Self-assessment: Theoretical and Practical Connotations. When it Happens, How is it Acquired and what to do to Develop it in our Students

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Abstract

Self-assessment is one of the most usual activities in classroom from all different educational levels. However a high percentage of teachers report not knowing how self-assessment influence students' learning or how to implement it successfully in their classrooms. In this article two different lines of research concerning self-assessment will be analyzed (self-regulation and formative assessment) along with a new conceptualization of what self-assessment is. Later the relationship between self-assessment and the use of learning strategies by the students will be examined explaining how this skill can be acquired. In the last sections it will be analyzed how the use of different pedagogic strategies can enhance a successful implementation of self-assessment in classrooms.

Autoevaluación: Connotaciones Teóricas y Prácticas. Cuándo Ocurre, Cómo se Adquiere y qué Hacer para Potenciarla en nuestro Alumnado

Resumen

La autoevaluación es una práctica habitual en las clases en los diferentes niveles educativos. Desafortunadamente un porcentaje elevado de profesores desconoce de qué manera específica afecta al aprendizaje de nuestros alumnos y cómo implementarlo con éxito en las aulas. En este trabajo realizamos un recorrido por las dos corrientes que enfatizan el uso de la autoevaluación (teorías autorregulatorias y evaluación formativa) presentando re-conceptualización de lo que significa autoevaluación. Posteriormente se analiza cuáles son las relaciones entre la autoevaluación y el uso de estrategias de aprendizaje de los alumnos y cómo se adquiere esta capacidad. A continuación se presentarán estrategias pedagógicas que fomentan una buena implementación en el aula para que los profesores podamos ayudar a nuestros alumnos a adquirir la capacidad de autoevaluarse.

Palabras Clave: autoevaluación, autorregulación, evaluación formativa, rúbricas, guiones de evaluación, criterios de evaluación.

Introduction

In this paper we analyze different perspectives on self-assessment with the aim of displaying the theoretical complexity of this strategy, and of simplifying their use through appropriate educational recommendations. To achieve this objective we distinguish, first, between self-assessment as a learning strategy that a student can activate, and self-assessment as a pedagogic strategy through which the teacher asks the students to reflect on their work. This distinction, coming from different research traditions, will help us to reflect on the goals of each theoretical approach to reach a shared vision. Second, a definition of self-assessment is provided and each element that integrates this process is explained in detail in order to clarify the importance of this definition in comparison to alternative ones. Third, we expose the relationship between self-regulated learning and the use of learning strategies by students. To do this, we survey what different self-regulation theories say on self-assessment, collect empirical evidence on this relationship, explain which phases of self-regulation influence self-evaluation, and give and comment on an example to achieve greater concreteness. Subsequently, we analyze how this ability is acquired, and describe the pedagogic conditions that, if the teacher implements them, encourage self-assessment in the students. Finally, the article closes with a brief introduction of the different types of intervention used in the classroom to encourage self-evaluation.

It is important, before defining self-assessment, to differentiate two theoretical approaches that make reference to it. In the first perspective, self-assessment is understood as an instructional process used by the teacher as an educational resource. "Let's evaluate our work" is a phrase that can be heard in the classroom. In fact, a high percentage of primary, secondary and university teachers recognize using self-assessment as an instructional process (Noonan & Duncan, 2005; Panadero, Brown & Courtney, 2013). When self-assessment is considered as an instructional process, it is considered as part of formative assessment along with other types of assessment as, for example, peer assessment (Black & Wiliam, 1998).

The second approach that includes self-evaluation stems from self-regulation theories. Self-regulation is usually understood as the control that a person exerts over his/her thoughts, actions, emotions and motivation through personal strategies to achieve his/her goals (Zimmerman, 2000). In this approach, self-assessment is understood as a process that pupils carry out to self-regulate their learning. As an illustration, the self-regulation model proposed by

Zimmerman displayed in Figure 1, it can be seen that self-assessment is a self-regulatory process.
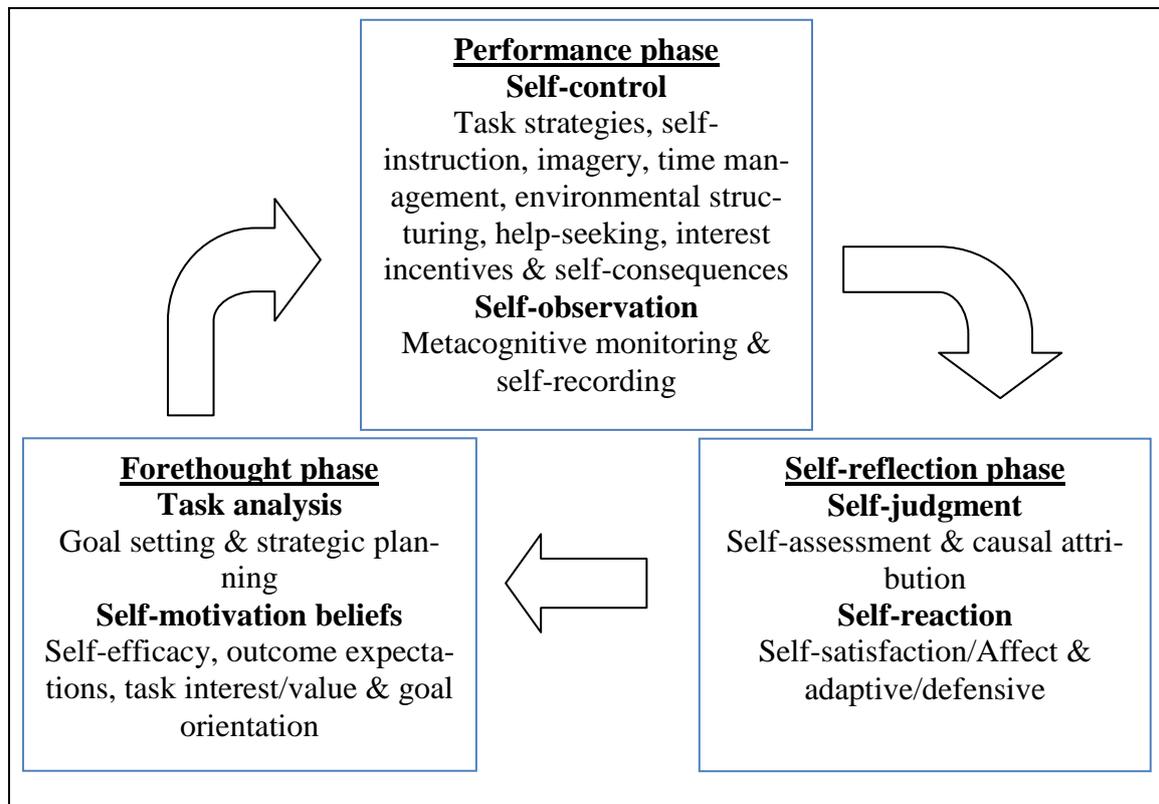

Figure 1. **Self-regulation phases and proceses (Zimmerman y Moylan, 2009).**

Although the difference between the two approaches can seem obvious, it is not evident in many papers on self-assessment. The most common situation is that authors adopt only one of these approaches, without considering them jointly. From our point of view, when a teacher tries to foster self-assessment, he or she should use this process as an instructional strategy whose ultimate goal should be to guide the students in the task of learning how to self-evaluate their work in order to improve self-regulation. In other words, the use of self-assessment is not "just" a decision without further pedagogic implications. Teachers should be aware that teaching and fostering such a process involves training it in an explicit way, trying to warrant that students learn to evaluate themselves or, said in other words, trying to enhance the metacognitive processes of planning, monitoring and evaluation (Winne & Hadwin, 1998). It is important to share this conceptualization because teachers using self-assessment as an instructional strategy very often have doubts about their usefulness, and about the accuracy of student ratings (Noonan & Duncan, 2005; Panadero et al., 2013). How self-assessment can be used in an effective way is a point that will be dealt with later. How-

ever, what should not be forgotten, as Boud (1995a, p. 15) noted, is that "self-assessment" is a process by which students develop their learning skills. It is not just an assessment technique among others.

In short, when starting from a pedagogic view of self-assessment -the view underlying research on formative assessment (Black & Wiliam, 1998, 2009)- authors do not usually make explicit the internal process underlying self-assessment training. By contrast, when self-assessment is conceptualized as a self-regulatory process, as it happens in research on self-regulation (Puustinen & Pulkkinen, 2001), the authors focus on the internal process, and do not usually make explicit that it is an instructional resource that teachers can and should use and encourage, though there are a few exceptions (Paris & Paris, 2001).

Here we will describe the implications for teaching and learning to try to integrate both perspectives on self-assessment, as we consider that the use of self-assessment as an instructional strategy must pursue the improvement of self-assessment as a self-regulatory process. With this aim, we will explain first the nature of the self-assessment process and its relation with self-regulation, and second, the learning conditions in the classroom that promote the acquisition of this skill.

Self-assessment: what is it?

One of the classic definitions of "self-assessment" describes it as "*student activity through which it judges their own learning, specifically its achievements and its results*" (Boud & Falchikov, 1989, p. 529). Although it is a widespread definition, in this paper we use a definition with some innovative features that the first does not contain.

From our point of view, "*self-assessment is the qualitative assessment of the learning process, and of its final product, realized on the basis of pre-established criteria*" (Panadero, 2011, p. 78). In relation to these criteria, it is important to point out that self-assessment is moderated by the perfection level that the student wishes to achieve. Next we discuss the definition carefully, reflecting on the meaning of each element.

The first part of the definition established that self-assessment is a "qualitative assessment." This expression implies that self-assessment is not a mere quantitative assessment or "give a score to one-self." This latter practice was conceptualized as self-assessment for a

long time, though it should have been named "self-rating" (self-grading, self-evaluation or self-marking in English) (Andrade & Valtcheva, 2009). It is not a good teaching strategy, as it does not warrant reflection on the work done (Alonso-Tapia & Baker, 2010; Baker, Alonso-Tapia, & Huertas, 2012). In short, the qualitative assessment that refers to the definition does not focus on the score, but in the understanding of the proceedings by students it is possible to learn from mistakes and successes. Self-evaluation is therefore a reflective process based on pre-established criteria.

Another relevant aspect of the definition proposed in this study is that self-assessment is the evaluation "*of execution, that is, of the learning process and of the final product*." Why is this relevant? Many definitions consider that self-evaluation occurs only after the activity, when the student finishes the job and evaluates the final product. However, self-assessment also occurs during the learning process to the extent that the student monitors what he or she is doing, and compares it with procedural criteria (Greene & Azevedo, 2007; Winne & Hadwin, 1998). Moreover, appropriate self-assessment also influences the planning phase (Boud, 1995b), a fact by which it is recommended to make explicit the assessment criteria from the beginning of the activity (Andrade, 2010; Andrade & Valtcheva, 2009; Boekaerts & Corno, 2005). The reason for this recommendation is the clearer the goals, the better self-regulation of their own work (Boekaerts & Cascallar, 2006). Thus, self-assessment influences all stages of the self-regulatory process, influencing learning recursively during planning, execution and evaluation of it (Zimmerman & Moylan, 2009).

Another novel element of the definition is the inclusion of the "assessment criteria." These criteria are specific guidelines under which work will be assessed by both the teacher and the student (Goodrich, 1996). Criteria can be established in three ways. First, *externally* when the teacher sets the guidelines; second, it can be external in origin but may have been accepted internally, a fact that occurs when the professor discusses and negotiates guidelines with the students; and third, the guidelines can be internal in origin, as when the student reflects on the characteristics that the work requires and sets his or her own criteria. The greater the sense of autonomy in the choice of criteria, the greater the student's motivation to achieve them, as it happens with other goals (Deci & Ryan, 1985). Finally, these criteria are essential for self-regulation; they can more effectively lead the student in the selection of learning strategies as long as they clarify the objectives to achieve (Andrade & Valtcheva, 2009; Boekaerts & Corno, 2005).

However, there is much controversy surrounding the fact of making explicit these criteria. Research indicates that when a teacher makes them explicit learning improves (Andrade, 2010; Andrade & Valtcheva, 2009; Boekaerts & Corno, 2005). Nevertheless, many teachers do not want to make criteria explicit because they think it will reveal what they will ask, in other words "to tell the secret." To avoid this opposition, it is important to emphasize that what is recommended to make explicit is not the content on which the questions will be asked, but the criteria that will be used to assess the correctness of the answers. That is, it is recommended to explain the "rules of the game" to the students so that they know how their work will be assessed, as this knowledge will increase their perception of control. This in turn will develop greater interest in the task and foster self-regulation of its realization. In fact, pupils that have clear goals have more possibilities of adequately self-regulating their motivation and effort (Boekaerts & Cascallar, 2006; Boekaerts & Corno, 2005).

The last part of the definition refers to "*the level of perfection that the student wants to achieve*" in their work. The student sets targets based on the level of accomplishment he or she wants to achieve in a specific activity; the level may depend on the type of task – its nature, its importance, its difficulty or its ambiguity. For example, a student experiencing difficulties in mathematics will try to reach a level of performance only enough to pass the course. However, a student who wishes to obtain an outstanding grade will try to achieve an excellent level of performance. These levels of perfection will also influence self-assessment because students, even if their work can be improved, will be sufficiently satisfied when they achieve the performance level they established for the task.

Role of self-assessment in the self-regulation process

As is argued throughout this paper, self-assessment is a key process for self-regulation, as it is the act of reflecting on and becoming aware of the learning process and its outcome (Paris & Paris, 2001; Puustinen & Pulkkinen, 2001; Winne & Hadwin, 1998; Zimmerman & Moylan, 2009). This reflection on what has been done allows for repeating the process if it was done correctly, until one becomes an expert in its execution. However, if implementation has not been done correctly, self-assessment makes one aware of errors and opportunities to correct them. For this reason, self-assessment can improve future executions of the activity, and favors the transfer of adequate modes of realizing a learning activity to other situations (Boud, 1995a).

Different theories on self-regulation have revealed the relationship between self-regulation and self-assessment, and the empirical evidence supporting it. The following section examines this relationship and support.

Puustinen and Pulkkinen (2001) in their review of the five main theories of self-regulation concluded that all of them considered self-assessment as a key process. In another theoretical review, Zimmerman (2001) noted the same fact after analyzing seven theories, only two of which were included in the review of Puustinen and Pulkkinen. Likewise, if theories are analyzed independently – even those that were not included in the reviews – it was found that all of them support the important role that self-assessment plays in self-regulation (e.g. Belfiore & Hornyak, 1998; McCaslin & Hickey, 2001; McCombs, 2001; Paris & Paris, 2001). Paris and Paris state: "How can academic assessments of learning be infused with the same passion and autonomy? Self-assessment may be the key. Self-assessment includes all three domains of SRL: cognitive, motivational, and affective" (p. 95). Thus, from theories of self-regulation, self-assessment is conceptualized as a fundamental process. However, it is important to note that the self-assessment theorists also emphasize the role that this process plays in self-regulation (Andrade, 2010; Bannert, 2009; Boud, 1995c).

At the empirical level, there is evidence that shows the relationship between self-assessment and self-regulation. The students with high ability for self-regulating their learning, self-assess their work more efficiently and more often than students with low ability (Lan, 1998). In a similar way, the students with academic success monitor and evaluate their thinking more than those who are not successful (Biemiller & Meichenbaum, 1992). Moreover, there is also evidence showing that interventions based on teaching self-assessment strategies (monitoring and evaluation) improve self-regulation (Bannert, 2009; Dignath, Büttner, & Langfeldt, 2008; Kostons, van Gog, & Paas, 2009; Kramarski & Michalsky, 2009, 2010; Kramarski & Zeichner, 2001; Sitzmann & Ely, 2010; van den Boom, Paas, Merriënboer, & van Gog, 2004; Wirth, 2009). In addition, the interactive self-regulation model proposed by de la Fuente and colleagues (de la Fuente y Justicia, 2007; de la Fuente et al., 2012) also add empirical evidence about this relationship. Therefore, as learning to evaluate one's work has positive effects on self-regulation, teaching such process should be an instructional objective. However, in order to improve the success of teachers' interventions aimed at enhancing self-assessment and self-regulation, it is advisable to know in depth how self-

assessment functions in relation to the self-regulatory process, a point that is discussed in the next section.

When does self-assessment take place?

As already noted, when Zimmerman and Moylan (2009) conceptualized the process of self-regulation, they put self-assessment in the last phase, that of self-reflection. However, there are self-regulation theories that consider self-monitoring that occurs in the execution phase as paramount importance in self-assessment, as it is an essential part of it (Greene & Azevedo, 2007; Winne & Hadwin, 1998), an aspect that the authors of this paper subscribe in line with several authors whose work focuses on assessment and self-assessment (Kostons et al., 2009; Segers, Dochy, & Cascallar, 2003). Other authors go further, recommending that when teaching students to self-assess their work, they should be taught to self-assess it from the planning stage (Andrade & Valtcheva, 2009; Boekaerts & Corno, 2005; Boud, 1995b). The reason is that if students are taught to evaluate themselves from the planning phase, they can go on doing so while they monitor the implementation of the task, during the implementation phase of it. Self-monitoring can allow them to detect whether their performance is adequate or not, and modify their actions if the students detect that they are not effective for learning. At the same time, this process activates the students' motivation, as becoming aware of what is happening is experienced as progress, and this experience enhances interest in the task and the sense of personal efficacy, characteristics that favor learning. Below we will argue why self-assessment influences self-regulation and learning during the planning and the execution of the task.

How can adequate teaching of self-assessment influence the learning process from the planning phase? As already explained, to encourage self-evaluation it is recommended to provide students the assessment criteria at the beginning of the activity, because when such criteria are available the students can plan their actions strategically. (Andrade & Valtcheva, 2009; Boekaerts & Cascallar, 2006).

Why does self-assessment take place during the execution phase? Let us imagine a student who is monitoring his or her actions during the execution of a task. This student doubts whether the activity is being performed correctly. So, he or she checks the criteria that the teacher has given. Then, the student realizes that what he or she is doing is not correct and decides to modify the way he or she will proceed (see Table 1). What this student has done is

to self-assess his or her activity during the process of its execution, a fact that happens very often while a task is being realized and not just once it has been finished. In sum, students not only self-assess the final product of the learning process, but also the path they follow to achieve that product.

The fact that self-assessment can also occur during the learning process has important pedagogic implications. To improve the outcome of self-assessment, this process must not be limited to exclusively assessing the end product of learning, but also the process, as not doing so can lead to a wrong result, an outcome that implies that the student's effort has not been effective as the student has to repeat his or her work, a consequence that decreases motivation (Alonso-Tapia, 2005).

Table 1. Process and product Self-assessment example

Actions, thoughts and emotions	Self-regulatory actions
Planning phase. Guillermo is a good student from 4º ESO (compulsory secondary education) that has to write a composition for his Spanish language course.	**Goals**: Remind the goals and reading the assessment criteria.
When he first approaches the task, the first thing he does is to remind the composition goals given by the teacher and read the paper she handed out in which the assessment criteria are given. Using them, Guillermo know what aspects the teacher considers crucial for a good writing stile. As an example, one of those criteria is that the composition has to have an introduction, a central part and a conclusion.	
As the composition is long –at least three pages-, Guillermo plans the time he will use: he will devote one hour to structure the composition and to write down the first page, then he will rest for 15 minutes and, in the last half hour he will finish the two last pages. He knows that the biggest effort will come when starting the story and structuring because he has previously control the time when writing compositions.	**Planning**: Plan the task and the time to have control over the performance.
Guillermo feels capable to perform the task without problems as he has done it previously with success. He says to himself: "This is not difficult, I can do it". He thinks that with effort and a good planning he will do it. This positive efficacious feeling comes from the accumulated experience as performing similar activities he has always been satisfied with the final outcome. On top of that this particular task is interesting to him as he has to write about his vacations and, for this reason, he will activate more learning strategies.	**Expectations of success**: Giving self-messages that exteriority and reinforce the success expectations.
After setting clear goals, having planned the task, being interested in it and feeling capable, he starts performing.	

Performance phase. During the task, Guillermo remembers the vacations to choose what to write about. He pays special attention to the punctuation as he has been committing mistakes lately. He also keeps reminding the goals to achieve a final product in line with what was asked for.	**Performance**: Remembering the vacations to produce content for the composition. Examining the punctuation implies supervising the task. Both are regulation of work.
After half an hour his older brother asked him if he wants to play to the computer. Guillermo feels very tempted but he says to himself that once he is done he will be able to play peacefully. His brother leaves the room but Guillermo still have the idea on his head. To stop it from bothering him he imagines himself playing after finishing the task. This way he is able to be back to the task and concentrate again.	**Self-control**: Telling to himself that he will be able to play once he is done, and imagining himself playing are strategies that allow him to regulate his concentration.
There is a moment in which he stops to think if he has done an appropriate introduction for his composition. He goes to check the criteria given by the teacher and he reads that he should have presented the topic and the roles in it. That moment he realizes that he hasn't yet introduced his family members with whom he did the trip, so he re-writes the introduction so they are adjusted to the goals.	**Process self-assessment**: Checking if he is performing accordingly to what it is supposed. This is an example of self-assessment occurring during the task before the final product is achieved.
Self-reflection phase. Once he is done with the task, Guillermo reviews the final product. For that purpose he remember the criteria given by the teacher and checks that he has reached the standards, concluding he has done a good job. If it was up to him his score would be high. He feels satisfied and hopes the teacher agrees.	**Product self-assessment**: Comparing what is being done against the assessment criteria but, in this occasion, after the task is done.
Two days later Guillermo is given back his scored composition by the teacher with a good grade. He attributed this to his work and effort.	

In summary, self-assessment is an essential process for self-regulating learning as it implies becoming aware of the objectives of the task and monitoring of student's progress with respect to them. However, if self-assessment is really important for learning, how is this ability acquired? The reason for this question is that if you understand how it is acquired, it will be possible to propose ways of developing it effectively.

How is self-assessment acquired?

The acquisition of self-regulatory skills requires effort from the students for a longer time when the competence to perform is more complex (some academic competences are: learning to summarize, to design a conceptual map, to orally present a piece of work, etc.). Indeed, self-assessing different tasks is a complex ability, and therefore crucial that the teacher helps students to acquire it (Boud, 1995c; Brown & Harris, 2013; Dochy, Segers, & Sluijsmans, 1999; Griffee, 1995). However, help from the teacher is not always adequate, as shown in the next example.

> *Let's imagine a student calculating a division for her first time. She calculates the divi-sion following the steps indicated by her teacher. When she reaches the solution, she hands her work to the teacher to get it corrected. The teacher corrects the di-vision and gives it back to the student while saying that she has done it wrong and telling her the correct answer without further explanation. This way, the student does not internalize the criteria that would have allowed her to self-assess her work, which makes her dependent on the teacher assessment to assess the quality of her work and how to act in the future.*

If we are to help students to acquire self-assessment skills, it is better to act as in the next example.

> *In another occasion, the student finishes the exercise and asks the teacher to correct it. Then, the teacher hands out a document with an example of the exercise done step-by-step, so that the student can compare her own exercise with it to decide if she needs to change anything. The student then compares her performance to the model, detects a mistake in a step, and modifies the exercise to reach the correct answer.*

In this occasion the teacher has trained the student to self-assess her own work, comparing her performance against the model, correcting her mistakes. Consequently, if this ability is practiced in the classroom, this student will become use to self-assessing her work, and will become more autonomous.

Unfortunately, not all students are able to self-assess their work in this way. Therefore, teachers should explicitly teach students to self-assess so that all students have opportunities to learn.

The importance of teaching and promoting self-assessment is based on its value for the development of self-regulation. Students will need both skills when, in the latter academic years, task difficulty increases (Dignath et al., 2008). So, to ensure that this increase in task difficulty is not too steep for students, teachers need to help develop their self-assessment skills from the early academic years (Dochy et al., 1999; Griffee, 1995).

In order to achive a better understanding of how to promote self-assessment and self-regulation, it is necessary to know the conditions that favor its acquisition. Even though there are no specific studies on the acquisition of self-assessment skill, there are studies about how self-regulation – of which self-assessment is a basic process – is acquired. The main idea behind the acquisition theories of both skills is that students need to be directly instructed, to observe models, and experience in order to learn how to self-assess and self-regulate their work. That is, students can learn to self-assess their work through direct instruction from their teachers' explanations, through observation of persons self-assessing their work, or through emulation, practice, group activities, etc. The goal of the interventions should be to convey to students a self-assessment model that they can apply.

In the light of the above reasons, the following question arises: how can we help students self-assess their work on a regular basis? In the next section we examine the conditions needed to promote the use of self-assessment.

Conditions that promote self-assessment

Though even very young students are capable to self-assess their work, they don't always do so, perhaps because one or more of the necessary conditions are not provided in their learning environments (Andrade & Valtcheva, 2009). In relation to such *conditions* it is possible to distinguish between *conditions in the strict sense* – actions that if do not occur obstruct self-assessment – and *instructional aids* that the teacher can provide to the students to teach them how to self-evaluate their work and to encourage the use of self-assessment (Goodrich, 1996). The *conditions* necessary for self-assessment are:

a) *Awareness of the value of self-assessment*. Unless students are aware of the usefulness of self-assessment, they will not self-assess their work, as it requires effort from them. For this reason, it is important that they understand that self-assessment is a crucial ability for learning.

b) *Access to the criteria on which assessment is based*. Students should know these criteria because it should be used to self-assess their work. It is recommended that students have access to these criteria from the beginning of the task, as it has been explained throughout this article (Andrade & Valtcheva, 2009).

c) *The task to be assessed needs to be specific*. If the task is too broad or it is not well defined, it can be complicated to self-assess its realization. For this reason, it is rec-

ommended that the teachers, having this fact in mind, try to choose tasks that are well defined and with steps clearly established, at least the first time they try to teach their students to self-assess their work.

As for the *instructional aids* that have been used to promote self-assessment and aim is to provide the above-mentioned conditions, they are the following:

1) *Self-assessment modeling*. As students learn many times through watching an expert, it is recommended that they watch a model (e.g., their teacher or an expert peer in the competence being learned) thinking aloud while self-assessing the realization of a task. As an example, this type of modeling (thinking aloud) is especially effective if it is first performed by the model, and then the students are asked to repeat it, saying aloud the steps they are following and the logic behind them. In this manner, the teacher can detect and correct mistakes during execution.

2) *Direct instruction and assistance for self-assessment*. It is necessary that students receive instructions until they understand the procedure and they are capable of being autonomous. This is especially the case if the task of self-assessment is new to them, as in this case they would not know the assessment criteria and how to apply them. Nevertheless, they also need feedback about their own self-assessment, so that they can know whether they are doing it appropriately and, if necessary, what aspects should be improved (Dochy et al., 1999; Griffee, 1995). To carry out adequate instruction in self-assessment, it is therefore crucial that teachers know how to teach it.

3) *Cues that help to know when it is appropriate to self-assess*. It is necessary to give students instructions about when to self-assess. Again, teacher modeling is helpful so students can visualize when to do it.

4) *Practice*. The fact of observing how one can self-assess one's own work is not enough to learn how to do it. It is necessary that the teacher provides opportunities to learn how to self-assess because, as it happens with other competences, practice improves this skill. Unfortunately, teachers frequently become discouraged after their first attempts to achieve this goal. However, it is important to note that self-evaluation of the way one is doing a task, for example, summarizing a text, is a complex learning activity, as it is necessary not only to internalize strategies as removing the trivial, using

superordinate categories, using expressions that include several ideas, selecting the main idea, but also to learn how to apply them, and these acquisitions are not learned all at once. Moreover, it should be noted that self-regulation is not an activity that occurs in a vacuum. The criteria from which to evaluate one's own work vary depending on the tasks, and so it is not easy to transfer what you know when changing to another task. Consequently, it is necessary that teachers keep track of the fact that learning to self-assess and to self-regulate one's work in the context of specific tasks requires: a) to train these processes in the context of different tasks, e.g., reading, writing, problem solving, etc., and b) time.

5) *Opportunities to review and improve the process of realizing a task as well as the final performance*. An aid to enhance self-assessment is allowing students to return their work if, while self-assessing it, they detect mistakes. If they are not allowed to do it self-assessment loses part of its value, as its goals are allowing the detection and corrections of mistakes, and improving performance. And if self-assessment loses its value, then the students' motivation for self-assessment decreases, as they feel powerless after detecting mistakes and not being allowed to correct them (Pardo & Alonso-Tapia, 1990).

In summary, there are a number of pedagogic aspects that influence the presence or absence of self-assessment and how students do it. The variety of aspects mentioned might cause someone to think that teaching students to self-assess their own work is a difficult task, which is not true (Deakin-Crick, Sebba, Harlen, Guoxing, & Lawson, 2005). In fact, some of the pedagogic strategies previously listed, modeling, practice, giving cues and direct instructions, are usual praxis in many classrooms (Andrade & Valtcheva, 2009).

One of the key features for successful implementation of self-assessment in the classroom is giving the assessment criteria, as previously stated. These criteria have been given to students by teachers in different forms especially for the last fifteen years. Several reviews of the specific ways in which self-assessment has been implemented have been realized, (Brown & Harris, 2013), and empirical evidence according to the same taxonomy used in this review has been gathered (Alonso-Tapia & Panadero, 2010; Panadero, 2011; Panadero et al., 2012; Panadero, Alonso-Tapia, & Huertas, 2013; Panadero, Alonso-Tapia, & Reche, 2013). Next

we present the different pedagogic options in the implementation of self-assessment that have been used.

Instructional help for self-assessment

According to a review of the literature there are three types of instructional help to promote self-assessment depending on the presence or absence of assessment criteria, and in this case, on how these criteria are presented (Alonso-Tapia & Panadero, 2010; Panadero, 2011).

Self-grading or self-assessment without specified assessment criteria

This approach consists of students assessing or grading their performance at the end a task without being given the assessment criteria. Historically self-assessment was considered the same as self-grading – scoring one's own work – an idea currently called into question (Andrade & Valtcheva, 2009; Boud, 1995a). Just asking the students to score their work does not guarantee that they will take into account the assessment criteria and therefore, does not guarantee that learning or self-regulation will take place either. Actually, the empirical evidence available notes that when the students do not know the assessment criteria (because they have not been made explicit) self-grading accuracy is low (Tan, 2012).

Self-assessment using rubrics

A rubric is an assessment and scoring tool that contains the assessment criteria. It consists of three parts: the assessment criteria, a scale for self-grading the different quality levels, and a short description indicating the quality level standards (Table 2 shows a rubric example). The rubric is a useful tool, as it explicitly states the assessment criteria, which helps students to visualize them from expert models and to evaluate the work using quality level standards, depending on the rubric design quality (Goodrich Andrade, 2011; Panadero, 2011). The use of rubrics is growing in European countries and it is a tool with a high penetration of use in the US.

Table 2. **Rubric to self-assess a conceptual map design.**

Assessment criteria \ Score	4	3	2	1
Concepts	All the important and secondary concepts are included	Contains the important and some secondary concepts but not all	The important concepts are included but not the secondary ones	Some key concepts are lacking
Hierarchy	The organization is complete and correct and the map transmit it	The organization is correct but incomplete: some levels or elements are lacking	The organization is complete but incorrect: there are concepts in the wrong places	The organization is incomplete and incorrect
Relationships among concepts in different hierarchical levels	RELATIONSHIPS They are correct making connections among the correct concepts LINKS Explicit and help to better understand the relationships among concepts	RELATIONSHIPS They are correct but incomplete: some connections are lacking LINKS Incomplete: Only some are explicit but they are correct	RELATIONSHIPS Some are incorrect making connections among concepts that do not have any relationship LINKS Only some are explicit but some are incorrect	RELATIONSHIPS The majority are incorrect or there are only a few LINKS Incomplete and incorrect
Relationships among concepts from different columns	There are several connections making relevant relationships	There is only one	None	None
Simplicity and easiness of understanding	Its design is simple and easily understandable. There are examples.	Some relationships are difficult to understand. Contains a few examples.	There is an excessive number of connections There are no examples.	Neither the relationships nor the hierarchy are understandable. There are no examples.

Self-assessment through the use of scripts

Self-assessment scripts are a set of questions organized systematically that focus on the process to perform a specific task (Table 3 shows a script example).

Table 3. **Self-assessment script for conceptual maps.**

1. Is it clear what should be included in the conceptual map?
2. Based on the previous questions, have I identified sufficient concepts to collect all the ideas from the original text?
3. Have I ordered the concept using a hierarchy having the most global ones at the beginning of the list?
4. Have I reviewed the list to add more concepts if needed?
5. Have I started to design the map with the most global concepts in the upper part?
6. Have I entered 3 or 4 sub-concepts under the most global ones? (Keep in mind that if you have more than 6 concepts under the same hierarchal level it might be possible to enter a new hierarchal level (though this is not always possible as, for example, there 8 insect types).
7. Have I linked the concepts using nexus –words that add information to the links for the relationship with more importance-?
8. Have I used links making relationship among different columns of the hierarchy?
9. Have I put some examples under the concepts so that they were easier to visualize?
10. Have I reviewed the conceptual maps once finished keeping in mind…
    …that there are different ways to organize the concepts?
    …what was the purpose and the information I had?

The purpose of scripts is to promote reflection on the adequacy of the process that is being followed, and on the partial results that are being obtained during the performance of the task. It has been found that in some cases the efficacy of scripts as self-assessment tools is even greater than that of rubrics (Panadero, Alonso-Tapia, & Huertas, 2012). Scripts and similar tools (as prompts and cues) also allow self-assessing one's work once the task has been performed but, if only used at that time, they lose part of their potential as students would have to redo their work if they detect a mistake only when they have finished the task (Bannert, 2009; Thillmann, Kunsting, Wirth, & Leutner, 2009).

In sum, rubrics and self-assessment scripts are efficient ways of promoting self-assessment, as they provide a basis to know how to do it, which does not occur when students are simply told to self-assess. Both tools, rubrics and scripts, contain the assessment criteria, a crucial aspect necessary to have a direct impact on the way students self-assess their work. The use of one or the other will depend on the teacher's pedagogic purpose and he or she will

have to choose which one is more adequate for the competence to be developed (for more information see Panadero, 2011).

Conclusions

The aim of this article was to clarify the complexity of the self-assessment process, and to provide guidance to facilitate the work of teachers to promote its use. With this purpose, three tasks have been carried out, each of which represents a specific contribution.

In the first place, a review of different theoretical perspectives on self-assessment has been realized. This review has highlighted that the self-assessment process involves self-monitoring own work using the available criteria to assess its adequacy and, if necessary, to modify it. It is, then, an integral part of the self-regulation process that facilitates learning and experiencing one's progress, an experience that enhances motivation to learn. In fact, one of the main ideas we wanted to convey was that there is an important relationship between self-assessment and self-regulation. Though self-assessment is by itself a process that promotes learning when correctly implemented (Brown & Harris, 2013), if it is also considered how important self-assessment is for self-regulation and the activation of learning strategies, then the importance of self-assessment increases, especially considering compelling research about the positive educational effects of promoting self-regulation (e.g., Dignath et al., 2008; Paris & Paris, 2011).

In the second place, it has been shown that, self-assessment is important for learning and according to research it is common practice in the classroom. However, many students do not self-assess their work spontaneously nor properly, either because they do not know how to do it due to a lack of specific criteria to be taken into account, or because they do not see the value of spending effort to make such an assessment. It is, therefore, necessary for teachers to explicitly teach students to self-assess their work. However, a high percentage of teachers do not recognize what self-assessment is useful for – and therefore, how important is it – and how to implement practices that foster it. For this reason in this study, in addition to exposing the nature and relevance of self-assessment for students' learning and strategy use, we have exposed and illustrated some procedures that can be used either for teaching self-assessment (e.g., direct instruction, modeling, etc.), or for motivating its use and facilitating its implementation (i.e., mainly rubrics and scripts). The teacher must adapt these procedures to the type of task (e.g., reading, writing, problem solving, conducting experiments, etc.) as self-assessment

and self-regulation do not occur in a vacuum, but in the context of specific tasks whose adequate realization responds to different criteria.

Finally, the conditions that enhance the effectiveness of teaching self-assessment have also been reviewed. First, it is advisable to allow students to modify their work if they become aware of errors while self-assessing their work, as giving them this opportunity helps them to see the usefulness of self-assessment, and this experience will enhance their motivation to self-assess their work in the future. And second, it is necessary to give students opportunities to practice self-assessment if they are to develop this capacity in the context of different tasks.

In short, self-assessment is a crucial competence for student development, a skill that can be fostered in the classroom following pedagogical criteria, and also very important, the ease of implementation, as demonstrated by previous experiences (e.g., Brown & Harris, 2013).

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