INVESTIGATING THE ROLE OF METACOGNITIVE AWARENESS IN UNIVERSITY STUDIES

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The purpose→ to provide reliable theoretical **overview on metacognitive awareness**

(1) **definition, components and sub-components** of metacognitive awareness

(2) its **origin and essence** from the point of view of its **historical development**

(3) link it to **motivation and age**

(4) characteristics of **self-regulated learners** and the **meta-cognitive strategies** they use

(5) **major challenges** in the implementation of metacognitive awareness.

The rapid development of sciences changed the quality of education to learning-centered education

-Objectives of learning-centered education in university studies :

- Creative and reflective thinking of the student
- learning by doing and experiencing
- active participation in the teaching process

-crucial components of learning-centered education

- metacognitive awareness
- motivation
- regulating own study processes

-features of **successful learners** → to other learners

-explore learner **internal factors≠external factors** (instruction)

- **individual differences** that play a central role in learner **autonomy** and self-regulation

learner motivation

learning aptitude

learning strategies

metacognitive awareness is larger framework to view learner strategies within

-Metacognition is a multifaceted topic of research.

- Metacognitive beliefs
- metacognitive awareness
- metacognitive experiences
- metacognitive knowledge
- metacognitive skills
- executive skills
- higher-order skills
- metacomponents
- metamemory

-metacognitive training is a challenging task→ not just adding a few new activities in learning environments

-**first** discussed by psychologist (Flavell, 1976) → **self-knowledge** (Fleming and Dolan, 2012).

-the **psychological and neural matters** are not well understood.

-The development of **self-regulatory strategies** is important (Hasselhorn and Labuhn, 2011).

-"being meta-cognitive" →**take charge of their own learning consciously→improving performance** (Hacker et al., 2009).

-**Metacognition (regulation of that performance** by monitoring and evaluating) is differentiated from **cognition (performing** a task)(Fleming et al., 2014).
-All the stipulated points highlight the need for **further clarification** of metacognitive awareness
-complex concept
-how it can be fostered
-**lack of clarity of links** among psychological and neural affairs of metacognitive awareness, self-efficiency and self-regulated learning

Metacognition and related neural structures

-The prefrontal cortex (PFC)→ metacognition (Fleming& Dolan, 2012)
-PFC coordinates with the posterior region but anatomically unconnected. The PFC + posterior parietal cortex (PPC) associated with working memory, theory of mind, metacognition, …etc.
-The PFC continues to develop throughout childhood and adolescence based on recent studies (Dumontheil et al., 2008).
-PFC changes a great deal during adolescence, as the brain's myelin→ fatty substance→ coats the white matter→ improves signal transmission to the gray matter
-We have development of the PFC for intelligent
-meta-cognitive ability →gray matter volume in the PFC

The metacognitive strategies recruited by self-regulated learners

Fleming& Dolan (2012)

PFC →predicting, reflecting and judgment making.

making prediction→ ventromedial pre-frontal cortex (vmPFC)→ role in imagining the future

reflecting on past task → the anterior and lateral parts of PFC

-Fleming et al. (2014)

Metacognitive strategies and self-regulated learning (SRL) acquisition

McCaig et al. (2011) →rostro-lateral PFC (rlPFC)→ metacognitive strategies.

-it is introspection→ determines the accuracy of our judgments regarding task performance.

-Neuroscientific studies→ to make judgements before (prospective- feelings of knowing) and after (retrospective- judgment of learning) task performance.

-personal belief that one's efforts will produce successful outcomes equates to self-efficacy (McCaig et al., 2011)

-self-regulated learners adopt a “**growth mind-set**” →**more competent and effective** learners than fixed ones→promote learning
 (Clark, 2014).
-“**formative feedback**” (Black& Wiliam, 2009). - **deep** involvement of students in **metacognitive strategies**
- to **oversee one's own learning**→responsible and effective learner (Black& Wiliam, 2009).
-SRL is an **active, constructive process**→ learners set goals for their learning, monitor, regulate, and control their cognition (Zimmerman& Maylan, 2009).
- Self-regulated students are **meta-cognitively, socially, motivationally, and behaviorally active**.

Metacognition, self-efficacy and self-regulation

Zimmerman& Moylan (2009)

-SRL strategies is central to academic achievement

-sequence of planning, performance and reflection

-The planning phase entails motivation, self-belief and confidence→ self-efficacy.

-performance phase is monitoring, self-control and self-observation.

-**Reflection is of particular importance**

-**metacognition and self-efficacy(mediated by motivation**- learner believe that their minds are capable of successfully)

-self-regulatory learners→ **more advanced metacognitive skills and higher sense of self-efficacy**

-training=metacognitive strategies + motivational + cognitive training→more active recruitment of the PFC (McCaig et al., 2011).

-a **“moment”** into a opportunity for learning is **dependent on the meta-cognitive awareness**+ accurate **self-belief**→ success (self-efficacy).

-teachers→ questioning and feedback→ self-efficacy of the students (leading+active agent in learning) →**internal feedback**→ self-regulated (Clark, 2014).

Conclusion

- encourage a reflective and strategic learning

-a change in positive or negative direction on motivation→ metacognitive awareness

-**Prefrontal and anterior cortex** play a crucial role in the meta-cognitive affairs

-equip students with the **self-regulatory capabilities** →educate themselves

- **new and accurate learning strategies** → fostering of the

1)explicit cognitive + metacognitive instructions

2) metacognitive strategies

3) helping learners to plan and monitor toward goals

4) encouraging cooperative group work to evaluate

5) self-assessment

6) discussion including when, how and why the strategies work

-**lecturer** →**model** metacognitive strategies by thinking aloud

-**other** lecturers to share practice

-**update** their own knowledge through on line sources

Educational Implementation

-Metacognitive activities that ask students to reflect on what they know not only help learners + valuable information for their instruction.

Teachers → individual differences in the level of metacognitive awareness → effective instruction

Metacognitive ability should be developed →improve their academic achievements accordingly.