were concerned if I didn't get a good grade in some or other exam... (Individual Interview, 19/02/2019)

When discussing what type of teacher she would like to be, the first pedagogical trait or value she highlights is "giving children more freedom". She offers reasoned justification, namely that "they should make their own decisions, otherwise creativity will fail to develop and they will become very dependent" (Group Interview, 19/02/2019).

This statement is reflected in the notes she wrote in her practice diary at different times during her teacher training, always in favour of promoting children's autonomy while criticising the overbearing attitude of some of the professional tutors she had met.

The role of the teacher is to accompany, both physically and emotionally, always guiding, looking beyond, listening, observing, making proposals according to pupils' needs and interests, stimulating their thinking, combined with other functions to promote supervised autonomous learning among pupils. (Excerpt from the Autonomous Intervention Project)

She also highlights the teacher's responsibility in terms of assessment, as a mediator in this complex process that involves numerous aspects and goes beyond merely verifying results.

4.3. Participation in the Lesson Study

Working with an unfamiliar methodology such as LS has been a real personal challenge for her, as she had to overcome the resistance we mentioned earlier when immersing herself in activities that involve more complex mental processes.

The LS was something totally experimental for me and the truth is that, at times, I found it difficult. With patience, dedication and the help of my classmates and the teacher, I have understood how it works. (Excerpt from the final account of Practicum III)

Despite not feeling fully at ease in this type of activities, Estrella believes that working with Adela from the Practicum I onwards and spending so much time writing up the diaries and drafting the portfolio have helped develop her ability to analyse, understand and design activities, therefore making her task easier when it comes to the methodological strategy. She states that Adela has encouraged them from the very beginning to enter all the particularities and generalities of their experiences in the schools in their diaries, and to analyse them through reflection (Wood et al., 2019).

Indeed, Adela's concern for ensuring her students make the diary a reflective tool, which can be called on when organising the analysis activity, makes her students realise the importance of teachers researching their own practice (Stenhouse 2004), rather than being mere technicians who apply learned strategies and routines.

These initial phases of LS planning have allowed us to see how Adela interacts with them through questions that challenge students' ideas and stimulate group dialogue. It is a strategy to encourage participants to express opinions and ideas when planning the

LS and to foster group dialogue. "Why do you find the issue of resources so important when designing activities? Where does this concern come from? Could you summarise the needs identified in each of your contexts?" (Observation of seminar 06/11/2018).

Furthermore, recognising the difficulties that taking part in the LS process may imply for her students, she provides the tools necessary to guide them and help them manage their learning process. In this sense, in each seminar Adela provides a brief guide to ensure prospecting teachers understand which phase they are currently in, which tasks they have developed so far, and which are yet to be completed.

With regard to the difficulties faced, Estrella says that there were two moments of concern when developing the LS cycle. The first concern was during the problem definition phase (the search for the focus), i.e. when deciding on the topic that would motivate and guide the design of the group proposal. This first phase of the LS process consisted of exchanging information about the needs they had identified in the contexts in which they carried out their practical training. Estrella is perfectly amenable working alongside her colleagues to outline problems in her school, but is more wary when the tutor constantly intervenes to reassure them and convey calm. On this regard, Adela states that "it won't be difficult to find common ground despite the big differences in the contexts" (Excerpt from observation seminar 06/11/2018).

In this sense, although in the interview and in the fragments of her diaries Estrella explicitly states that she has improved when facing complex tasks requiring inquiry, analysis and creation, her gestures and comments would seem to unconsciously suggest that feelings of insecurity and fear are re-emerging. In this regard, Adela's previous experience in overseeing LS groups was of great help, as they were more than open to receiving advice through comments on the possibility of finding interests common to the different contexts. It is often complex for the prospecting teachers to

understand what they are really doing and what the purpose of LS is. In this sense, Adela, as she has previous experience, facilitates and provides prospecting teachers with a guide or brief document in each work seminar to situate the prospecting teachers at what stage they are at in the LS, what tasks they have developed so far and which ones are still to be completed.

The second concern was in the cooperative design of the experimental lesson, specifically when choosing and justifying the didactic activities.

We focused on psychomotor skills and music, but now what are we supposed to do with this? There was the context of the nursery, the context of environments, the context of... it was a real pot-pourri and I was the one who was the most overwhelmed, I admit it, because I thought, how on earth are we going to do something together? (Group Interview, 19/02/2019)

When making decisions on the quality of the didactic activities within this second phase of the LS cycle, procedural principles played a key role in ensuring coherence in choosing these activities rather than others, in accordance with the needs of those they were addressed to. Working with procedural principles places prospecting teachers in a position to design activities based on quality and in coherence with accumulated knowledge in education (Authors 2019).

Estrella believes that working in line with the principles of procedure was a further difficulty in the process they were building (saying, "we had to change our mindset"). However, once they understood the meaning of these principles, the students found very useful planning the design based on the common list they had prepared with those

characteristics required of the activities in accordance with the different educational theories and their authors.

Faithful to her pedagogical convictions, Adela accompanies prospecting teachers in this discovery in order to show them the value of theory in exercising their profession, as it helps when making decisions and solving problems that arise in practice (Authors 2016). This close relationship she has created with her students and the constant communication between them makes it easier for Estrella to face this task in a more relaxed way, without fear of making mistakes and having her errors penalised.

For example, when we did the activities, I had the peace of mind of knowing that I had done my best, but if something were to go wrong it wouldn't be a failure... so I had this freedom, and that's not something you get with other teachers. (Individual Interview, 19/02/2019)

In this regard, we observed a small change in attitude regarding the importance of grades when, prompted by Adela's concern to separate grading from assessment, she began to move away from her previous position of equating success with obtaining good grades.

The group work dynamics of design, observation, reflection, implementation and assessment have also provided fundamental support for Estrella in this process, incentivising her to deal with these tasks. This has provided invaluable support and has boosted Estrella's feelings of confidence and security, as she says in another part of the interview:

[...] with the Autonomous Intervention Project I have been overwhelmed at times, but the truth is that doing it in a group meant we helped each other and asked questions, so it has been much better than doing it individually. (Individual Interview, 19/02/2019)

Moreover, the fact that this collaborative work allows them to share ideas and learn from each other brings about a change in Estrella's beliefs in terms of understanding learning as an individualistic process, marked by her school experience, where her relationship with other classmates had not been very close:

I would say, "Can I help you?" And they would reply, "Look, here comes the swot". (Individual Interview, 19/02/2019)

Collaborative work may also have influenced the way she understands how teaching is planned, since hitherto in her practical training the activities had been planned individually, without the advice of peers. Indeed, taking part in this LS process differs from traditional objective-centred planning. Estrella argues that LS is ideal to work on this aspect, since "collaboration among teachers at a school is absolutely necessary, learning from each other and promoting better teaching for our pupils" (excerpt from the Final Dissertation). In the LS, Estrella takes an inquisitive stance towards teaching, as she identifies problems, asks questions, explores strategies, designs materials and evaluates her work.

Following the initial uncertainty of not being sure whether the activities were going to work with her students, she has seen that all her doubts around the suitability of the activities were unfounded, allowing her to feel the satisfaction of work well done and

to see that she has successfully combined the needs of her students with creating didactic activities.

Implementing the intervention project designed by the group gave Estrella the opportunity to compare the initial hypotheses around how they would work, as set out in the observation plan. She highlights this moment as key to understanding the connection between academic learning and school-based practice.

I have found meaning in everything we have prepared, and, even though I couldn't do it all, it has helped me know how to act... And what we said about children learning through imitation, well it's true. (Individual Interview, 19/02/2019)

Estrella believes Adela places great importance on designing the activities, taking care to ensure they are in line with the principles of procedure, and understands during their implementation that they represent a way of understanding teaching that "breaks away from traditional programming with a class and a textbook" (Individual Interview, 19/02/2019).

When implementing the LS, we saw that the teaching role played by Estrella is very far removed from the transmissive, top-down model she experienced in her school days. When addressing them, she crouches down to their level, in order to look them in the eye and try to convey the message in such a way that the child can do it with all his or her senses.

Her tone of voice is always soft when addressing her pupils. If a pupil does not have a medal, she asks politely, "Alejandro, do you have a medal?" (Excerpt from observation of Lesson 01/02/2019)

After planning how to observe experimentation of the LS, she states that she is taking the role of facilitator, allowing pupils to be more autonomous in their learning process. This suggests that there have been small changes in her attitudes and beliefs as a result of this reflective process that accompanies LS in each of its phases.

However, we can perceive small details that appear in her way of acting, most likely unconsciously, that still emerge as a result of these previous beliefs. For example, when she wants to quieten her pupils down in order to address the whole group, she gets their attention by saying "Shhh!" several times, something she also does when two pupils are fighting in the middle of the final assembly, this time raising her voice.

4.4. Changes in knowledge and understanding. Learning

When we talked to her about the importance of contextualising the didactic design in keeping with real scenarios, she believed that the balance was positive and said that she considered the practical subjects to be fundamental for her training as an early childhood teacher. With regards to a learning process she considers very useful, she highlights the ability to build her own teaching-learning resources, and to make use of other spaces in the school apart from the classroom.

In this sense, we can deduce that interactions with the group within the LS also influence the use of curricular resources by the prospecting teachers who design the activities. Teaching material resources in the school where Estrella carried out her practical training were in short supply, which was a handicap when it came to thinking about activities to carry out with pupils. However, sharing these needs with her colleagues has enriched her perspective around the possibility of creating her own materials in order to meet teaching needs, once again incorporating more elements in her pedagogical

knowledge. In this regard, she believes that "it is vitally important for teachers to design spaces and create materials" (excerpt from the Autonomous Intervention Project).

In the group discussions around the search for didactic materials and resources, Adela suggested the interesting idea of leaving the resources in the school, therefore ensuring that the activities would have a certain continuity rather than being a one-off. This provides us with evidence of the influence of LS when thinking about the materials that form part of the activities, as in this sense they learned that having resources external to the school can enrich the teaching process.

Part of these activities were hands-on and oriented towards active participation by pupils-. They were therefore a breakaway from the methodology followed by their teacher, who preferred to focus more on the textbook and less on interactive tasks, due in part to the lack of resources available in the school, meaning they could use these materials to meet their own teaching needs.

Estrella also highlights the need to incorporate more active, pupil-focused methodologies in her future practice and avoid reproducing the teaching model she has received, thereby indicating that her reflective thinking about the experience and participation both before and after the practical training have provided her with new habits and skills to work with her future pupils.

It would seem that she consciously identifies aspects she remembers as negative in her time at school and wants to avoid repeating them. One such example is the way she defends having pupils work by environments, which she believes "leaves memory-based learning to one side, in order to focus on experimental and playful learning". (Excerpt from the Autonomous Intervention Project) Her answers also show how her deepest beliefs re-emerge and continue to dominate her thinking, although it should be borne in mind that such evidence comes from the first diaries kept in the Practicums. Indeed, in

later diary entries during the subsequent Practicums, she takes a more critical stance towards activities considered traditional, such as worksheets.

I believe there are several ways to promote this learning and put the worksheets to one side. For example, by making a circuit with signs, they can learn them in a fun way and without work, rather than sticking stickers on a page. Learning will also be much more enriching and not as exhausting as with the worksheets methodology. (Excerpt from the Practicum II diary)

Estrella also expressed interest in the role of theoretical content in her training, in which it is important to highlight not only knowledge of the subject matter, but also pedagogical and didactic knowledge and the ability to manage diversity in the classroom. In this regard, she appears to go beyond what we previously discussed around the importance of knowing what "theory says about...", demonstrating her disappointment with those subjects that are part of the syllabus but which, in her view, are far removed from the real needs of the contexts.

Many subjects are taught at university, the vast majority of which do not really teach how a classroom works. (Diary excerpt from the Practicum III)

To some extent, this harsh criticism manifests her perception of what taking part in this LS process meant to her. Indeed, she highlights her experience in the Practicum III as being useful for her training as a teacher, and, when returning to the university to finish the course, she finds it decontextualised and loses trust in what it can offer her.

5. Pedagogical implications of LS and conclusions

This research examines the practice of professionally developing LS as a vehicle for prospective teachers' learning. The case study inquires into the training process of a student using information provided by a range of data collection instruments (interviews, observations, student diary, etc.), focusing on beliefs around teaching and learning forged in her personal life history, possible changes in her thinking when taking part in the LS process, the lessons learned after completing the Practicum III, and the influence of the tutor as a guide in the LS process.

Although studies indicate that any profound modification of teachers' practical pedagogical thinking requires time, as well as ongoing processes of inquiry and reflection on action (Korthagen 2017, 2018; Pérez Gómez 2019), this research has identified several changes on a declarative level in terms of the way teaching is perceived and how the student involved in the process acts in just a relatively short period. The results of our analysis therefore support the findings of previous research (Soto et al. 2015), namely that taking part in LS processes can bring about more relevant transformations when teachers' beliefs, values and dispositions are still at an early stage of construction, thus facilitating learning among prospecting teachers. The LS process has allowed our protagonist to experience her new theories, especially during the development of the experimental proposal, a process of thinking through the activation of new knowledge, attitudes and agreed skills that lead her to reflect on her practical knowledge. Soto et. al. (2016) state that participating in LS during initial training is key to crystallise the professional competences required to be a teacher.

As we argued in previous sections, there is little doubt that the construction of practical thinking, as that which guides and governs how reality is interpreted and

intervened on, requires more than the mere acquisition of academic content (Hernández et al. 2013). In general, teaching practice is considered one of the most important and challenging aspects in initial teacher training programmes, as it provides relevant practical experience for prospective teachers and helps them to develop an inquiring stance towards teaching (Cochran-Smith and Lytle 2009). In this regard, we found evidence that participation in the LS process offered Estrella an opportunity to develop and refine her beliefs about teaching and learning, while planning and designing the activities of the didactic proposal brought out her beliefs around the role of the teacher, the meaning of the activities, the materials to be used, assessment, etc. In the final interview with Estrella, when we spoke about whether she had perceived any changes in these beliefs as a result of taking part in this LS process, she undoubtedly attributed these changes to her experience in the process of LS. In contrast to her initial interview, here she placed great importance on the theoretical aspects of her training, stating that, thanks to Adela, she had come to realise the importance of having a good theoretical base in order to plan quality activities and make sense of all the theory she had seen in other subjects. The reflection process that accompanies the construction of the procedural principles, along with subsequent observation work in the classroom, favour the two processes that are key in reconstructing practical knowledge, namely theorisation of practice and experimentation of theory (Soto et al. 2015), which implies the individual reflecting on the action itself. In this sense, Estrella states that she has incorporated new habits into her way of planning activities, meaning we can affirm that certain changes were present during lesson experimentation, although it would still be hasty to believe that she has automated them. In her statements, we found a change in her self-confidence when it comes to working as an early childhood teacher and assessing the strengths of her training. We were able to see part of this evolution because we found extracts in the

diaries of previous practicums, in which she reflects a certain insecurity when encountering the unknown or when taking on certain tasks that provoke the emergence of the implicit.

All of the above would seem to imply that she considers herself a learner who is constantly searching for ways and processes to improve teaching and learning. By talking with her peers about the purpose of her activity, presenting her ideas with rationale, and making decisions consistent with the context in which she is working, this LS process has undoubtedly provided Estrella with opportunities to articulate new ideas about how best to plan her teaching. Naturally, subsequent analysis of the experimental lesson helped her to organise her ideas in line with how the design of the activities had influenced her pupils' learning, thus favouring a posture of inquiry towards improvement of practice. Indeed, we perceive in her statements that the LS process helped her to reflect on her own beliefs about teaching and learning.

Despite the potentialities of LS as a strategy that favours the learning of prospecting teachers, the data show that the person who supervises the process (in this case, the academic tutor) always plays a decisive role in any good results that can be extracted from the experience of taking part in this methodology. In other words, the guidance, tutoring and feedback that prospecting teachers receive from their academic tutors play a fundamental role in their learning, and consequently have a profound impact on their training (Wellman and Wold 2006). Adela's deep pedagogical convictions, together with her experience in the use of this methodology, create favourable conditions for reflecting on and rethinking Estrella's beliefs and knowledge, i.e. positively influencing the processes of transformation of the subjective dispositions of the student involved.

The findings of this study show that being part of a group and having the opportunity to collaborate and share ideas and experiences help in both increasing shared responsibility (Dudley 2014) and also minimising isolation and feelings of insecurity or fear when planning didactic activities. The systematic organisation underpinning LS has encouraged Estrella to take risks in both the initial design and proposed improvement of the intervention, demonstrating the strength of working cooperatively where it is possible to broaden the contrast for real improvement and less monitoring of established practices (Wennergren, 2016).

This article adds to the state of the art for a topic of current interest, in order to help understand how a trainee teacher perceives the influence of LS on her learning. Given the lack of research linking the practice of LS to improvements in learning during initial training, it would be enriching to continue research in this line in order to explore its potential in improving training for prospecting teachers.

5. Strengths and limitations of the study

This study has certain limitations. On the one hand, the time it would actually take to follow up on the case, which in this case is limited by the time limits of the practicum course. On the other hand, we also base part of the knowledge generated on what the student remembers from her previous school years, which is limited by her own memory. Moreover, as she has already had contact with teacher training, she does not remember it in the same way, as her perspective changes.

However, there are two main strengths. Firstly, the presence of LS in initial teacher education is rare. There are interesting experiences both in England and in the United States, Singapore, Canada and Ireland in initial teacher education but generally for the teaching of mathematics and to a lesser extent science and social studies, Early Childhood

Education (Sims and Wals, 2009) and in Primary Education (Chassels and Melville, 2009; Leavy, 2010).

Secondly, the methodology itself, the case study, which in turn is part of eight case studies and multi-case studies, being this research strategy the most appropriate to investigate and detect in a sensitive and close way the unique and common elements that structure the context of the research with respect to the topic at hand.

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Table 1. Summary of the research framework

Activity			
Access to the field and initial negotiation	Data collection	Data preparation	Data analysis and report writing
-Student	- Group interview	- Interview	-Emerging categories
-Tutor	-Individual interview	transcription	-Identification of
-Students group	-Informal conversations	-Initial reading of all	extracts for the
	-Observation in seminars	the information	construction of evidences
	and in the experimental	-Return of the	-Creation of categories
	lesson	transcripts to the	-Report writing
	-Researcher's diary	protagonists	-Return of the Report
			-Incorporation of the
			assessment of the
			participants on the
			initial report
October 2018	November 2018 to June	October 2019-August 2020	
	2019		