Climbing up through Self-Regulated Learning (SRL): a comparative analysis of SRL processes among pre-service an in-service schoolteachers

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ABSTRACT

The quality of our educational systems depends, among many other factors, on the involvement, autonomy and professional development of teachers. Self-regulation capacity and, specifically, the self-regulation of learning is one of the key factors contributing to the academic and professional development of teachers. The purpose of this study is to delve into the understanding of pre-service and in-service schoolteachers' self-regulated learning processes, as part of their professional competencies' development. Through a qualitative methodology, semi-structured interviews, designed ad-hoc for the study, were conducted with eleven pre-service and twelve in-service schoolteachers. The interviews addressed aspects associated to the planning, the monitoring, and the reflection of their learning processes and professional development. Results show that self-regulated learning is an ability that is learned during their initial training, and which is continuously developed and defined during their professional practice, which shifts from the individual to the collective, and which is regulated through motivation.

The study leads us to conclude that without a doubt, the development of self-regulation of learning processes improves and completes the professional practice of teachers. Therefore, it is necessary to incorporate self-regulated learning in the study plans of schoolteacher's training and the school's strategic plan, as a key competency that must to be developed in an intentional, planned, and conscious manner.

KEYWORDS: Self-regulated learning; Pre-service schoolteachers; In-service schoolteachers; Professional competencies; Professional development.

Ascendiendo a través del aprendizaje autorregulado (AAR): un análisis comparativo de los procesos de AAR entre maestros en formación y maestros en ejercicio

RESUMEN

La calidad de nuestros sistemas educativos depende, entre otros muchos factores, de la implicación, autonomía y desarrollo profesional del profesorado. La capacidad de autorregulación y, concretamente, la autorregulación de los aprendizajes es uno de los factores claves que contribuyen al desarrollo académico y profesional de los maestros. El presente estudio tiene por objetivo profundizar en la comprensión de los procesos de autorregulación de los aprendizajes que desarrollan los maestros en formación y en ejercicio, como parte del desarrollo de sus competencias profesionales. A través de una metodología cualitativa, se realizaron entrevistas semiestructuradas, diseñadas ad-hoc para el estudio, a once maestros en formación y doce maestros en ejercicio. Las entrevistas abordan aspectos vinculados a la planificación, el seguimiento y la reflexión sobre los propios procesos de aprendizaje y desarrollo profesional. Los resultados demuestran que la autorregulación de los aprendizajes es una capacidad que se aprende en la formación inicial y que se sigue desarrollando y definiendo con el ejercicio profesional, que se mueve entre lo individual y lo colaborativo, y que se regula a través de la motivación. El estudio nos lleva a concluir que, sin duda, el desarrollo de la autorregulación de los procesos de aprendizaje mejora y completa la práctica profesional de los docentes. Por tanto, resulta necesario incorporar la autorregulación de los aprendizajes en los planes de estudio de la formación de maestros y en los planes estratégicos de las escuelas, como una competencia clave que debe desarrollarse de manera intencionada, planificada y consciente.

PALABRAS CLAVE: Aprendizaje autorregulado; Maestros en formación; Maestros en ejercicio; Competencias profesionales; Desarrollo profesional.

Introduction

Greater teacher autonomy implies, among other aspects, that they become able to self-direct their learning to be able to develop soundly in different academic and professional spheres. Directly linked to autonomous learning that is exclusively focused on the individual, we find Self-Regulated Learning (SRL) (Linkous, 2021; Voskamp et al., 2020; Louws et al., 2017).

The problem under study on which we are focusing our attention is set on the self-regulated learning in both pre-service and in-service teaching practice and seeks to elucidate which SRL conditioning factors and practices are developed to improve their professional competency in an ever-changing educational reality.

In this way, we tried to answer the following research questions: what factors influence the SRL of pre-service and in-service teachers? What are the strategies that pre-service and in-service teachers use to self-regulate their learning? In other words, the study covers the need to know first-hand, and in the opinion of pre-service and in-

service teachers, the conditioning factors of self-regulation of their learning and the strategies they resort to for its development.

Defining Self-Regulated learning

SRL, according to Zimmerman (2000), can be understood as a set of self-generated thoughts, feelings and actions that are systematically planned and adjusted to achieve one's own goals. SRL can be achieved through the active participation in training processes, as well as autonomously guiding and modulating thoughts, affections, and behaviors (Yamila, 2016).

The more important components of SRL are the cognitive, metacognitive, and motivational elements (Panadero, 2017, Heritage, 2018; Gargallo López et al., 2020). Starting from the synthesis from these authors, the phases through which SLR goes through converge in planning (analysis of tasks, delimiting the objectives, defining the mechanisms to achieve them, etc.), performance (examination of tasks, involvement in the activities, monitoring their performance, etc.), and self-reflection (appraisal of the implementation of tasks, systematic verification of that which is done to learn, etc.).

SRL contributes to a greater knowledge of the level of competency, the reflection about what to do to solve specific tasks, and the understanding of the skills needed to face new challenges that may appear. This means being able to solve problems, reason with efficacy, become aware of the decisions made and the knowledge involved, as well as the obstacles for learning, that is, learn throughout life (Capote et al., 2017).

Self-regulated learning of pre-service and in-service schoolteachers

The improvement of teachers' training has a positive impact on their professional activity and on the teaching and learning processes they develop with their students. Teachers support for student metacognition and SRL is critical for success in modern education (Greene, 2021). They have to be effective learners (Peeters et al., 2014), as the teaching profession signifies permanent learning (Graham and Phelps 2003) and professional development (Popova et al., 2018). Delving into self-regulation supports permanent learning and professional development (Gaeta, 2014; Nota et al., 2004), as schoolteachers grow professionally through the critical examination of their practices (Gibbons, 2020). However, learning difficulties can also emerge (Tuckman, 2003; Allgood et al., 2000).

The acquisition of professional competences is only possible if the trainee controls his or her own learning process (Barrero, 2007). Teachers who achieve self-regulation are in a better condition to model and develop learning processes supported by metacognition, self-reflection, and self- appraisal, which are always key for learning how to learn. Teachers become more competent when they self-regulate, by perceiving their learning needs, and converting them into reasons for improving (García et al., 2017). Without a doubt, self-regulation helps in improving the practice of teaching, as it grants more control of the surroundings and the conditions of the teaching and

learning processes (Baumert y Kunter, 2013; Timperley, 2008).

The initial and permanent training of teachers should include learning about self-regulation (Michalsky y Schechter, 2013), by providing them with the knowledge required and the tools that make this possible (Dignath-van Ewijk y Van der Werf, 2012; Moos y Ringdal, 2012). This is essential, as self-regulation can be learned and taught (Schunk, 2012; Schunk y Zimmerman, 1998). The pre-service and in-service teachers must therefore add SLR to their pedagogic tasks (Karlen et al., 2020), which equally places demand on their responsibility and commitment (García y Bustos, 2021).

Although it is important for in-service teachers to apply self-regulation in the learning experiences, it is also important for pre-service teachers to develop this competency, as it is during their university studies when we see the modification of mentalities, attitudes, and manners used to practice the teaching profession (Oates, 2019). Not acquiring this competency during initial training will make more difficult to promote it in the professional practice of teaching (Aguilar, 2020). Therefore, integrating self-regulation in the initial training of teachers can help it to be incorporated into the school environment later by in-service teachers (Bembenutty et al., 2015; Zimmerman, 1998).

Practices for self-regulated learning

Pre-service and in-service teachers support SLR in different ways, such as for example when learning and teaching self-regulation strategies, providing and receiving useful information about appraisal processes, organizing and structuring teaching activities, or creating conducive learning environments (Hidalgo et al., 2020). The design and development of the self-regulated learning practices strengthens the description and review of the training processes and results (Panadero et al., 2016).

This would be the case for practices that are supported on the theories of self-regulated learning, and which have an effect on phases such as reflection, planning and activation, monitoring, control, and reaction (Pintrich, 2000). But the relevant aspect is that these practices can favor that the pre-service and in-service teachers evaluate and reflect on the training processes to make better-informed decisions that are oriented towards improvement. In this sense, many authors (Hawe et al., 2019; Bouwer et al. 2018; Mak y Wong, 2018; Cazan, 2012; Cho y MacArthur, 2010) have brought attention to the practices focused on reflection, collaboration, or comparison, among others. In any case, we need to verify if this is also the case between pre-service and in-service teachers in our Catalan context or if, on the contrary, there are differences between them.

Nevertheless, the practices must invite pre-service and in-service teachers to learn how to learn, attain self-motivation and discover their own strong and weak points. Starting with an in-depth knowledge of these aspects, it is possible to be able to control and regulate the learning processes they utilize to adapt them to the variety of tasks they perform and the scenarios in which they do so, thus improving intervention and optimizing performance (McDonald, 2019). SLR increases when one understands how

learning is more successful and effective in each situation (Trías, 2017).

Method

This study aims to gain an in-depth understanding of the SRL processes developed by pre-service and in-service teachers as part of their development of professional competences. The qualitative approach was considered as the most adequate to achieve the objectives set, as it is oriented towards exploring and understanding the meanings that individuals or groups grant to experiences, phenomena, and problems studied (Creswell, 2009, Maxwell, 2005). The authors conducted semi-structured interviews with pre-service primary and in-service primary teachers. The semi-structured interviews allow us to come close to the understanding of the SRL processes starting from the interpretation of the primary teachers about their own experiences, thus providing rich and contextualized information about the self-regulation processes (Russell, 2006).

Considering that the concept of "self-regulated learning" is complex and could be confusing, the interviews used stimulated pre-service and in-service teachers to narrate their experiences, processes, and regular practices of professional development. The interview script was constructed by utilizing deductive and inductive approaches. In first place, several SRL models were reviewed to create the first version of the interview script. In second place, this preliminary script was revised and completed by in-service teachers, considering their own professional experience and the language that is commonly used in Primary Schools. The final script of the interviews was comprised by 17 questions which addressed aspects associated to the SLR concept, the planning, monitoring and reflection of the learning processes and professional development themselves.

Participants

The participation of pre-service teachers enrolled in different academic years of the primary education degree from different Catalan universities was solicited. Likewise, the participation of in-service teachers was solicited, from different Primary Schools and with a varied professional experience. The participants were selected through a maximum variation sampling strategy to ensure the variability of the respondents (Patton 2014). In the case of pre-service teachers, their gender and academic year were taken into account during the selection process. In the case of in-service teachers, gender and professional experience were considered.

Eleven primary education teachers were interviewed (8 women and 3 men), two were enrolled in their first year, and three in each of the following academic years (i.e. 2nd, 3rd, and 4th years); and 12 in-service teachers from six different Primary Schools (9 women and 3 men), four with at least five years of experience, 2 with six to ten years of experience, three with 11 to 24 years of experience, and 3 with more than 25 years of professional experience.

The study complied with the basic ethical requirements and obtained an informed

consent from all the participants. Among other matters, they were informed about the objective of the study, the forecasted use of the data obtained, and their right to abandon the study at any time. Likewise, the participants were de-identified to ensure confidentiality and anonymity.

Analysis of the interviews

The interviews were conducted in Catalan, the mother tongue of the participants, and lasted between 35 to 45 minutes each. The interviews were taped and transcribed verbatim. The interview extracts presented in the text were translated and edited by the authors to increase readability and clarity.

First, the interviews were read many times to identify emerging codes, themes, or categories. Next, focused coding was performed to identify analytical categories (clusters) or code groups (Bazeley, 2013; Saldaña, 2009). Additionally, some codes were merged or split, creating sub-codes to improve analysis (Gibson y Brown, 2009).

The transcription of the interviews and the treatment of data for analysis were performed with the NVivo software. Starting with documental analysis, an index of codes was established to help with content analysis. The codes were divided into five large blocks: 1) Concept of self-regulation; 2) Planning and activation; 3) Monitoring; 4) Control; 5) Reaction or reflection. Table 1 shows the resulting codes for each category, as well as the frequency of their appearance in the interviews from each collective.

Table 1

Analysis codes of the interviews

Coding units	Frequencies according to collective	
	Pre-service schoolteachers	In-service schoolteachers
1. Concept of self-regulation (AUTOREG_CONCEPTE)	8	9
2. Planning and activation (PLA_ACT)		
2.1. Learning strategies (PLA_ACT_EA)	18	27
2.2.Method of action (PLA_ACT_MA)	30	50
2.3.Adaptation to the context (PLA_ACT_AC)	6	17
2.4.Motivation (PLA_ACT_MT)	9	26
2.5.Barriers (PLA_ACT_BR)	8	22
2.6.Facilitators (PLA_ACT_FC)	3	13
2.7.Group (PLA_ACT_GR)	7	9
2.8.Activation of previous competences (PLA_ACT_PR)	2	2
2.9.Factors (PLA_ACT_FA)	1	3
3. Monitoring (MON)		
3.1.Review of objectives (MON_RO)	6	14
3.2. Re-organization and continuous appraisal of strategies (MON_AVC)	11	23

Coding units	Frequencies according to collective	
	Pre-service schoolteachers	In-service schoolteachers
3.3. Resources and tools (MON_REC)	29	60
3.3.1.Rubric (MON_REC_RUB)	15	24
3.4.Motivation (MON_MT)	20	35
3.5.Barreiers (MON_BR)	21	30
3.6.Facilitators (MON_FC)	6	8
3.7.Group (MPN_GR)	5	9
3.8.Criteria (MON_CR)	9	9
3.9.Strategies (MON_EST)	6	7
4.Control (CON);		
4.1. Self-reflection (CON_ATREF)	20	34
4.2. Self-evaluation (CON_AUTAV),	34	47
4.3.Educator feedback (CON_DOCAV)	28	36
4.4. Recognize deficiencies (CON_DEF)	12	22
4.5.Capacity of action (CON_ACT)	10	13
5. Reaction or reflection (REF)		
5.1.Transfer (REF_TR)	4	11
5.2.Learning from errors (REF_ERR)	10	18
5.3. Learning form successes (REF_EXIT)	7	14
5.4.Feedback (REF_FBK)	20	35
5.5. Emotional factors (REF_EM)	5	12

Results

Next, we present the results after the analysis of the interviews. To ease their organization and presentation, the five categories established for the coding were grouped according to the three phases with which we can conceptualize the different models that explain the SLR processes (Panadero, 2017): preparatory phase, performance phase, and appraisal phase. For each phase, we focused on two types of results: on the one hand, the factors that have an effect on or condition the phase, according to the perception of pre-service and in-service teachers; on the other, the strategies utilized for the development of the phase.

The responses are codified as a function of the profile (STUDENT for the pre-service teachers, and TEACHER for in-service teachers), and their experience (academic year of the students: 1st, 2nd, 3rd, 4th; years of professional experience for the teachers: 0-5, 6-10, 11-25, +25).

Preparatory phase

Conditioning phases of the preparatory phase

For the students, the factors that condition the preparation are: available time, if the task is individual or in a group, the indications of the professors, the degree of

difficulty, and motivation. In their context, the indications of the professors and the subject were fundamental for the planning of the tasks. If the task was shared with other colleagues, the students manifested the need to fit one's own self-regulation process with the other's processes.

First, I plan the work, I think about the parts it should have, and I check to see if the professor has provided the index, and I follow it. At the same time, I look at the assessment grid and write down in each aspect of the work, which aspects are considered by the professor. (STUDENT-3rd)

With respect to in-service teachers, the factors of preparation were basically focused on the programming of the academic year, the academic calendar, and the group-class characteristics. Another factor identified was group work between parallel teachers (those who are in charge of another class within the same school grade). In most of the cases, planning with the parallel teacher was considered an advantage, as the adaptation to the group-class characteristics and the application of alternatives when difficulties arise were facilitated between the two of them.

I always plan it myself, because if I don't, a final aim would not be there, and we always have to have an educational aim. (TEACHER/0-5)

Types of strategies of the preparatory phase

The students stated that the most common strategy utilized was focused on using an agenda or the making of chronograms. They also indicated that they established objectives and created lists of tasks they must perform. Another of the strategies that was commonly mentioned was summaries and schemes, with which they transformed and classified the information in a manner that was more understandable to them. Lastly, the pre-service teachers commented that the preparation strategies were performed individually as well as a group. It was remarkable that when they worked in groups, they distributed the tasks:

We divided the work but tried to do everything. What one does, is looked at by the other, and she contributes with other things. We did not have a defined role either. We all did everything, but with a base. (STUDENT-2nd)

For the in-service teachers, it was observed that some preparation strategies were the same as those from pre-service teachers: formulate objectives, make calendars, and put tasks on an agenda, make checklists, or make schemes or mental maps to organize tasks. In this phase, however, the teachers showed different strategies not utilized by the students. On the one hand, we observed the programming rubric, the resources, and overall, time. In many cases, the parallel teacher was greatly helpful in coherently planning the diverse classes and systematizing the recording of competencies and achievement of objectives.

I do a weekly forecast together with the other teacher (…) it is individual work, and shared planning. (…) We try to temporarily plan and specify (things) within the academic year. (…) What guides me the most is the recording according to competencies and dimensions, which is how you assess at the end of the trimester. (TEACHER/+25)

Table 2 shows the summary of the factors and strategies of the preparation phase

of the self-regulation process, comparing the data obtained from the pre-service and in-service teachers.

Table 2

Summary of factors and strategies of the preparatory phase

Preparation	Pre-service schoolteachers	In-service schoolteachers
Factors	Time	Programming of the course
	Individual or group task	Work in parallel
	Indications from the professor	Characteristics of the group-class
	Degree of difficulty	
	Motivation	
Strategies	Formulate objectives	Formulate objectives
	Prepare the calendar/Agenda	Prepare the calendar/Agenda/Chronogram
	Conceptual/mental map	Conceptual/mental map
	List of tasks	Lists of tasks
	Having in mind the work group	Having in mind the parallel teacher
	Summaries	Programming grid
	Schemes	Having in mind resources and time
		Adaptation to the context and group
		Schemes

Performance phase

Conditioning factors of the performance phase

With respect to the students, one of the main factors which influenced the performance phase was motivation. This factor was repeatedly observed in the interviews, and was associated to different elements: the subject or course, the task, the relationship with the course's professor, and the colleagues (in case of team work). The second factor detected in the students was the contextual factor, with the manifestations of aspects associated to the physical space, the social environment, or combining their studies with other work tasks.

We try to motivate each other: come on guys, there's not much to do, in a week we can submit it, leave it, and rest. (STUDENT-2nd)

As for the in-service teachers, it was also observed that motivation was a conditioning factor in this phase. In this case, the motivational aspects were focused on the students, their own work, and the parallel teacher. Contextual factors were indicated, this time centered on social problems that could affect the students, as well as the group-class characteristics.

First, I plan for the kids to have fun and it has an impact on them, that is makes sense to them. That it is meaningful. (TEACHER/6-10)

Types of strategies in the performance phase

In this phase, the pre-service teachers used the lists and objectives utilized in the planning phase to monitor the evolution of their tasks. The use of grids was also a strategy that is commonly used in the performance phase. These were normally provided by the professors themselves, and the students interpreted them as resources to control the evolution of their activities.

In almost all the courses, the guidelines provided are well defined, and to put these guidelines on one side, and my work on the other, and begin to verify. (STUDENT-1st)

In this phase, it was also observed that it was important to agree on the objectives or assessment criteria between colleagues or other agents, even those who were not involved in the task or the university sphere. A tendency to delve into aspects that they found interesting and to do more than the minimum required for the activity was also observed. A resource utilized by some students, to complement their university training, was to combine their studies with external training.

As for the in-service teachers, the interviews showed how their attention was focused on verifying if the objectives set during the planning stage were met, if they had to re-formulate, or if the didactic proposal was coherent with the needs of the students. The review and re-organization of what had been previously planned was individual and with the parallel teacher. Other strategies observed between equals were observation and reflection. The children themselves could also provide clues for re-directing the session or the program.

The group takes you towards a road or another, and this makes you have to continuously review what you have been doing. (TEACHER/11-25)

Lastly, the appraisal rubrics were shown as a very common strategy utilized for the development of tasks and to control the achievement of purposes and minimum goals. Table 3 shows a summary of the factors and strategies during the performance phase during the process of self-regulation, comparing the data obtained from the pre-service teachers, and the in-services ones.

Table 3

Summary of factors and strategies of the performance phase

Performance	Pre-service schoolteachers	In-service schoolteachers
	Motivation towards the task	Motivation towards work
	Motivation towards the professors	Motivation towards students
	Motivation among peers	Recognition of peers, students, and families
Factors	Context	Contextual characteristics of the group-class
		Time
		Motivation between peers/parallel colleague
Strategies	Review of lists and objectives	Review of planning and objectives

Monitoring of the activity guidelines	Observations and classroom diaries
Rubrics	Rubrics
Educator feedback	Feedback between peers/parallel colleague
Feedback between peers	Feedback from students
Complementary training	Reflection

Appraisal phase

Conditioning factors in the appraisal phase

For the pre-service teachers, two factors were detected in this phase. On the one hand, we found participation and company of the professor during the development of the task. For this aspect, it was observed that the students asked the professor for help essentially when they were lost during the task to be completed, and that the degree of help they received was dependent on the attitude of the professors themselves. At this point, they recognized that they preferred to have feedback during the consecution of the task rather than at the end, when everything has been submitted and could no longer be modified.

I think that the present format of the university is that the professors do not help, but basically guide. That he or she tells you this, the guidelines, he tells you more or less how he wants the work, corrects them, and that's it, and then explains it.. (STUDENT-1st)

A second factor in this phase was associated with emotional aspects, related with the level of satisfaction with one's own work.

Talking with people around me calms me a bit. (STUDENT-4th)

As for in-service teachers, the main factor which influenced the appraisal phase was the student's results.

According to the results. I normally see if it's working or not. (TEACHER/11-25)*)*

Types of strategies in the appraisal phase

As for the students, an appraisal strategy identified was the review of the task. This review allows them to develop a process of reflection to assess the need to improve the work. On some occasions, they become aware of the need to appraise the task from the start, and not only after the grades are provided.

So, it is as if I have already self-reflected, prioritized, but you can never reach perfection, so the objective is to do the best you can do. (STUDENT-3rd)

Another appraisal aspect was the role of the professor, through retrospection from tutoring sessions before submitting the work or reflecting on the results obtained. Very frequently, they understood the professor's feedback as part of the creation of the work, and in some cases, it was recognized that this communication favored the results from the activity. Likewise, the feedback could be between peers or work groups, to share impressions about what they are working on.

Therefore, the feedback from the professor is also important. If I want to do a part,

but it doesn't fit within the criteria, without the need for a tutoring session, I have to directly modify it, because it will not come out well. (STUDENT-4th)

With respect to the in-service teachers, it was observed that reflection about the task itself was one of the most-utilized appraisal strategies. This reflection is focused on reviewing the experience and the aspects contemplated in the different strategies during the preparatory phase (review of the lists, criteria, and objectives). This could be individual or with other members of the education community.

Yes, reflection yes. I'm always questioning if what I'm doing is adequate for the students. (TEACHER/0-5)

Another appraisal strategy utilized by the professors was the feedback received from the students.

I like to go along with the indicators we have marked and that they evaluate themselves as well (...) this is the type of reflection you do as a teacher, if you are worth it, if you are not, if you have to change things, or not, also in the conversations with your colleagues, what one does, so does the other... (TEACHER /11-25)

Lastly, the teaching experience itself was utilized as an appraisal strategy.

Experience also tells me that on many occasions, whatever works with one group will not work with another, and you will have to modify it almost completely, but at least you have the initial idea. (TEACHER /11-25)

Table 4 shows a summary of the factors and strategies of the appraisal phase of the self-regulation process, comparing the data obtained from pre-service and in-service teachers.

Table 4

Summary of factors and strategies of the appraisal phase

Appraisal	Pre-service schoolteachers	In-service schoolteachers
Factors	Participation of the professor	Student results
	Emotional	
Strategies	Review of lists and objectives	Reflection
	Feedback between peers	Feedback between peers/parallel teacher
	Feedback from professors	Feedback from students
	Reflection	Experience

Discussion

Self-regulation is one of the key processes that contribute to the academic and professional development of teachers. It is a complex process, which includes cognitive, metacognitive, and motivational-affective aspects. Although SRL has been extensively explored from the point of view of factors involved, especially in the area of psychology, our study provides greater knowledge about how it is developed during the training of teacher, in both initial training and professional practice.

The study shows that SRL is an ability that is learned during initial training, which is continuously developed and defined with professional practice. This progression is

visible in the discourse of the teachers, who point towards the use of multiple and varied strategies (García et al., 2017), associated to different levels of SRL, and which adapt to their training, cognitive, and motivational needs.

Initial training is a key moment for the development of SRL, and prepares students for their future professional practice. This depends on various factors and components, and it's not an ability that is acquired alone, but requires the participation and commitment from others (Hadwin et al., 2011; Ramírez Echeverry et al., 2016). Cooperation and shared learning represent valid strategies during initial training as well as continuous training, to acquire and develop self-regulation in a more meaningful manner. The presence of the professor as a guide is made more visible in the initial training stage, although to a lesser degree as the students near the end of their studies. During professional practice, the role of the professor is assumed by one's peers, in particular the parallel teacher with whom one shares the teaching duties in the group. Even though the class peers play a key role in the planning, monitoring, and control of the tasks, in the professional stage, teachers guide themselves and regulate their actions starting with the behaviors and results from the students.

The data show, through the protagonist's own voices, that the SRL ability increases with experience, and the presence of different supporting instruments for the different tasks. Even though the instruments of support are marked by the professors during initial training (i.e., Alvi y Gillies, 2020; Azevedo et al., 2012; Öhman, 2017; Xu y Ko, 2019), in the professional stage, this is acquired by the teachers themselves. If both students and teachers utilized similar tools during the preparatory stage, these differed and became more complex with professional experience. An example in this sense are the tools utilized for monitoring and control of the tasks. In the professional phase, these imply long-term actions and are designed considering the time resources and available materials, as well as the needs of the students.

As for the strategies utilized in SRL training, the data showed the important role of the appraisal strategies. Given their capacity for making students commit to their learning and making them reflect on a task, the self-evaluation and appraisal strategies between peers play a strong and substantial role in SRL training, as pointed out in previous studies (Panadero et al., 2016; Andrade, 2019). A more in-depth study of the involvement of the appraisal strategies in SRL is still an open field for exploration, especially in the direction of the connections that could be made between different appraisal strategies and the SRL phases, as indicated by Brandmo et al. (2020).

The teachers interviewed helped us understand the complex nature of SRL and the variety of factors that intervene in their development. The participants pointed to the role of metacognition, motivation, and the affective processes in task development. Metacognition is mirrored in the ability of teachers to quickly detect what they know about their own cognition (Flavell, 1979), it is constructed throughout a training process, and is finally developed with professional practice. Also, it has an influence on the strategic commitment of the participants, through the interaction of knowledge, experiences, and metacognitive control (Winne y Perry, 2000). Professional experience is key in this regard, at it helps teachers to be able to integrate knowledge about themselves, about the tasks they must perform, and especially to know what strategies

they must use (Weinstein et al., 2011).

Even though metacognition is a key element, the participants highlighted the fundamental role of motivation (Linnenbrink y Pintrich, 2002). It plays a mediating role in every phase of SRL, and is a constant aspect in the discourse of the teachers interviewed. Motivation serves for maintaining efforts during the task, helps teachers initiate, guide and evaluate the process, and the final product. Many constructs exist that can contribute with the development of effective motivation, and they include self-efficacy and the definition of the results (Pajares, 2008), the definition and monitoring of the good-performing criteria, or the objectives defined (Dweck y Master, 2012), interests (Hidi y Ainley, 2008), and intrinsic motivation (Reeve et al., 2008).

The role of motivation in SRL deserves a very careful look, as in our study, the participants coincided in highlighting its contribution. Although motivation is promoted with the help of the professor during the training stage, who establishes an environment of cooperative learning, this role is played by colleagues in the professional stage, who, through constructive social interaction and feedback, help to cognitively re-structure current knowledge and guide the making of decisions in the resolution of a task (Psaltis et al., 2009), facilitating the commitment with the reflective cycles that are typical of SRL.

Conclusions

The study leads us to conclude that without a doubt, the development of self-regulation of learning processes improves and completes the professional practice of teachers. Among other aspects, we have observed that these processes promote social relations in both pre-service and in-service teachers. Also, the use of support strategies in the development of SRL increases in quantity and complexity as the teacher's profession moves forward.

We also highlight the role of motivation and appraisal as key elements in every phase of SRL, for both pre-service and in-service teachers. The study corroborates the role of motivation as a mediating and transversal factor, which allows regulating and self-regulating the learning process.

The study also showed limitations due to the use of a qualitative methodology. This study could be complemented with the use of quantitative research tools that could complete the results, aside from increasing the sample size.

Ultimately, we especially underline the importance and need to include SRL in the study plans in the initial training of teachers, as well as in continuous training. As we have observed, this is a key competency that must be developed intentionally, planned, and consciously.

Conflicto de intereses

Los autores declaran no tener ningún conflicto de intereses. Los financiadores no tuvieron ningún papel en el diseño del estudio; en la recopilación, análisis o interpretación de datos; en la redacción del manuscrito, o en la decisión de publicar los resultados.

Contribuciones de los autores

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