DEVELOPMENT OF A NEW METACOGNITIVE SELF-REGULATED MODEL OF COMPETENCY

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Abstract

Since 2017, the University of Aix-Marseille (AMU) has engaged in a pedagogical transformation towards a Competency-Based Approach (CBA). Nevertheless, the evaluation of competencies is not yet operational. The transition to a CBA implies a pedagogical paradigm shift: what is evaluated here is not only students' performance (the result of their activity) but also their ability to achieve this result (the mental processes that lead to performance). In order to make CBA operational, it is essential to go beyond traditional evaluation systems since these systems focus almost exclusively on the productive character of competence (performance). Indeed, some conceptions of CBA are still influenced by an empiricist and behaviourist approach and tend to reduce competence to its observable manifestations, leaving aside its constructive character. The difficulty of creating new tools to assess competencies lies in the lack of socio-constructivist models that give their rights due to the learner's cognitive activity and social acceptability. The present model aims to anchor CBA in the Self-Regulated Learning (SRL) theories and, more specifically, to define competency through the metacognitive approach. Metacognitive analysis, judgments, and controls are necessary for students to plan and regulate their activity according to what is asked of them in a specific situation. To be competent, students must be performative and consciously explain the mental processes that lead them to acceptable performance. Also, for a student to be competent, a third party must validate their knowledge and abilities. Competence is certificative. Competency is a conscious mental ability that translates into socially acceptable behaviour. This model aims to present competence through a fuller scope, including its productive, constructive, and social characteristics. The practical use of this model would allow for the implementation of new and more robust competency assessment tools.

Keywords: *College assessment, competency, metacognition, models (theoretical), self-regulated learning.*

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1. Introduction

By 2024, French Universities must transition to CBA to meet governmental standards. Each university department has to establish a competency-based structure program as a first step and then implement new assessment methods ensuring competency evaluation beyond knowledge checking. Nevertheless, other than the use of portfolios, there are few guidelines on how to assess competencies. Portfolios are great assessment tools because they focus not only on students' performance but also on the mental process that leads them to their final activity (Tardif, 2017; Coulet, 2011; Poumay & Georges, 2017). However, to properly use portfolios, there needs to be pedagogical alignment (teachers have a clear understanding of the specific goals and objectives of the program as a whole, not only for a specific course), plus students' reflexive activity needs to be supported (Buckley et al., 2012). In other words, to progress in the CBA, assessment needs to evolve into portfolios but to use portfolios, the CBA needs to be well advanced. Teachers are expected to make profound changes in their evaluations, but few options are given to them. This paper proposes to present a new take on the assessment of competencies by presenting a model of competency development based on the theories of Self-Regulated Learning (SRL) and metacognition. Embedding the competency notion into a fuller theoretical framework could lead to creating and implementing new assessment tools.

2. Competency and the socio-constructivist framework

Competency may be understood as "a complex know-act based on the effective mobilization and combination of a variety of internal and external resources within a family of situations" (Tardif, Fortier, & Préfontaine, 2006, p.22). Several french-speaking researchers base their definition of competency on Tardif's work, and even though they might differ, they usually maintain his 3-components-structure: Competency has constructive and productive characteristics, and it is always situated. Competency is constructive in the sense that it is combinatorial by nature; it integrates resources of different kinds (e.g., psychological, contextual). Students must follow a cognitive process to achieve (construct) a specific action by combining different resources. Competency is also productive because it supposes a finalised action, it leads to a result. The productive character of competency is its observable manifestation, also known as performance. Finally, competency takes place in a specific and real context. It is always situated. (Boutin, 2004; Chauvigné & Coulet, 2010; Coulet, 2011; Crahay, 2006; Goudreau & Boyer, 2017; Jonnaert, 2009; Tardif, 2017).

Mottier-Lopez (2017) adds another important component to this structure: competency can only be inferred. Competency is certificative, to be valid, it needs to be socially assessed by experts (e.g., teachers). Usually, teachers infer competency (so assess it) by its productive character, performance. To be competent, students need to perform well, but even chance could explain good performance in a given context (Rey, 2012). Competency is the person's ability to find solutions to complex problems in a specific context, whereas performance is the solution itself (Boutin, 2004; Chauvigné & Coulet, 2010; Coulet, 2011; Crahay, 2006; Jonnaert, 2009; Kahn & Rey, 2017; Tardif, 2017). When assessing competency, its constructive character is often put aside, which leads to undermining the complexity of the notion. A clue to understanding this paradox could be that competency is not embedded in a theoretical framework emphasising its double dynamic (Coulet, 2011; Crahay, 2006; Jonnaert, 2009). There is a gap between theory and practice: researchers have a rather socio-constructivist definition (e.g., taking into account the relationship between the learner and the environment, seeing competency as dynamic and situated), but what is actually assessed remains within a behaviourist framework, what is taken into account is the productive aspect, performance.

3. Self-Regulated Learning (SRL) and metacognition

To overcome this conceptual lack, the present proposition is to anchor the notion of competency in the robust theoretical framework of SRL. SRL refers to people's cognitive and metacognitive activity of altering process-information strategies that conduct to learning outcomes in terms of knowledge, understanding, and competency (Dignath & Büttner, 2008; Panadero, 2017). SRL pedagogical interventions have the particularity of focusing on both learning development processes and learning outcomes. In this sense, one may argue that CBA is a type of intervention that falls within the SRL framework. In fact, competency development is a learning process that largely requires self-regulation (Boutin, 2004; Chauvigné & Coulet, 2010; Coulet, 2011; Goudreau & Boyer, 2017; Tardif, 2017).

In their meta-analysis, Dignath and Büttner (2008) studied the effect of pedagogical interventions promoting SRL in primary and secondary schools. Results show that older students benefit better from prioritizing the metacognitive aspects of learning. Indeed, high cognitive demanding tasks require the use of more specific self-regulation strategies to achieve acceptable performance. Thus, basing SRL pedagogical interventions in metacognitive models is recommended (Panadero, 2017).

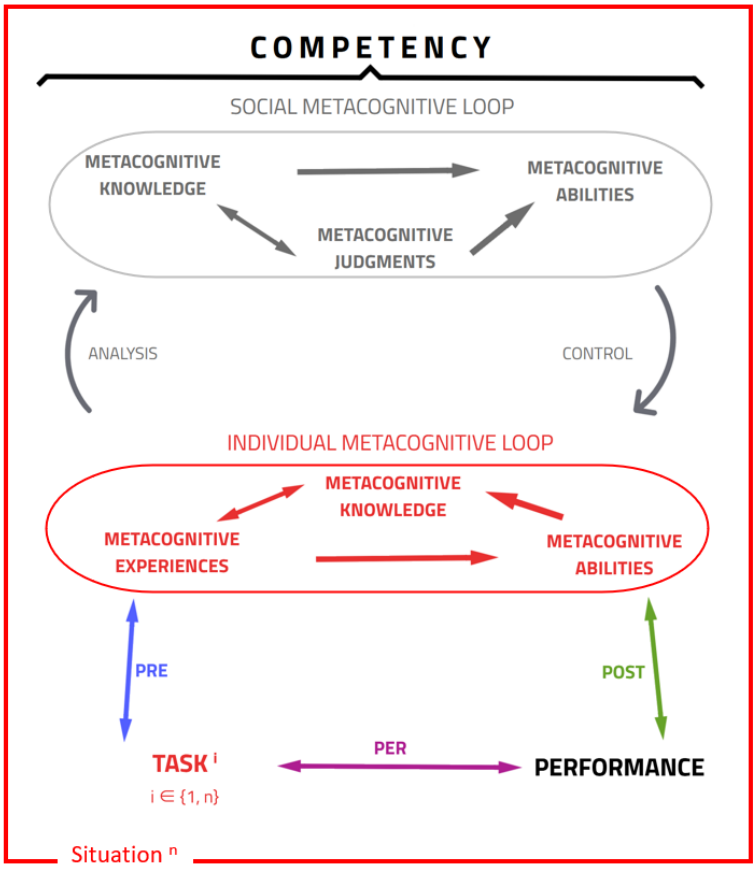
Metacognition may be described as monitoring and controlling activities that a person has over their cognition (Efklides, 2008; Quiles, 2014). Metacognitive activity echoes competency's constructive characteristic: the cognitive processes leading to action. Even so, in the metacognitive theory, the difference and the link between the cognitive processes and performance (competency's productive characteristic) is well understood. E.g., Leclercq and Poumay (2004) define metacognition as "the conscious or unconscious judgments, analyses, and regulations (but which must be made explicit, observable and conscious) made by the apprentice on their own performances (processes or products), in situations of PRE, PER or POST performance".

Based on these associations, the present proposition is to anchor the notion of competency on the SRL metacognitive theoretical framework. Whereas CBA lacks a detailed analysis of the processes organising the mobilisation and the regulation of the activity it deploys, both metacognition and SRL have been vastly modelled. The creation of the metacognitive self-regulated model of competency (MSRMC) is an attempt to root competency into a broader scope.

4. Metacognitive self-regulated model of competency (MSRMC)

In our model, we understand competency as the conscious ability to self-regulate one's activity according to a specific context and leading to effective performance.

Figure 1. The metacognitive self-regulated model of competency.



The red rectangle represents situation *n* (*n* meaning it could be an infinite number of situations). Competency is not only being able to complete task *i* at time *t* in a situation *n* but rather people's capacity to identify the situation and interpret it correctly. By identifying the situation, they can choose and implement the knowledge and abilities at their disposal, needed to successfully achieve their activity (Coulet, 2010, 2011; Kahn & Rey, 2017; Masciotra et al., 2004). Here, we define the capacity to situate oneself as a metacognitive self-regulatory activity in accordance with the demanded tasks and performance. As competency is contextual and socially constructed, both the Individual Metacognitive Loop (IML) and the Social Metacognitive Loop (SML) give place to metacognitive activity through iterative monitoring and regulation (Efklides, 2008).

While there is an ongoing discussion on the degree of consciousness involved in the IML and its components (Efklides, 2008; Quiles, 2014), competency is intrinsically conscious (Masciotra, 2005; Rey, 2012) in the sense that it must be socially certified (Coulet, 2011; Goudreau & Boyer, 2017; Tardif, 2017; Tardif & Dubois, 2013). E.g., when using a portfolio, a competent person must be able to explain to their evaluators the mental process that led them to their final action in order to guarantee that their performance is coherent with the prescribed task (and not only for a specific task but for all the tasks *i* that can be included in the same situation *n*) (Buckley et al., 2012; Tardif & Dubois, 2013). Based on the IML, competency can be analysed. The analysis is the learner's conscious explanation and justification of the quality of their activity, including performance and the cognitive processes that led them to it (Leclercq & Poumay, 2004). The evaluator must take into account the learner's analysis (constructive characteristic of competency) plus the actual result of their activity (productive characteristic of competency) to define the level of development the learner has achieved and thus certify competency (Coulet, 2011; Tardif, 2017; Tardif & Dubois, 2013).

A person's analysis becomes a shared space between individuals (arrow from IML to SML), e.g., a student and their peers during the learning phase or a student and their teacher during an assessment. The conscious exchange between different people leads to the deliberate control of individual cognition and, consequently, controlling their productive activity (arrow from SML to IML). In other words, the results of the SML become meta-metacognitive information that each person has to consider to activate their IML and lead to acceptable performance (Efklides, 2008).

The SML comprises three components: Metacognitive Knowledge (MK), Metacognitive Judgments (MJ), and metacognitive Abilities (MA). MK refers to individuals' representations of the situation (contextual knowledge including the task demands) and themselves (knowledge and abilities they have at their disposal to complete the prescribed task). MJ are a shared assessment made by both parties regarding the degree of quality they attribute to the individual activity being analysed. MJ are made between both actors based on their individual MK (double arrow from MK to MJ). According to the result of the MJ, both actors activate their individual MA to regulate (initiate, stop or modify) the use of cognitive strategies (memory strategies, attentional focus, reasoning, planning, evaluation, etc.) to deliberately control their cognition (arrow from MJ to MA) (Efklides, 2008; Leclercq & Poumay, 2004; Masciotra et al., 2004; Panadero, 2017; Quiles, 2014). E.g., during the assessment, students will share the analysis of their own competency with their teacher. Together, they will make a MJ on the students' competency and, from the results of this explicit and conscious judgment and their individual MK, they will activate their MA to control their activity (arrow from MK to MA) through their IML.

The IML's role is to allow people to situate themselves according to context and act coherently. The IML and the task are in red because they are both necessary for self-regulation in accordance with the situation (also in red). E.g., learners must differentiate between what is expected of them and what they are actually able to do. In a learning and evaluation situation, they must recognise the prescribed task(s) by the teacher and, through metacognition, carry out the said task(s) to achieve acceptable performance. Performance is the concrete result of the activity, a finalised action measured by the prescribed task (Chauvigné & Coulet, 2010; Coulet, 2011; Efklides, 2008; Tricot, 2017).

To situate themselves through the IML, students use Metacognitive Experiences (ME), MK, and MA. MK is being continuously updated by integrating information from ME and MA (arrows from ME and MA to MK). ME reflects the ongoing cognitive and metacognitive process that individuals undertake to monitor their activity while performing a task (awareness of the state of cognitive processing and the production of possible conflicts or errors). The ME is an evaluation of the degree of accuracy and/or degree of satisfaction that the learner attributes to their ongoing activity. First, individuals understand their activity through MK, and then they evaluate their performance (or future performance) according to the prescribed task (arrow from MK to ME). Based on the results of the ME, students use their MA to regulate the use of cognitive strategies to regulate their cognition and achieve adequate performance (arrow from ME to MA) (Efklides, 2008; Leclercq & Poumay, 2004; Masciotra et al., 2004; Panadero, 2017; Quiles, 2014). The difference between ME and MJ from the MSL is that MJ are necessarily conscious because they are a shared judgment between two people. In contrast, individuals are not imperatively aware of their ME.

As for the relationship between the SRL process and productive activity, metacognition is a function of performance. First, the IML is used to situate the task before passing into action (PRE performance), regulation and control regard only the prescribed task (double arrow from IML to Task). Then it is used while performing (PER), regulation and control regard the relation between the prescribed task and ongoing performance (double arrow from Task to Performance). Finally, the IML is used after the action is completed in a tangible result, regulation and control regard the finalised performance (POST) (double arrow from Performance to IML) (Efklides, 2008; Leclercq & Poumay, 2004).

To sum up, competency supposes not only good performance (successful handling of the demanded task(s) through metacognition) but also a conscious and socially acceptable understanding of the self-regulatory process allowing for it (Jonnaert, 2009; Tardif, 2017).

5. Future research

The MSRMC aims to be a theoretical backbone to the development of competency assessment tools. To this day, there is an ongoing experiment at AMU where teachers and students are testing a new tool called "Reflexive questions". Students must answer metacognitive questions (including MK, ME, and MA items) at the class's beginning, middle, and end (PRE, PER, POST performance). Answering these questions has a double aim: supporting students' reflexive activity and offering teachers a new tool to assess competency that can be complementary to the evaluation of performance.

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