Self-Regulated Learning: Current and Future Directions

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Abstract

The context of Educational Psychology has seen profound changes over the last 30 years; due to these, self-regulated learning has become a current focus for research, and one of the essential axes of educational practice. Since Zimmerman and Schunk's (1989) publication, *Self-Regulated Learning and Academic Achievement*: *Theory, Research, and Practice*, a great deal of research on self-regulated learning has been undertaken. Taking these and other current publications as our reference, this paper's objective is to gather the main concerns being addressed in studies on self-regulated learning. In addition, we highlight a series of directions that may guide future research in this field.

Keywords: self-regulated learning, learning strategies, academic motivation, academic performance.

Introduction

The context of Educational Psychology has seen profound changes over the last 30 years; due to these, self-regulated learning has become a current focus for research, and one of the essential axes of educational practice (Pintrich, 2000a; Reynolds and Miller, 2003). Currently, learning is conceived of as an active, cognitive, constructive, significant, mediated and self-regulated process (Beltrán, 1996).

Achievement of significant, self-regulated learning requires both *will* and *skill* (Blumenfeld and Marx, 1997; McCombs and Marzano, 1990). For this reason, education should help students to be aware of their own thinking, to be strategic and to direct their motivation toward valuable goals. The goal is for students to learn to be their own teachers; in this sense we speak of the need to move from teaching to self-reflective practice (Schunk and Zimmerman, 1998).

Since the publication of *Self-Regulated Learning and Academic Achievement: Theory, Research, and Practice* (Zimmerman and Schunk, 1989), a great deal of research on self-regulated learning has been undertaken. Later, other relevant publications have appeared, which gather and present the main advances in this field:

- *Self-Regulation of Learning and Performance* (Schunk & Zimmerman, 1994).
- *Self-Regulated Learning: From Teaching to Self-Reflective Practice* (Schunk & Zimmerman, 1998).
- *Handbook of Self-Regulation* (Boekaerts, Pintrich & Zeidner, 2000).
- Self-Regulated Learning and Academic Achievement: Theoretical Perspectives (Zimmerman & Schunk, 2001).

Taking these and other current publications as our reference, this paper's objective is to gather the main concerns being addressed in studies on self-regulated learning. In addition, we highlight a series of directions that may guide future research in this field.

Characteristics of students who self-regulate their learning

According to Zimmerman (2001, 2002), what characterizes self-regulating students is their active participation in learning from the metacognitive, motivational, and behavioral point of view. Characteristics attributed to self-regulating persons coincide with those attributed to high-performance, high-capacity students, as opposed to those with low performance (or learning disabilities), who show a deficit in these variables (Reyero and Tourón, 2003; Roces and González Torres, 1998; Zimmerman, 1998). However, with adequate training in these dimensions, all students can improve their degree of control over learning and performance, and many learning disabilities found particularly in low-performance students can be alleviated.

In general, studies show that the following characteristics differentiate students who self-regulate their learning from those who do not (Corno, 2001; Weinstein, Husman and Dierking, 2000; Winne, 1995; Zimmerman, 1998, 2000, 2001, 2002):

1) They are familiar with and know how to use a series of cognitive strategies (repetition, elaboration and organization), which help them to attend to, transform, organize, elaborate and recover information.

2) They know how to plan, control and direct their mental processes toward the achievement of personal goals (*metacognition*).

3) They show a set of motivational beliefs and adaptive emotions, such as a high sense of academic self-efficacy, the adoption of learning goals, the development of positive emotions towards tasks (e.g. joy, satisfaction, enthusiasm), as well as the capacity to control and modify these, adjusting them to the requirements of the task and of the specific learning situation.

4) They plan and control the time and effort to be used on tasks, and they know how to create and structure favorable learning environments, such as finding a suitable place to study, and help-seeking from teachers and classmates when they have difficulties.

5) To the extent that the context allows it, they show greater efforts to participate in the control and regulation of academic tasks, classroom climate and structure (e.g. how one

will be evaluated, task requirements, the design of class assignments, organization of work teams).

6) They are able to put into play a series of volitional strategies, aimed at avoiding external and internal distractions, in order to maintain their concentration, effort and motivation while performing academic tasks.

In summary, if we narrow down what characterizes these students, it is that they see themselves as agents of their own behavior, they believe learning is a proactive process, they are self-motivated and they use strategies that enable them to achieve desired academic results.

Models of self-regulated learning

In the last fifteen years, numerous theories and models have tried to identify processes intervening in the self-regulation of learning, and to establish relations and interactions between these and academic performance. Puustinen and Pulkkinen (2001) have carried out a revision of current models in this field, analyzing their main similarities and differences. Out of the whole group, the authors highlight Pintrich's model (2000b) as one of the most important attempts at synthesizing the different processes and activities which help to increase self-regulation in learning.

The Pintrich model

Pintrich (2000b) proposed a theoretical framework based on a socio-cognitive perspective[1]; its objective is to classify and analyze the different processes which play a part in self-regulated learning, as asserted by scientific literature. In this model, regulatory processes are organized according to four phases: a) planning; b) self-monitoring; c) control; and d) evaluation. Within each of these phases, self-regulation activities are in turn structured into four areas: cognitive, motivational/affective, behavioral and contextual.

1. The socio-cognitive perspective of learning, rising from work by Bandura (see Bandura, 2001; Schunk, 2001, for a review), is characterized by its study of self-regulation as an interaction of personal processes (cognitive, motivational/affective and biological), behavioral processes, and contextual processes.

Table 1. Phases y Areas for Self-Regulated Learning

(Pintrich, 2000b, p. 454)

ÁREAS DE REGULACIÓN

Phases	COGNITION	MOTIVATION/ AFFECT	BEHAVIOR	CONTEXT
1. FORE-THOUGHT PLANNING, AND ACTIVATION	Target goal setting Prior content knowledge activation Metacognitive knowledge activation	Goal orientation adoption Efficacy judgments Ease of Learning judgements (EOLs); perceptions of task difficulty Task value activation Interest activation	(Time and effort planning) (Planning for self-observations of behavior)	(Perceptions of task) (Perceptions of context)
2. MONITORING	Metacognitive awareness and monitoring of cognition (FOKs, JOLs)	Awareness and monitoring of motivation and affect	Awareness and monitoring of effort, time use, need for help Self-observation of behavior	Monitoring changing task and context conditions
3. CONTROL	Selection and adaptation of cognitive strategies for learning, thinking	Selection and adaptation of strategies for managing motivation and affect	Increase/decrease effort Persist, give up Help-seeking behavior	Change or renegotiate task Change or leave context
4. REACTION AND REFLECTION	Cognitive judgments Attributions	Affective reactions Attributions	Behavior choice	Evaluation of task Evaluation of context

For Pintrich, these four phases represent a general sequence which the student steps through as he or she carries out the task, but they are not hierarchically or linearly structured. The phases can occur simultaneously and dynamically, producing multiple interactions among the different processes and components included therein. Furthermore, Pintrich indicates that not all academic tasks explicitly involve self-regulation: sometimes, the performance of certain tasks does not require the student to strategically plan, control and evaluate what he or she is going to do; rather, the execution can be performed more or less automatically (or implicitly), as a function of the students' prior experience with the same.

As can be seen in Table 1, self-regulating processes begin in the *planning* phase, where we find such important activities as: setting of desired goals or the specific objective being sought after with the task (*target goal setting*), activation of prior knowledge about the material and of metacognitive knowledge (recognizing the difficulties involved in the different tasks, identifying knowledge and skills needed for addressing them, knowledge about resources and strategies that can be helpful in addressing the task, etc.) (cognitive area); the activation of motivational beliefs (self-efficacy, goals, value given to the task, personal interest) and of emotions (motivational/affective area); planning the time and effort to be used in the tasks (behavioral area) and the activation of perceptions regarding the task and the class context (contextual area).

Within the *self-monitoring* phase, we find activities that help the student become aware of his or her state of cognition, motivation, emotions, use of time and effort, as well as conditions of the task and of the context. For example, those activities related to self-observation of comprehension (mecognitive awareness) are included here. These activities are manifest when students are aware that they have not understood something they have just read or heard, when they are aware that they are reading too quickly for the type of text involved or for the goals they have set (e.g, understanding the main ideas), or when they actively observe their own reading comprehension, asking themselves questions to see whether they have understood (Pressley & Afflerbach, 1995). Likewise, this phase encompasses processes the students put into play in order to be aware of their motivational pattern (whether they feel competent for performing tasks, whether they value them, or what goals guide and direct their academic behavior), aware of their own behavior ("I have to put in more time and effort in order to understand this chapter", "I need to get help"), as well as characteristics of the tasks and the classroom context (what class rules exist, how performance will be evaluated, task requirements, reward and punishment systems, teacher behavior, etc.).

On the other hand, in light of results from the previous phase, *control* activities are put into play, encompassing the selection and utilization of thought control strategies (use of cognitive and metacognitive strategies), motivation and emotions (motivational strategies and strategies of emotional control), as well as those related to regulating time and effort and to control of diverse academic tasks, and control of the atmosphere and structure of the class.

At this point we wish to point out that it is very difficult to differentiate the phase of self-observation from that of cognitive control, as it appears in some self-regulation models (Butler & Winne, 1995; Nelson & Narens, 1990), where both aspects are conceived of as separate processes. Although at a conceptual level it is possible to differentiate processes involved in self-observation and in cognition control, empirical studies in this area do not support such a separation, since most of the time both processes occur simultaneously (Pintrich, Wolters & Baxter, 2000).

Finally, the *reflection* or evaluation phase includes judgments and evaluations that the student makes regarding his task execution, comparing it to previously established criteria (his or her own, or the teacher's); attributions made regarding the causes of successes or failures; affective reactions experienced due to the results, as a consequence of attributions made; choice of behavior to be followed in the future, as well as general assessments about the task and the class environment.

In summary, the Pintrich model is offered as a global, comprehensive framework from which to analyze in detail the different cognitive, motivational/affective, behavioral and contextual processes that promote self-regulated learning. One of the innovations present in this model as compared to others is that for the first time the contextual area is included as an area subject to self-regulation. As in the new teaching models based on a socioconstructivist perspective, such as learning communities (Brown, 1997; Brown & Campione, 1990) and the *learner-centered classroom* (McCombs & Whisler, 2000), in this model it is noted that students *can* do something to change and modify their context, thus this aspect should be considered an important question in self-regulation of learning.

The role of academic motivation in self-regulation of learning

If, during the first years of the cognitive revolution boom in Educational Psychology (1970s and 80s), studies were focused on the role of cognitive variables (studies on information processing, cognitive styles, learning strategies, prior knowledge, thinking processes), in the 1980s and 90s this field of research received a great boost from the influx of studies in the motivational field (studies on self-concept, self-efficacy beliefs, attributions, goals, etc.). This heightened an interest in studying how variables mentioned are linked and influence one another in learning results, thus giving rise to the development of research on self-regulated

learning (González Torres and Tourón, 1992; Pintrich, 2003; Roces and González Torres, 1998).

Studies performed in this area agree in that intervention in learning strategies encourages cognitive learning and learning motivation, and, on the other hand, improvement in students' motivational beliefs not only influences learning motivation, but also influences the way and the quality with which students process information, selecting and using specific learning strategies.

Specifically, studies on self-regulated learning in recent years take in contributions from cognitive theories of motivation, starting with Atkinson's model of expectancy times value (cfr. Wigfield y Eccles, 2000), and they highlight the importance of *self-efficacy expectations* (conviction held by the individual as to whether he or she can successfully perform the behavior required to produce specific results) (Bandura, 1977) and the importance of *goals* (reasons for performing the tasks), both being critical aspects of motivation that influence control and regulation of learning.

Self-efficacy beliefs, first addressed by Bandura (1977, 1986) in his studies on self-regulation of behavior, are neither global personality traits nor general self-concept, but rather specific self-conceptions that individuals develop mainly from their mastery experiences (successes/failures) in different activities. Bandura (1997) considers that self-efficacy beliefs, being characterized by their situational and behavioral specificity, are better predictors of motivation and behavior in a specific field than are global indices of self-concept. For this reason this construct has received a good deal of attention in motivational research and in the field of self-regulated learning.

In this respect, studies performed by Pintrich and collaborators using the MSLQ (*Motivated Strategies Learning Questionnaire*) are notable (Pintrich, 2003; Pintrich, Smith, García & McKeachie, 1991; Roces, 1996). These studies have a correlational nature[2] and use samples of studies from secondary and from university. Also notable are studies by Zimmerman and Schunk (cfr. Schunk, 2001; Schunk & Ertmer, 2000; Zimmerman, 2001, for a

2. In our own context, González Pienda, Núñez and Roces, from the Universidad de Oviedo, and González Cabanach, Valle and Rodríguez, from the Universidad de la Coruña, have performed a series of studies which aim to determine the causal relationship between motivation, learning strategies and academic performance (cfr. Rodríguez, 1999; Valle, González Cabanach, Vieiro & Suárez, 1998).

review), which have underscored the positive effect of academic self-efficacy beliefs in the entire process of self-regulation.

One matter of great interest to current researchers in this area is the clarification of differences existing between self-efficacy beliefs and self-concept. There has been a tendency in the research to produce measures of general self-efficacy, very similar to those of self-concept developed from the model by Shavelson, Hubner and Stanton (1976). This represents a problem, since these beliefs show less predictive capacity when they lose their situational specificity. Thus, in recent years, there has been an attempt in various studies (Bong & Clark, 1999, Bong & Skaalvik, 2003, Pajares & Schunk, 2001) to more closely define the differentiating characteristics between the two constructs.

In summary, our objective is not to delve into the differences and similarities between these self-beliefs (toward that end, the reader is referred to the studies noted above). We wish to point out that despite researchers' enthusiasm for separating self-concept and self-efficacy, we find that on careful examination of the aspects that make up the two beliefs, both share very similar characteristics as to their multidimensional nature (Bong, 1998, Marsh, 1990), the sources students use for their creation and development (cfr. Bong & Clark, 1999; Skaalvik, 1997), and, when measures are taken of both constructs, as to their relationship with academic performance (Bong & Clark, 1999; Pajares & Schunk, 2001; Skaalvik, 1997).

All these reasons lead us to think, along with Bong and Skaalvik (2003), that perhaps the highly sought-after distinction between these beliefs may be overestimated, and that trying to make such remarkable differences between these constructs has only increased confusion when it comes to using them. In certain situations, such as when measuring self-concept in its specific dimensions and self-efficacy beliefs at a general level, both beliefs are empirically similar. In other words, differences between the two constructs can be easily overcome.

On the other hand, with regard to research on academic goals, stemming from theories by Dweck (1986) and Nicholls (1984), most studies have focused on examining the impact of

two types of self-regulated learning goals: learning goals[3] (also called *mastery* or *task* goals) and achievement goals[4] (also *ego* or *ability* goals).

Numerous studies show that students who pursue and adopt learning goals use deeper cognitive strategies (elaboration and organization), and deeper metacognitive strategies (goal planning activities and activities pertaining to self-observation of one's own comprehension); they have more adaptive motivational beliefs towards themselves and towards the tasks (high beliefs of self-efficacy when facing difficult tasks, formation of an adaptive attributional pattern; a great intrinsic interest in and enjoyment of the tasks; high levels of value, usefulness and importance assigned to these tasks; a greater number of positive affective reactions to the tasks); and they show higher levels of effort and persistence, as well as more behaviors related to seeking academic help when they have difficulties than we find in students with other types of goals (cfr. Kaplan, Middleton, Urdan and Midgley, 2002; Pintrich, 2000b, for a review).

In the case of achievement goals, however, we wish to point out that a greater discrepancy exists regarding their repercussions in motivation and self-regulated learning. In many studies findings have been uneven, and even contradictory. The first papers dealing with this area showed that these goals were associated with a set of factors harmful to learning, ranging from cognitive (use of superficial strategies), motivational/affective (attributions of failure to low capacity, low interest in the task, high test anxiety), to behavioral (use of self-handicapping strategies). Nonetheless, in these same studies the components of approach and avoidance motives were not empirically distinguished, thus it was not possible to reach a single integration of results (Elliot, 1999).

Currently, with the new reconceptualization of goal theory offered by Pintrich, Barron, Elliot, Harackiewicz and collaborators in the second half of the 90s, where such components were distinguished, it has come to light that the effects of achievement goals on motivation and on performance vary according to which objective predominates in approaching the task: that of demonstrating one's own competence (*performance-approach*), or of avoiding negative judgments about one's personal worth (*performance-avoidance*) (Harackiewicz, Barron, Pintrich, Elliot and Thrash, 2002).

3. Students oriented toward learning goals are characterized by focusing on the learning process and by the desire to develop their abilities and broaden their understanding when performing tasks (Urdan, 1997).
4. Students pursuing achievement goals are oriented toward demonstrating competence and trying to be better than others (Urdan, 1997).

In general, findings indicate that students oriented toward demonstrating competence (*performance-approach)* report positive aspects in their motivation (increase in self-efficacy beliefs and in their interest and involvement in tasks when they are successful in their objectives) and in their cognition (a certain usage of cognitive and metacognitive strategies), although findings about the latter question are rather contradictory among themselves (cfr. Barron and Harackiewicz, 2000; Harackiewicz *et al*., 2002; Midgley, Middleton and Kaplan, 2001; Pintrich, 2000b). However, despite such benefits, it has been shown that being focused on demonstrating competence and on comparing oneself with others can have its costs, for example, avoidance of difficult tasks, increased test anxiety, as well as a decrease in the use of certain self-regulation strategies, such as seeking academic help (Newman, 1998; Pintrich, 2000b; Urdan, Ryan, Anderman and Gheen, 2002).

On the other hand, studies agree in pointing out that the component of performance avoidance is not the best orientation for involving oneself in academic tasks. It has been demonstrated that students with these goals show a motivational, affective, cognitive and behavioral pattern which is very harmful to learning and motivation (Pintrich, 2000b). For example, they usually use *self-handicapping* strategies in order to protect their feelings of self-worth when facing failure situations; they do not make an effort to use cognitive and metacognitive strategies and they limit themselves to completing the minimum requirements of the task; they attribute failure to internal, stage factors, such as lack of ability; they have low self-efficacy beliefs; they show a negative interest and value towards the task; they experience much anxiety regarding tests and academic performance; and they show low levels of effort and persistence in tasks[5], as well as in behaviors related to seeking academic help (Dweck, 2002; Middleton and Midgley, 1997; Midgley and Urdan, 2001; Ryan and Pintrich, 1997; Wolters, 2003).

Synthesizing, we wish to point out that currently, with new reconceptualizations of the goal theory, we are overcoming the tendency to consider that achievement goals are inadequate for promoting an optimal motivation and desire for learning. In fact, as Dweck indicates (1986), students interested only in learning goals, but not in reaching other objectives (getting good grades, doing tasks assigned in class, meeting class objectives), may be acting

5. These students, who focus on not looking incompetent before others, may make some effort toward this end (e.g., studying to avoid getting the worst grades), but not in the same way as students with learning goals or who try to demonstrate competence.

against their own interests, and may even put at risk their future learning opportunities (access to certain university programs, professional outlets, etc.).

This new perspective in the study of goals criticizes many studies' exclusive focus on the effects of different goals taken separately, giving scarce attention to positive effects that can be gained by pursuing multiple goals at the same time. Thus, it is suggested that in order to be successful in school, students should be oriented both toward intrinsic goals (broadening knowledge, mastering the task, developing abilities, etc.) and toward extrinsic ones (e.g., trying to get good grades, performing better than others and obtaining positive judgments from that, pursuing goals related to social responsibility, etc.) (cfr. Barron & Harackiewicz, 2000; González Torres, 1997; Harackiewicz *et al*., 2002; Lin, McKeachie & Kim, 2003; Pintrich, 2000c; Valle *et al*., 2003; Wentzel, 2000).

Elsewhere, research centered on the study of goals from a social perspective reveals that an orientation toward social goals, especially those relating to social responsibility, in coordination with an orientation toward academic goals (learning/approach to performance), is one of the most viable and beneficial ways to increase learning and performance (Patrick, Anderman & Ryan, 2002; Urdan & Maehr, 1995; Wentzel, 2000, 2002, 2003).

Evaluation of self-regulated learning

A matter of great importance, yet difficult to investigate, relates to measurement or estimation of the difference components and processes in self-regulated learning (Schraw & Impara, 2000; Winne, Jamieson-Noel & Muis, 2002; Winne & Perry, 2000).

In an attempt to clarify and classify methods and instruments used by researchers to measure processes involved in the self-regulation of learning, Winne and Perry (2000) distinguish between: a) instruments that measure self-regulated learning as an *aptitude*, describing relatively stable qualities or attributes of the student, and enabling prediction of future behavior (cognition and motivation); and b) instruments that measure self-regulated learning as an *activity* (*event*), characterized as more complex measures that collect information on the states and processes the student undertakes while he or she is self-regulating.

Within the first category, we include self-reporting questionnaires, structured interviews and teacher judgments, and within the second category, the *think-aloud* protocols, methods of error detection in tasks, the *trace methodologies* and observation measures.

a) Instruments that measure self-regulated learning as an aptitude:

Self-reporting questionnaires

Until the present day, these are the most utilized procedures for measuring self-regulated learning, due to their facility in design, administration, and interpretation of results. These measures are based on the self-report offered by the subject directly. Some of the most utilized questionnaires are:

- *The Learning and Study Strategies Inventory* (LASSI) (Weinstein, Schulte & Palmer, 1987). The LASSI is a self-reporting questionnaire with 77 items, designed to assess learning strategies used by university students. Items in the 1987 version are grouped in 10 scales: attitude, motivation, time organization, anxiety, concentration, information processing, selection of main ideas, use of techniques and support materials, self-assessment and testing strategies. In our context, it has been one of the most widely used scales for measuring learning strategies (e.g., Durán, 1999; González Pienda, Núñez, Rodríguez and González Cabanach, 1994; Prieto and Castejón, 1993). However, the lack of adequate construct validity has been noted, and the need to examine and revise it before using it in future research.

- *The Motivated Strategies for Learning Questionnaire* (MSLQ) (Pintrich *et al*., 1991). Pintrich and collaborators have created this self-reporting tool with 81 items, based on the motivational model of expectancy times value (Pintrich, 2003; Wigfield and Eccles, 2000), with the objective of measuring different motivational components and the use of learning strategies in a given course or subject matter (see table 2). One of the advantages of this instrument is that it has been applied and validated at different educational levels, both university and non-university. In our context, this questionnaire has been translated and adapted by Roces, Tourón

and González Torres (1995), distributed under the name of CEAM II (*Cuestionario de Estrategias de Aprendizaje y Motivación*).

Table 2. MSLQ Scales and Subscales

SCALES	DIMENSIONS	SUB-SCALES
MOTIVATION	Expectancy components	Control beliefs
		Self-efficacy
	Value components	Intrinsic goals
		Extrinsic goals
		Task value
	Affective components	Test anxiety

SCALES	DIMENSIONS	SUB-SCALES
LEARNING STRATEGIES	Cognitive and metacognitive strategies	Rehearsal
		Elaboration
		Organisation
		Critical thinking
		Metacognition
	Resource management strategies	Time and place of study
		Effort regulation
		Peer learning
		Help-seeking

- *The Components of Self-Regulated Learning* (CSRL) (Niemivirta, 1998). Niemivirta (1998) produced this questionnaire with the objective of measuring motivational and cognitive components involved in self-regulated learning. On one hand, with regard to academic motivation, the CSRL assesses the constructs of goals, control beliefs and self-esteem. On the other hand, with regard to cognition, students's use of learning and self-regulation strategies is assessed. Here they include different strategies associated with different levels of information processing: from a superficial level, where memorization strategies are classified, to a deep le-

level, encompassing strategies of elaboration, goal planning and self-observation of one's own comprehension.

Structured interviews

One of the most widely used interview procedures for measuring self-regulated learning is the *Self-Regulated Learning Interview Schedule* (SRLIS) (Zimmerman & Martínez-Pons, 1986, 1988). After identifying fourteen types of strategies used by secondary students to self-regulate learning in and out of the classroom, Zimmerman and collaborators developed a structured interview procedure in order to assess them.

Later studies confirmed the validity of this procedure for measuring the use of self-regulation strategies and for discriminating between high and low performance students according to their use of these. The fourteen strategies measured by this procedure are: information organization and transformation, self-evaluation, goal setting and planning, information seeking, registry and control, environmental structuring, self-consequences, repetition and memorization, seeking help from peers, seeking help from teachers, seeking help from adults, and reviewing the tests, notes and textbooks.

Teacher judgments

In this case, the teachers are those who evaluate the quality of self-regulated learning in students, by using daily academic activities. Zimmerman and Martínez-Pons (1988) have created a scale for the the teacher called *Rating Student Self-regulated Learning Outcomes: A Teacher Scale*, with the objective that teachers measure students' use of self-regulation strategies. Using a questionnaire with 12 items, teachers score on a 5-point *Likert* scale whether students use any of the fourteen strategies identified on the SRLIS.

b) Instruments which measure self-regulated learning as an activity:

Think-aloud measures

Thinking aloud is a protocol where the student reports his thoughts and the processes and cognitive strategies he or she puts into play while carrying out a task. One of the areas

where this protocol has most been used is in reading (Pressley, 2000; Pressley & Afflerbach, 1995). It should also be noted that the student's verbal responses are analyzed by means of the answer protocol which Zimmerman and Martínez-Pons used (1986).

Methods of error detection in tasks

These instruments are usually employed for evaluating the self-observation process in the area of reading comprehension. For this purpose, reasearchers introduce some errors into the materials students are using for study (e.g. textbooks), in order to observe whether the errors are detected and what students do when they discover them (Baker & Cerro, 2000; Garner, 1987).

Trace Methodologies

These instruments are based on signs or observable indicators regarding cognitive processes that student deploy when performing tasks. For example, one of the indicators that has been used to measure the process of cognitive control is whether the student writes more information than is necessary in the margins of his notebook or his textbook, such as foot-notes, summaries, personal comments, diagrams, comparisons of the information with other sources, etc. (Baker and Cerro, 2000; Winne and Jamieson-Noel, 2003).

Measures that observe task execution

These measures are based on observations made by judges as to what the students are doing as they perform the tasks (for example, Perry, 1998). Frequently these are complemented with interviews. There are several advantages to these measures for evaluating self-regulated learning (cfr. Turner, 1995): they are objective measures of what the learners are doing instead of what they remember or think that they do; they allow relating students' behaviors to the conditions required by the tasks; and finally, they can decrease difficulties associated with measuring this process in children, such as, the answering bias in questionnaire completion (they tend to answer very optimistically) and the subjects' limitations in describing cognitive processes that they use during task performance.

The teaching of self-regulated learning

In the book *Self-Regulated Learning*: *From Teaching to Self-reflective Practice* (Schunk and Zimmerman, 1998), one can find different examples of instructional interventions and models designed with the objective of teaching processes and strategies involved in self-regulated learning (see also García Ros, Clemente and Pérez González, 1994; González Torres, 1997; Monereo & Castelló, 1997; Sanz de Acedo & Iriarte, 1999, for a review).

Common points (or didactic strategies) where the different inventions and programs concur are as follows: direct teaching of strategies, modeling, guided and autonomous practice using strategies, feedback, self-observation, social support and its withdrawal at the moment when the student has reached a certain degree of responsible participation, and self-reflection.

With *direct teaching of strategies*, one explains to the student characteristics of the strategies that can help him or her better process information and regulate learning; how these are used; what skills are involved in them; when, how and why to use one strategy or another; and what they are useful for, that is, what they benefits are.

Modeling is one of the most recommended procedures for teaching self-regulation (Graham, Harris & Troia, 1998). Steps taken in planning, controlling execution, distributing cognitive resources and reflecting on what has been done can all be assimilated by students as they observe the teacher or other expert models (*peer models*) performing them. (Schunk & Zimmerman, 1998, 2003).

Practice using self-regulation strategies, first *guided* and later *independent*, and *feedback* from "others" (mainly the teacher) regarding strategy effectiveness, are procedures that improve learning and students' motivation, since they promote transfer of strategies and their maintenance. The objective of guided and autonomous practice is that the responsibility or control, of initiating, applying and evaluating the strategies be transferred from the teacher to the student (Onrubia, 1996). This kind of mediated learning, initially proposed by Vygotsky and other authors (e.g., Feuerstein), is on the essential components in many instructional models and programs (e.g., scaffolding, reciprocal teaching, etc.) (Valle, González Cabanach, Vieiro and Suárez, 1998).

Self-monitoring is a very important component in the intervention, since if the student wants to learn strategies, somehow he or she has to oversee their application, their effectiveness, and how to change or modify them in case they are ineffective.

Providing the student with *social support* from the teachers and from classmates while he or she is learning self-regulation strategies is also one of the most utilized strategies in various programs. This also involves eliminating the support over time as the student becomes more competent in their acquisition and development. In this regard, Graham *et al*. (1998) affirm that taking away this support, or *scaffolding*, must be done step by step, moving from more directive, intensive mediation in the initial stage to more self-regulated forms.

Finally, all these programs follow a didactive process culminating in *self-reflective practice* (or metacognitive discussion), where students independently practice the acquired skills and strategies, they reflect on the learning process they have followed, they evaluate performance attained and strategy effectiveness, if needed they modify the perspective used, and they carry out adjustments in their social and physical environment in order to create a more favorable learning environment.

As indicated by Paris and Paris (2001, p. 91), the nature of instruction in this field has changed drastically in the last 30 years. Whereas at the beginning (1970s and 80s), explicit teaching of strategies was emphasized (direct instruction), currently, instructional models put the emphasis on self-reflective practice and on *scaffolding instruction*, since the main objective is metacognition, that is, development of awareness and control of our reflection processes. On the other hand, we also observe in the area of intervention, a tendency to integrate the teaching of strategies within specific tasks and material from the curriculum.

Ley and Young (2001; see also Paris & Paris, 2001), taking their basis in studies that support the positive influence of self-regulation on learning and performance and that identify deficits in students that do not regulate their learning (e.g., Zimmerman, 1998), propose a series of general guideliness for designing instruction aimed to help students who are less expert in self-regulation become more strategic and self-regulated. Specifically, these authors recommend:

- Helping students create and structure favorable learning environments. Specifically, this can be accomplished by helping them develop volitional strategies aimed at avoiding internal and environmental distractions (noises, classmates' interference, etc.), and eliminating or diminishing them, keeping their attention and their effort on the task being performed. In this regard, Corno[6] (1993, 2001) has proposed six types of basic strategies that students can put into play in order to stay focused on the task and to successfully carry out their intentions for learning: a) *covert volitional control* strategies, aimed at controlling the student's inner world (cognition, motivation, emotion); and b) *overt volitional control* strategies, aimed at controlling aspects outside the subject in relation to the task and the external context.

- Organizing instruction and activities such that they favor the use of cognitive and metacognitive strategies.

- Provide the student with opportunities for *self-monitoring*. This process, a key element of self-regulation (Butler and Winne, 1995; Zimmerman, 1998), depends in turn on two processes: the establishment of goals and *feedback* from others and from oneself (self talk). Thus students can be encouraged to self-monitor their learning: on one hand, by helping them use internal and external *feedback* in order to oversee to what degree goals are being fulfilled, and whether strategies in use are effective or not; and, on the other hand, by making them see the importance of establishing short-term, realistic and specific goals, since this way progress and advances are easier to confirm. Likewise, the student can stimulate self-monitoring by keeping a log of aspects related to academic tasks (e.g., time used to complete them, to take notes, to read the text, etc.), since these activities facilitate generation of feedback that can guide efforts to achieve future goals.

- Provide students with continuous evaluating information and give them the chance to self-evaluate their learning. The level of goal achievement should be stressed, whether knowledge of the subject was improvement and the effectiveness of strategies being used.

6. In recent years, we find a movement to recover within Psychology volition as an explanation for moving from intention to action, and this is now being incorporated in studies on self-regulation of learning. This current awakening of interest can be attributed to Kuhl (2000) and Heckhausen (1991), German psychologists, and in the educational field to the American researcher Corno (2001). As a complement to traditional approaches to motivation and self-regulation, focused on the mediating role of beliefs (expectations, values, goals), these authors, from a more functional perspective, are studying dynamic factors and forces relating to volition, which appear to be necessary to move individuals toward the goals that they set for themselves (González Torres, 2003).

Likewise, it is very important to provide students with corrective *feedback* that helps them see where they have erred and how to correct problems.

In our context, teachers and researchers interested in instruction for promoting self-regulated learning can find various instructional proposals in programs by De la Fuente and Martínez Vicente (*Programa Prorregula*, 2000), Yuste and Ayala (*Progresint 31*, 2000), and Hernández and García (*Notice*, 1997), among others.

Future directions for research

Various publications in the field (cfr. Butler, 2002; Eccles, Wigfield & Schiefele, 1998; Paris & Paris, 2001; Patrick & Middleton, 2002; Pintrich, 2003; Pintrich *et al*., 2000; Schunk & Zimmerman, 2003; Zeidner, Boekaerts & Pintrich, 2000) point out some of the main directions where future research should be focused:

1) Improving the definition and making more operational the main processes and activities involved in self-regulated learning, and the differences between this construct and those related to it (e.g., self-control, metacognition).

2) Development of more complete models which incorporate concepts referring to dynamic forces that affect the self-regulation process (e.g., volitional processes).

3) Perfecting the research methodology and measuring instruments. On one hand it has become necessary to use more complex designs (e.g., longitudinal designs, causal studies and not only correlational). On the other hand, we need to create and validate a greater number of methods and instruments of a qualitative nature which will complement and contrast with the use of self-reports, allowing researchers to investigate self-regulated learning as a dynamic and continuous process (*event*), which unfolds over time and in a specific context, and to overcome limitations associated with the excusive use of self-reports for assessment. Additionally, Pintrich (2003), from a motivational perspective, proposes an interest in performing classical experimental analyses, in the same fashion as purely cognitive psychologists, in order to examine in depth the effects of motivation on cognition and on learning.

4) Analysis of the role of learning context in cognition and academic motivation. Research carried out in recent years from a socioconstructivist perspective (e.g., McCaslin & Hickey, 2001; Paris, Byrnes & Paris, 2001; Volet & Jarvela, 2001) is showing how context characteristics and demands of the situation affect students' learning and motivation. Therefore, it is necessary to move forward in the development of learner-centered teaching models and in the so-called learning communities. These models, based on the self-determination theory of Deci and Ryan (2002), highlight the importance of structuring the context such that student needs for competence, autonomy and affective connection are satisfied, thus favoring self-motivation and self-regulated learning. On the other hand, the TARGET model by Ames (1992), whose work was later continued by Midgley and collaborators (Midgley, 2002), contributes interesting suggestions for designing learning environments, oriented toward the development of self-regulated learning and motivation to learn. Finally, in response to new changes underway in the schools (e.g., introduction of information and classroom communication technologies), these new learning environments should be studied to see how they influence the process of self-regulation (e.g., Hill and Hannafin, 1997).

5) Studying the influence of personal human development on the process of self-regulation of learning. For example, Pintrich and Zusho (2002) reviewed studies that focus on the analysis of effects of different variables on self-regulated learning, both motivational variables (self-efficacy, goals, value given and interest in the task) and cognitive variables (e.g., metacognitive knowledge, prior knowledge, working memory), stressing the mediating role of personal development (age) on the nature of this relationship.

6) Examining the role of individual and cultural differences in self-regulated learning. Regarding the former, one could study the influence of temperament, impulsivity, patience or resistance to distractions in the self-regulation process, following the lead of Paris and Paris (2001, p. 99). Likewise, the study of gender differences continues to be a burning question within Educational Psychology research. Whereas empirical research shows that there may be differences in the use of certain self-regulation strategies, favoring the girls (e.g., Ablard & Lipschultz, 1998); nonetheless, findings have been attributed to biases in the boys' and girls' responses to self-reporting questionnaires more than to the existence of real differences (cfr. Pintrich & Zusho, 2002, p. 276). On the other hand, a question of great interest is whether findings from research on self-regulated learning, where mainly students of Western cultures were involved (USA, Europe, Canada), can be generalized to subjects from other cultures.

7) The teaching of different processes which intervene in self-regulated learning within each of the different areas of the curriculum. As indicated by Schunk and Zimmerman (2003, p. 74; see also Schunk & Ertmer, 2000), it is important to integrate self-regulation activities and strategies within the school context and within the different subjects of the curriculum, and to help students modify them and adapt them to the different learning situations.

Conclusions

Currently, the study of what self-regulated learning is, what processes are involved in it, and how to teach them, has become a burning topic within Educational Psychology and one of the principal directions where this discipline is advancing.

Self-regulated learning is a fusion of *skill* and *will*. The strategic learner is one who has learned to plan, control and evaluate his or her cognitive, motivational/affective, behavioral and contextual processes. This learner knows how to learn, is self-motivated, knows his or her possibilities and limitations, and as a function of this knowledge, controls and regulates learning processes in order to adjust them to the task objectives and to the context, to optimize his or her performance and improve skills through practice.

One of the characteristics of students that self-regulate their learning is the control of their motivation and emotions. Specifically, research highlights the role of perceptions of self-efficacy and goals. Regarding the latter, research initially brought out that students oriented toward achievement goals (demonstrating competence) showed a motivational, cognitive and behavioral pattern which was harmful to learning and performance. However, in recent years, since the reconceptualization of goal theory carried out by Pintrich, Barron, Elliot and Harackiewicz, we find positive effects from these goals on motivation and on performance, and the benefits of pursuing multiple goals at the same time.

Until now, self-reporting questionnaires have been the most-utilized instruments for evaluating different processes involved in self-regulated learning. However, current research based on a socioconstructivist perspective, is beginning to use more and more introspective

and qualitative instruments with the objective of capturing the dynamic, procesural and social nature of self-regulation.

In recent years we have witnessed a very important change in the area of intervention. Currently, instructional models stress the importance of self-reflective practice, collaborative learning and *scaffolding* in the teaching of self-regulation. Furthermore, it is being stressed that intervention should be focused in natural environments, using genuine, contextualized tasks, linked to the interests and needs of the students, since this will allow them to generalize what they have learned to situations from their personal, academic and social life.

The role of context, the perfecting of research methodology and measuring instruments, the teaching of self-regulation strategies within the curriculum, the influence of human development on self-regulation and the role of certain intra- and inter-personal variables are some of the future directions where research may move forward in this field -- a field which is helping us better understand factors involved in the teaching-learning process, and develop intervention proposals directed toward reducing students' difficulties in learning, due to their lack of awareness and control over learning, and toward optimizing their academic performance.

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