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Reflections on the role of metacognition in student reading and learning at higher education level

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Abstract

This article represents a literature review and interpretation pertaining to the role that metacognition is seen to play in student performance. It begins by providing evidence from research reported in the literature which indicates that not all students are able to accurately assess their capabilities, and suggests that this lack is linked to insufficiently developed metacognitive skills (MS). The concept of metacognition, as well as its role in academic learning and reading, is discussed. On the basis of evidence from research reported in the literature, which has shown that explicit teaching of metacognitive strategies can result in improved performance among students, the article concludes by suggesting practical ways in which lecturers can help their students develop key MS.

Keywords: metacognition, learning, reading, self-regulated learning (SRL)

Introduction

Many South African institutions of higher education offer a range of foundation courses to first-year students who are identified as under-prepared for the demands of tertiary level education. These courses aim to facilitate the acquisition of the requisite academic literacies in a scaffolded manner. An integral feature of this process is students' utilization of written tutor feedback. A study by Dube, Kane and Lear (2012) found that students are often unable to

benefit from such feedback because they lack the necessary MS that would enable them to make effective use of it. Further, many students have an unsophisticated, 'surface' approach to learning, which hinders comprehension of feedback (Gibbs and Simpson, 2002). By extension, such students are unlikely to become self-directed learners. Simply put, their inability to think critically about their thinking, writing, or the feedback it elicits, imposes severe restrictions on their ultimate academic success.

However, MS can be acquired, and hence it follows that the explicit teaching of such skills should be a core component of foundation academic literacy courses. This article discusses various related factors, namely: the frequently unrealistic perceptions students have of their abilities; the vital role of metacognition in learning and reading; and ways in which lecturers can foster the development of MS. (It should be noted that, for the purposes of this article, the word 'lecturer' has replaced 'teacher', even where the source cited refers to 'teacher').

Students' perceptions of their capabilities

Not all students are able to rate themselves accurately when it comes to the skills considered essential for successful university study; in fact, the majority tend to overrate their capabilities. In a recent study conducted by Miller and Geraci (2011), students were asked to predict their performance in several exams. In most cases, student predictions were higher than the marks obtained. This was particularly true for low-performing students. In another study, a survey of 559 students in academic development courses at a South African university, 93.7% of students rated themselves *good* or *excellent* in their ability to read English, and 85.5% rated themselves *good* or *excellent* in their ability to write English, the medium of instruction (Karsten and Mapisa, 2007). This would seem to be at odds with the results of proficiency tests administered at several universities across South Africa. Between 2008 and 2009, tests given at eight institutions of higher learning revealed that only 47% of first-year students were proficient in the academic skills required for university success, while the rest were in need of 'extensive support' (Blaine, 2010). In 2010, the Deputy Dean of the Faculty of Humanities at the University of Johannesburg (UJ) noted that only 21% of the students who took the 2010 National Benchmark test were proficient in academic literacy (Johl, 2010). This appears to indicate a disparity between how students perceive their own capabilities and how prepared for higher education they actually are, given test results and current university dropout rates (Scott, Yeld & Henry, 2007). It further suggests an inability on the part of some students to realistically assess their own ability or performance.

One possible reason for this is the seeming disjuncture between high school and university. Scott, Yeld and Hendry (2007: 23) assert that there is a lack of 'effective educational continuity, or articulation, between consecutive educational levels'. In other words, there is little communication regarding the kinds of attributes that high school students need to develop in preparation for the challenges and rigours of university study. Hence, when universities receive these inadequately-prepared students from the school system, they are expected to bridge the gap at the same time as they try to fulfil their own mandates as institutions of higher learning. Scott et al. (2007) advocate a 'systemic change' that will see students being provided with the necessary tools to successfully make the transition from one educational phase to the next. However, such change cannot occur spontaneously, and so there is a need for lecturers at first-year undergraduate level to explore interim measures to foster successful integration of high school graduates into university study. 'It is vital for the higher education sector to address factors that are within our control, including the way we approach teaching and learning within universities themselves' (Gower, 2008). Developing students' MS is a strategy that could contribute significantly in this regard as it might lead to students becoming actively involved in understanding how they learn and in identifying gaps in their individual knowledge bases.

Metacognition

Metacognition is a complex construct; essentially, it refers to consciously thinking about one's own thinking processes. Research also suggests that the use of MS is linked to age, gender, and socio-economic status (Leutwyler, 2009). The concept was initially associated with Flavell (1971), whose perspective was developmental and very much a product of the then ongoing change in focus in educational psychology from environmental factors to learners themselves and how they interact with information. It involves recognizing what one knows and does not know and utilizing appropriate strategies to promote learning or accomplish a task (Blakey and Spence, 1990). To Ku and Ho (2010: 252), the term describes 'the awareness and control of one's own thoughts'. It is this control of one's thinking that makes it possible for one to perceive what is present or lacking in one's knowledge base. Huff and Nietfeld (2009: 162) stress the active nature of the process of knowing one's 'cognitive state', coupled with 'the ability to make appropriate adjustments to performance when needed'.

Metacognition is viewed by many as critical for higher-order thinking and 'deep' learning in a university context. Gijbels, Van de Watering, Dochy and

Van den Bossche ([2005](#)) distinguish between 'deep' and 'surface' learning; the former referring to when meaning of content is comprehended and constructed, and the latter to memorization and rote learning. Although most people employ MS to some degree, research has shown that learners with strong MS are more successful (Ertmer and Newby, [1996](#)). For many students, however, the ability to acquire and apply appropriate learning strategies does not come naturally; it must be learned. In fact, studies have shown that explicit teaching of metacognitive strategies can result in improved performance (Blakey and Spence, [1990](#)) and may compensate for low IQ or lack of prior knowledge as well (Swanson, [1990](#)).

Metacognition and learning

According to Flavell ([1979](#)), there are three broad aspects of metacognitive knowledge (MK), relating to *self, task, and strategies*. *Self-knowledge* includes awareness of one's weak and strong points: for example, a student might be cognizant of the fact that s/he usually performs better in multiple-choice tests than in essays (Pintrich and Schunk, [2002](#)). Such self-knowledge must, of course, be accurate to be useful. *Knowledge about tasks* pertains to awareness of differing degrees of difficulty of tasks and that a variety of cognitive strategies may be needed, for example, recognizing something is generally easier than recalling information (Pintrich and Schunk, [2002](#)). *Strategic knowledge* can be either general or domain-specific. There are many widely applicable learning strategies, which can be categorized into: rehearsal, elaboration and organization (Pintrich and Schunk, [2002](#)). Efklides ([2009](#)) expands Flavell's concept into a distinction between MK, *metacognitive experiences* (ME) – which comprise cognizance of what one actually experiences while performing a particular task, and are largely affective, though also cognitive, in nature – and MS, which represent strategies that one selects and applies in attempting to best cope with a task. According to Roll, Aleven, McLaren and Koedinger ([2010](#): 126), MK consists of, among others, the two skills of 'knowledge of knowledge' (the ability to identify gaps in one's knowledge) and 'regulation of knowledge' (the ability to determine what needs to be done to overcome these gaps), which are not domain-specific. They are transferable from one context to another and are therefore critical to learning across the curriculum.

Over the years the concept of metacognition has grown considerably, and is now closely linked with those of *self-regulation (SR) and self-regulated learning (SRL)*. SR derives from Bandura's social cognitive work, which highlighted 'behavioral and emotional regulation [and later] motivation' (Dinsmore,

Alexander and Loughlin, 2008: 393). Vrugt and Oort (2008) regard self-regulated learners as 'actively engaged in the learning process'. SRL, which is associated with Zimmerman, relates to students consciously applying strategies that will facilitate the achievement of academic goals (Schunk and Zimmerman, 2008). With regard to the *relationship between SRL and metacognition*, Kistner, Rakoczy, Otto, Dignath-van Ewijk, Buttner and Klieme (2010: 158) say that there are two distinct points of view. One sees metacognition as a 'superordinate or equated concept to SRL'. In other words, metacognition either subsumes SRL or is separate but equal to it. The other views SRL as the key concept, with cognition, metacognition and motivation as its component parts. For the purpose of this article, the writers subscribe to the view that students need to have a level of MS before they can successfully self-regulate their learning.

Both SR and SRL are more *affective in nature* than cognitive (Lajoie, 2008). There is increasing awareness of, and research into, 'the fundamental role of emotion in cognition' (Immordino-Yang and Damasio, 2007: 9), and, by extension, metacognition. At play here, too, is the factor of personal epistemology – 'Individuals' beliefs about knowledge and knowing' (Hofer and Sinatra, 2010: 113). Indeed, there is growing research into the complex relationship between epistemology, metacognition and SR, though it is still in its nascent stage and presents many challenges, particularly as regards measuring personal epistemology (Hofer and Sinatra, 2010: 116). In addition, *cultural context* has always to be considered. Broadly speaking, though, educational analysts concur that as students develop they tend to be more conscious of their cognitive processes and use this to improve their learning (Pintrich and Schunk, 2002). Kistner et al. (2010: 158) stress the need for a student to be able to, among other skills, set his/her own learning goals and strategies on how to achieve them as well as evaluate the learning outcomes: 'In a society that requires lifelong learning, the ability to regulate one's own learning is getting more and more important to be successful in academic as well as in non-academic contexts.' Such self-directed learning is critical in conditions such as prevail in this country where under-achievement among university students, as stated earlier in this article, is widespread.

Metacognition is further seen as *integral to transfer, or application, of learning* from one context to another. In fact, Perkins and Salomon (1992) argue that the objectives of learning have not been achieved unless transfer has taken place. Reflection, actively searching for connections, and thinking about one's own thinking processes, appears to promote transfer and provide the conditions for it to occur.

Metacognition and reading

Metacognition also plays an important role in the development of reading skills, and of reading in order to learn in particular. Upon entering university, students very quickly find themselves engaged in a variety of complex *learning activities that involve reading*: skimming and scanning, differentiating between essential and non-essential information, identifying main ideas; paraphrasing and summarizing; drawing conclusions and making inferences and predictions; analysing, synthesizing and evaluating information; and integrating new knowledge with what is already known. Students are expected to develop the ability to read challenging texts critically, purposefully, and with comprehension (Nel, Dreyer and Kopper, 2004). Many students, especially those who may be at risk of failure, are unable to do this as they lack the requisite skills to meet the demands now being placed upon them.

In addition to the three aspects of MK attributed to Flavell, *text-type* is important in the process of reading to learn (Collins, 1994). According to Collins, knowledge of text structure facilitates learning and is, in fact, critical for reading to learn. Students with strong MS are able to recognize how texts are organized (for example, cause and effect, comparison/contrast, problem/solution, etc.). They are also cognizant of the order in which texts are presented and can discern relationships and links between them. Further, skilled readers grasp why this knowledge is important and understand the impact it has on their own learning. Two other key skills that such students possess are 'comprehension monitoring and revision' (Ku and Ho, 2010: 253). They are thus less likely to give up on the reading task or resort to plagiarism when confronted with dense or unfamiliar texts.

The *meta-comprehension skills* of many students may also be underdeveloped, which results in their being unable to know whether they have understood something or not. Nonetheless, it is essential that students understand what they read and what they are being asked to do (task awareness). Writing a summary, for instance, involves a different skills set than the one with which to write a report. Students need MK to be able to summon the correct approach to take in order to comply with the requirements of a task. Once an attempt has been made to complete a given task, students must have, or must develop, the capability to evaluate their own performance and, possibly, identify measures to be taken to attain a higher standard. This is what Sadler (1989: 119) refers to as 'evaluative expertise', comprising the capability to distinguish between acceptable and unacceptable work, and to acquire an accurate understanding of what constitutes quality work and the standard being aimed for.

Further, it is critical that students attain a *repertoire of reading strategies*. As Huff and Nietfeld (2009: 162) say, 'Previous research has shown that effective readers employ a number of metacognitive strategies in a flexible manner that aids their comprehension of text.' These strategies can be used during and after reading. For example, in order to improve comprehension during reading, Tei and Stewart (1985) recommend re-reading, adjusting reading rate, identifying and defining new vocabulary, making predictions, and mental imaging. This last term refers to the process of a reader making pictures in his/her mind before, whilst, and after reading (Fredericks, 1986). However, Keene and Zimmermann (2007) caution that such imaging derives from schema (existing knowledge).

Note-taking, summarizing, self-questioning, and the ability to annotate texts are also important in reading development. Students must understand when it is optimal to use each of these strategies. Readers with well-developed MS are adept at selecting the most effective strategy at any stage of the learning or reading process, thus effectively monitoring and taking control of their own learning.

Reading comprehension is also dependent on what a student already knows. Efficient readers are able to tap into *prior knowledge* and background information and integrate it with what is being learned. Many students, however, may not have had an opportunity to gain prior knowledge and, consequently, are unable to do this, which hinders the development of comprehension skills. The importance of prior knowledge was emphasized by Paulo Freire, the Brazilian scholar and educator, who stated that when literacy is defined as the ability to read words it 'must necessarily be preceded by the reading 'or deciphering' of the world around us' (Campos, 1990: para. 2). To Freire, therefore, reading is inextricably linked to previous life experiences. In order to make sense of new information contained in a text, it is necessary to relate it to what is already known. Freire went on to say:

> Literacy work must take this reality as its point of departure and refer to it constantly so as to make possible, thanks to the greater breadth of knowledge that reading and writing confer, a more profound decipherment, a 're-reading' of the world once it has been discovered. (Campos, 1990: para. 5)

This would seem to indicate the critical need for students, even at higher education level, to be provided with some kind of prior knowledge base before new topics are introduced or tasks for reading ahead of lectures are assigned. The section of this article that deals with the development of metacognition among students suggests various ways of providing this prior knowledge.

Developing students' metacognitive skills

Research suggests that *lecturers' personal understanding of metacognition* influences their pedagogical knowledge of metacognition and their ability to promote the development of MS in their classrooms (Wilson and Bai, 2010). Therefore, it is important to include within *professional development* courses instruction in strategies to encourage and develop metacognition. Besides comprehending metacognition themselves, lecturers can promote the development of MS in their students. It is important for lecturers to be intentional about the teaching of metacognition. From the outset the concept of metacognition should be introduced and defined for students. Students need to understand why metacognition is important and the nature of its relationship to learning and academic success. Ritchhart, Turner and Hadar (2008: 145) note that *metacognition 'can be substantially developed* through a classroom culture where thinking is modeled and rich opportunities for thinking are present'. It is also vital to make it clear that there are specific strategies that promote the development of MS and that these strategies can be taught and they can be learned by all students. Equally important is the need for students to identify at the beginning of a learning activity what they know and do not know about the topic in order to determine what it is they need to know.

The promotion of metacognition can also be enhanced by creating and fostering a *supportive and learner-centred environment*. When introducing something new – a concept, some reading, or a new area of study – it is essential to explain why the learning activity is important, relate it to what has already been taught, and tap into students' prior knowledge. *Activating prior knowledge* is especially important because research has shown that in order for comprehension to occur and learning to take place, new knowledge must be integrated with previously acquired knowledge and students must make connections with what they already know (Rumelhart, 1980). If the expected prior knowledge base is weak, measures need to be put in place to correct the situation, for example, the pre-teaching of key vocabulary, development of content preview guides, group discussions around key concepts, development of questions to guide and establish a purpose for reading, etc. (Rumelhart, 1980). Activities and strategies such as these set the stage for meaningful learning to occur. Situating the development of metacognition 'within context and in response to learner needs and capabilities' (Huff and Nietfeld, 2009: 163) in this manner has been shown to yield positive results.

Metacognition also involves the *planning, monitoring, and evaluation of one's own learning*. Brainstorming, mind mapping, and goal setting activities are

useful in getting started. Breaking down projects and assignments into small chunks, as well as setting deadlines for each task, helps students to plan and effectively manage their time. *Formulating clear objectives and assessment criteria* as well as sharing them with students helps them to monitor and measure their own progress. As already discussed, students require assistance, too, in developing evaluative expertise. This can be enhanced by ensuring that students understand and fully engage with assessment criteria (Sadler, 1989).

According to Moon (2001), *reflective activities* also encourage metacognition and facilitate learning. At the end of an activity or class, students can be asked to discuss or write about what they have learned. The feedback provided can be valuable for student and lecturer alike in terms of checking for understanding and identifying possible areas of confusion which might require re-teaching or re-learning (Blakey and Spence, 1990). Providing time at regular intervals throughout the learning process for students to stop, 'take stock' and self-question is also helpful. *Group discussions, cooperative learning, peer assessment and self-assessment* are particularly useful. By discussing progress and strategies with others, students can learn to self-regulate and assess whether or not they are on the right track themselves. Swinehart (2009) maintains that this ability to self-monitor and think also encourages language development and promotes independence and motivation.

It is also recommended that lecturers establish an environment conducive to metacognition (Blakey and Spence, 1990) by *modeling for students* their own thinking and learning processes. What questions do the lecturers have? What links do they make with what they already know? Are they able to make predictions about the future? Swinehart (2009) suggests that lecturer think-alouds such as these should form an essential part of every learning situation. Similarly, Blakey and Spence (1990) assert that thinking out loud, holding regular debriefing sessions and discussing one's own thinking motivates students to do the same. It gives them the tools required to become knowledgeable about their own thinking as well as the actual words to discuss these processes. Skilled modelling of thinking by fellow students has also been found to be effective and, in some instances, even more effective than lecturer modeling (Schunk, 1989).

Further, research suggests that it is important for students to become aware of their own *dominant learning style* and the ways in which they learn best, taking into account personal background, individual strengths and weaknesses, interest and motivation (Collins, 1994). Armed with this knowledge, students can make

the changes required in order to facilitate their own learning and become successful students and lifelong learners.

Finally, lecturers can *monitor students' development of MS* through such tools as concept maps, which are described by Ritchhart et al. (2008: 148) as 'a graphic organizing technique designed to help learners explore their knowledge or understanding of topics that are highly elusive and mystifying'. *Concept maps*, which are metacognitive tools in themselves, are ideal for this purpose. Firstly, information is organized hierarchically to illustrate the relationship between a key concept and subordinate ones. Secondly, cross links are used to show relationships between concepts at various levels on the map, with key words or phrases such as 'causes' or 'is different from' inserted at the mid-points of the connector lines to characterize the nature of the relationship. Analysis of students' efforts can show up faulty reasoning or understanding as well as gaps in the students' understanding of a topic. Thus, not only can lecturers actively develop their students' MS, but they can also monitor their progress.

Conclusion

One of the major challenges facing today's institutions of higher learning is how to enable students to become active learners and critical thinkers who can assume greater responsibility for their own learning. A key factor here is poorly developed MS. This article has sought to highlight the pivotal role that MS play in the performance of tertiary level students, many of whom are 'underprepared' and whose previous educational experience often appears to have imbued them with inaccurate perceptions of their own academic abilities.

Metacognition is viewed by many as critical for deep learning in higher education, and research indicates that students with well-developed MS perform better. Unfortunately, not all students have acquired or know how to apply the metacognitive strategies that could result in improved learning. Explicit teaching of these strategies has been shown to enhance academic performance and may compensate for gaps in prior knowledge and low IQ scores as well.

Metacognition is also seen as integral to the development of reading skills and reading to learn in particular. Competent readers possess a repertoire of strategies which can be employed before, during and after reading. Skilled readers are adept at monitoring and evaluating their own comprehension – they know, for example, when comprehension has broken down, and are able to take corrective action if necessary. Given that the results of the South African National Benchmark Test indicate that the majority of first-year students lack

the reading and writing proficiency required for successful university study, the development of these competencies could be facilitated by the acquisition and application of relevant MS and strategies.

Finally, it is important to be intentional about the teaching of metacognition. Students need to understand why this concept is important: how it relates to learning and academic success; and that metacognitive strategies can be learned by all students. Learner-centred environments with activities and tasks that promote student engagement, critical thinking and reflection encourage the development of MS and promote students' ability to apply and transfer knowledge across academic contexts.

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