International Electronic Journal of Elementary Education
Vol. 2, Issue 1, October, 2009.

Introduction: Metacognition, more than the lognes monster?

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Metacognition is one of the promising contemporary research fields in psychology and education. The concept has been introduced to describe and explain how people gain control over their learning and thinking, particularly in the case of cognitive failures and difficulties they meet when dealing with information processing and problem solving (Efklides & Sideridis, 2009; Flavell, 1976). However, although every one agrees that there has to be something as 'metacognition' (like the lognes monster?), no one agrees as to what exactly metacognition is about. In addition researchers currently use different concepts for overlapping phenomena (Desoete, 2007; 2008; Desoete & Roeyers, 2006; Desoete & Veenman, 2006). Is self-regulation the same as metacognitive skills? How does calibration fit in?

Before looking at these questions, a brief description of the **conceptual model** and the facets of metacognition will be made in order to highlight the complexity of notion of metacognition and its relations with cognition. Metacognition has been described as having three facets, namely metacognitive knowledge, metacognitive experiences and metacognitive skills (Efklides, 2001, 2008; Flavell, 1979). 'Metacognitive knowledge' has been described as the knowledge and deeper understanding of cognitive processes and products (Flavell, 1976). According to Efklides (2008) ***metacognitive knowledge*** is declarative knowledge stored in the memory. It encompasses information about people (including one's self), as well as information about tasks, strategies, and goals. In addition, ***metacognitive***

ISSN:1307-9298

www.iejee.com

experiences are what the person is aware of and what she or he feels when coming across a task and processing the information related to it (Efklides, 2008). They take the form of metacognitive feelings, metacognitive judgments/estimates, and online task-specific knowledge. Metacognitive feelings have an affective and cognitive character. The affective character of metacognitive experiences can be explained by two feedback loops. The first one is related to the outcome of cognitive processing and detects the discrepancy from the goal set. Error detection (as discrepancy from the goal) and feeling of difficulty (as lack of processing fluency) are associated with negative affect (Efklides, 2006). Metacognitive judgments/estimates include judgment of learning, estimate of effort expenditure, estimate of time needed or spent, but also estimate of solution correctness. When people are asked to make a judgment about their confidence there are two sources of information on which they rely, according to Efklides (2008), namely their estimate of solution/response correctness (as discrepancy of the response to the goals) and their feeling of difficulty (as cue that the response might not be correct). Metacognitive experiences, in essence, make the person aware of his or her cognition and trigger control processes that serve the pursued goal of the self-regulation process (Efklides, 2008; Koriat, 2007). However, the person can feel highly confident, even if the outcome of cognitive processing is not correct, just because the solution was produced fluently, thus endangering appropriate control decisions. This is particularly true for persons who are not aware of their ignorance (Efklides, 2008; Kruger & Dunning, 1999). Finally ***metacognitive skills*** refer to the voluntary control people have over their own cognitive processes (Brown, 1980; Efklides, 2008).

There are different methods of **assessing** metacognition (Desoete, 2008; 2009). Self-report questionnaires are frequently used to assess metacognitive knowledge and self-ratings are usual measures for metacognitive experiences (Efklides, 2008). In addition to the self-report measures, think-aloud protocols or systematic observation of behaviour can take place to measure metacognitive skills (Veenman & Elshout, 1999). Recently often multi-method techniques are being used. These techniques combine measurements of metacognitive experiences and/or knowledge (e.g., Dermitzaki & Efklides, 2003). For example, students are asked, before and after the processing of a task, to assess the difficulty they experience, the correctness of the solution (conceived or produced), the effort required, and to make subjective estimations about the use of problem-solving strategies. In addition, in calibration studies a comparison is made of whether the prediction before the tasks or the evaluation after a task corresponds with the actual performance on the task. Calibration studies are therefore most closely related to the assessment of metacognitive experiences and refer to the reliability of metacognitive experiences.

Finally, several studies point to the fact that metacognition can be **trained** (e.g., Desoete, Roeyers, & De Clercq, 2003), but needs to be taught

explicitly in order to develop. However, additional research is needed on how metacognitive training can promote mathematical problem solving, reading comprehension, spelling skills etc.

To conclude, several problems still remain unresolved in the conceptualisation, assessment and training of metacognition. On the one hand, there seem to be various facets of metacognition to be assessed with different techniques. On the other hand, from mathematical problem-solving research, we know that how we test influences what we find (Desoete, 2008). The present special issue of IEJEE aims to devote additional insight in the conceptualisation, assessment and training of metacognition, since metacognition deserves attention by more researchers, educators, trainers, coaches and therapists. We are aim to create a channel for dissemination of research based knowledge and to communicate what we know with each other as researchers and with the practitioners within the fields of teaching, training, coaching and treatment.

We are delighted to have such distinguished members of the field as contributors for the special issue of *International Electronic Journal of Elementary Education* on metacognition. We are thankful to the researchers for their insights and efforts. Contributors to this special issue addressed a range of themes about metacognition: conceptual models, training programs, assessment, relationship issues, and problems and prospects for teaching and research.

Stolp and Zabrucky examine the contributions of metacognitive and self-regulated learning theories to research on students' calibration of comprehension. Karably and Zabrucky's article emphasizes the development of children's metamemory and provides practical implications of research findings for the classroom. Besides, Cubukcu's article focuses on learner autonomy, self-regulation and metacognition.

Kramarski's article reports the investigation of the effects of two reflection support programs on elementary school mathematics teachers' pedagogical problem solving view. Caviola, Mammarella, Cornoldi and Lucangeli investigate whether sequential-spatial working memory could be improved by training of fourth-grade children using metacognitive strategies. In addition, Lloret, Aguilar and Lloret report their research on the effect of a multimedia computing program on the production of activities and self-regulated learning processes.

Kitsantas, Steen and Huie's article reports how prior achievement and self-regulation processes contribute to fifth and third grade students' GPA and standardized test scores. In her study, Desoete aims to investigate whether adults with mathematical and reading disabilities show a similar profile of mathematics deficits compared with adults with isolated mathematical disabilities and if eventual differences can be explained through the severity or cognitive subtype hypothesis.

Table. Articles in special issue

Author(s)	Title	Focuses on				
		Conceptual model	Different Assessment techniques	Training programs	Relationship issues	Age group (children/ adult)
Stolp & Zabrucky	Contributions of metacognitive and self-regulated learning theories to investigations of calibration of comprehension	●				
Karably & Zabrucky	Children's metamemory: A review of the literature and implications for the classroom	●				Children
Cubukcu	Learner autonomy, self regulation and metacognition	●				
Kitsantas, Steen & Huie	The role of self-regulated strategies and goal orientation in predicting achievement of elementary school children	●				
Desoete	Mathematics and metacognition in adolescents and adults with learning disabilities.		●			Adults
Lloret, Aguilar & Lloret	Self-regulated learning using multimedia programs in dentistry postgraduate students: A multimethod approach		●	●		Adults
Caviola, Mammarella, Cornoldi & Lucangeli	A metacognitive visuospatial working memory training for children			●		Children
Kramarski	Developing a pedagogical problem solving view for mathematics teachers with two reflection programs.			●		Adults
Ozsoy, Memis & Temur	Metacognition, study habits and attitudes				●	Children
Sarac & Tarhan	Calibration of comprehension and performance in L2 reading				●	Adults
Battistelli, Cadamuro, Farneti & Versari	Do university students know how they perform?				●	Adults

Sarac and Tarhan's aim was to examine students' accuracy of calibration of comprehension and calibration of performance in L2 reading. They also aim to investigate the intercorrelations between different calibration measures, and to examine the relationship between L2 readers'

metacognitive knowledge and their calibrations. Ozsoy, Memis and Temur's article investigates the relationship between fifth grade students' metacognitive knowledge and skills, and their study habits and attitudes. Besides, their study is also dealing with investigating how this relationship changes with students' GPA levels. Finally, aim of the Battistelli, Cadamuro, Farneti and Versari's study is to investigate the ability to self-evaluate performance in tests of reasoning of a linguistic, mathematical and formal nature, in a group of University students.

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