

STRATEGIES OF COGNITIVE AND METACOGNITIVE LEARNING

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Abstract

Cognitive and metacognitive learning strategies are critical in enhancing students' abilities to process, understand, and retain information effectively. These strategies form the foundation of effective learning and are essential for academic success and personal growth. Cognitive strategies refer to techniques that directly help learners engage with and process information. Examples of these strategies include summarizing key points, taking structured notes, creating mind maps, and employing problem-solving methods to break down complex concepts. These strategies not only help students understand and organize information more effectively but also improve memory retention and the ability to apply knowledge in different contexts.

In contrast, metacognitive strategies focus on the learners' self-awareness and self-regulation during the learning process. These include planning one's approach to learning tasks, continuously monitoring understanding, and evaluating the effectiveness of strategies being used. Metacognition involves reflection, which allows learners to recognize their strengths and weaknesses, adapt their methods, and develop more efficient ways to approach tasks. This self-regulated learning process enables students to take responsibility for their academic growth and become independent learners.

Integrating cognitive and metacognitive strategies into educational practices not only enhances the teaching-learning process but also fosters lifelong learning. Teachers can promote cognitive strategies by incorporating collaborative tasks, active learning methods, and practical applications of theoretical concepts. Meanwhile, fostering metacognitive awareness can involve teaching students to set realistic learning goals, regularly assess their progress, seek constructive feedback, and modify their approaches as needed.

Studies have consistently demonstrated that combining these strategies results in deeper learning, improved critical thinking, and better academic performance. Moreover, it equips learners with the skills needed to solve complex problems, adapt to new challenges, and succeed in dynamic and uncertain environments. In today's rapidly evolving world, these strategies are indispensable in preparing students to become adaptive, analytical, and lifelong learners. The integration of cognitive and metacognitive learning strategies ensures not only academic excellence but also the development of skills necessary for future professional and personal success.

Key Words: Cognitive, Meta-Cognitive, Learning Strategies, Motivational Belief

Introduction

It is broadly recognized that students transitioning to higher education are often unprepared for the diverse learning and study demands they will face. In school the teacher oversees all facts of the teaching-learning process, including setting both short term and long-term goals, designing activities, supplying resources and managing time allocation. They generally obtain the necessary knowledge in a well-designed format. In higher education, there tends to be a greater sharing of learning responsibilities between the teacher and the students. Students are granted much more freedom to manage their own work and they are also responsible for taking notes during lectures and reading the assigned texts. This India gives the students plenty of flexibility to develop into self-regulated learners allowing them to set goals choose from a variety of tactics and track their progress (Panaoura & Philippou, 2003).

The concept of self-regulated learning has been the subject of theory and research since the 1980s, when researchers focused on how students might monitor, direct, and govern their own learning. Self-regulated learning is domains, including thought processes, motivation, and metacognition. Self-regulated learning has grown in importance as a subject of study in psychology and education. One explanation for this is that learners ability to control their own learning significantly improves learning results (Steffen,2006). Self-regulated learning, to Pintrich(2000a) is "an active, beneficial process where learners set learning objectives and then make an effort to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their objectives and contextual features of the environment."According to Pintrich&De Groot(1990), Self-regulated learning integrates three key constructs: students' metacognitive planning, monitoring and regulation procedures; students' management and control of their effort toward classroom academic material; and students' cognitive learning strategies.

1.2 RECALL AND COMPREHEND THE INFORMATION

Self-regulated learning is a crucial factor in students' academic success in the classroom. Self-regulated learners are thought to employ both cognitive and metacognitive learning strategies while fostering adaptive motivational beliefs, despite variations in the definition of self-regulated learning is defined (Pressley et al., 1989; Pintrich & De Groot, 1990 and Zimmerman, 1989, 1994). These cognitive and metacognitive method are favorably and highly related to adaptive motivational beliefs such as an intrinsic orientation, high efficacy, and high value and interest, as demonstrated by Pintrich & De Groot (1990). Students who effectively regulate their efforts by setting goals, selecting appropriate strategies, monitoring and evaluating their progress tend to outperform those who lack these self-regulation skills. According to Pintrich (2003), it has also been argued that in order to improve students learning and academic performance, knowledge of cognitive and metacognitive self-regulated learning strategies is insufficient. To enhance their understanding of the course material, students must be encouraged to apply their metacognitive strategies.

In education psychology, Zimmerman introduced the concept of self-regulated learning for the first time in 1989. According to Zimmerman (2001), "self-regulated learning refers to learning that students generate for themselves and that is systematically geared toward the achievement of their learning goals." In order for students to become self-regulated, they need to be mindful of their thought processes and motivated to engage actively in their own learning, (Zimmerman, 2001). The initial stage involves self-evaluation and monitoring where individuals assess their own performance in relation to a specific learning task. For example, students evaluate their learning progress and self-efficacy based on their past academic achievement and outcomes. The second phase, goal setting and strategic planning, involves analyzing learning tasks, establishing clear objectives, creating learning plans and refining learning strategies. In the third phase, strategy-implementation monitoring, students apply specific techniques in their learning plans while tracking their progress to ensure accuracy. In the final phase, strategic-outcome monitoring, students evaluate their effectiveness by analyzing their classroom performance and the success of their strategic actions. Zimmerman's model emphasizes the role of motivation and learning strategies in self-regulated learning. They contend that self-efficacy and learning strategies are essential components of self-

regulated learning. These four phases are interconnected and influence each other closely. Students need both the ability and the motivation to self-regulate their learning.

Zimmerman's social cognitive modal of self- regulation serves as the foundation for Pintrich's paradigm for self- regulated learning (Puustinen &Pulkkinen, 2001). According to Pintrich (1999), self-regulated learning refers to the techniques students employ to manage resources, which includes managing and controlling the environment, as well as their cognition. According to him, self-regulation exercises serve as a bridge between learners' learning experiences and environments. Individuals' learning successes are substantially influenced by self- regulated learning. It is directly related to how metacognition is used. Pintrich(1990) centered his research on the individual learning habits of students. He looked into how learner motivation affected the use of cognitive, metacognitive, and self- regulated learning techniques.

From a social and cognitive perspective, researchers view self direction as a combination of individual, behavioral and environmental processes that are interrelated and cyclic. Students' knowledge, metacognitive processes, goal and outcomes are integrated within personal processes. Self-observation, self-judgment, and self-reaction are the key components of behavioral processes. Environmental procedures include verbal persuasion, modeling, and active feedback. According to social cognitive theory, self-regulatory processes social and physical settings have an impact on beliefs and their supporting behaviors.

The theories of motivated beliefs and self-regulated learning are related to a variety of techniques and modals (Marcou & Philippou, 2005).

The application of various self-regulated learning techniques is referred to as the "skill" component and is thought to have an effect on students' performance (Mc Whaw & Abrami, 2001). They consist of general cognitive (rehearsing, elaborating, organizing), metacognitive (planning, monitoring, regulating), and resource management strategies, according to Pintrich (1999). The idea of , motivational beliefs consist of self-efficacy, task value, and goal orientation beliefs is referenced by the "will" component (Pintrich, 1999). The theory of self-regulated learning and motivational beliefs are basically linked in the literature.

According to Zimmerman the three crucial traits of self-regulated learners:

a) They feel b) They can perform effectively c)They employ a variety of self-regulated techniques. They set a wide range of goals for themselves. According to Schunk and Zimmerman,1994,1998, self-regulated learners are proactive individuals who actively

manage their learning by organizing and practicing material, maintaining confidence in their abilities, valuing the importance of learning and understanding the factors that influence their progress. Research across various educational levels and subjects consistently shows a positive relationship between self-regulated learning and academic success. Research on self-regulated learning suggests that actively engaging in study enhances learning outcomes. According of Ames 1984 and Dweck,1986, classroom learning heavily relies on three key components of self-regulated learning: students' metacognitive strategies planning , monitoring and evaluating the learning process effort regulation, persistence and cognitive strategies for memorization and comprehension. Most self-regulated learning strategies now incorporate these three fundamental elements when developing models for students academic growth and classroom performance.

According to Valle et al., 2006, self-regulated learning is a concept that encompasses learning strategies , metacognition, learning goals and student motivation. According Zimmerman and Schunk,1989, self-regulated learning involves students improving their academic performance through the use of metacognition, motivation and self-regulation. They believed they were capable, self-sufficient and independent working diligently to achieve their academic goals. They select, organize and sometimes even design environments that foster learning. So, such students actively take charge and control of their own learning processes.

STRATEGIES FOR LEARNING

Learning strategies refers to the methods used to achieve learning goals. According to O'Malley and Chamot (1990), learning strategies are specific approaches or actions that individuals use to understand, acquire or retain new information. Properly using learning methods can help maintain productivity in the lifelong learning environment. Actions taken by the learner to aid in the acquisition, storage and retrieval of information. Students employ techniques to acquire, comprehend, retain and transfer knowledge while they are learning (Weinstein et al., 2011). The term "strategy" originates from the Greek word "strategikos", which refers to steps or actions taken to achieve victory in a war. The given technique is inherently neutral until the user's context is carefully analyzed; it is neither inherently good nor bad. The task aligns within the preference of a specific student is effectively utilized and is connected to other related strategies. These methods "make learning more fun, faster , more self-directed, more effective and more transferrable to other settings" (Oxford,1990). In addition, learning strategies can empower children to become more self-reliant, independent,

and lifelong learners (Allwright,1990). Learning strategies are divided into three categories: Cognitive, Metacognitive and Social affective strategies.

STRATEGIES FOR COGNITIVE AND METACOGNITIVE LEARNING

Students are self-regulated to the extent that they are metacognitively, mitigatory and behaviorally active participants in their own learning process, according to research(Zimmerman,2001).Students' use of cognitive and metacognitive strategies actively shapes their learning and enhances their awareness of the learning process. One of the main challenges in self- regulated learning is the student's ability to select integrate and effectively coordinate cognitive and meta-cognitive strategies. According to Payne(1992), cognitive strategies are the actions and ideas that students engage in when studying and these include using simple and sophisticated methods to digest information from lectures and texts. Surface cognitive strategies and deep cognitive strategies are the two categories of cognitive techniques. Surface, cognitive strategies, like mental rehearsal, involve repetitive review and rote memorization to help encode new information into short-term memory such as repeatedly reading course material. Surface processing is crucial for establishing a solid foundation of knowledge. Creating an outline of key ideas can help in long- term retention of the information. Deep cognitive strategies such as elaboration,organization and critical thinking include questioning the accuracy of information and integrating new knowledge with prior knowledge and experience.

Metacognitive strategies refer to the planning, monitoring and regulation techniques used by students to effectively execute cognitive strategies. this approach metacognitive provides insights into one's own thinking and fosters self directed learning. Tasks such as cooperation and clarification are examples of social and emotional strategies, which involves controlling emotions through ideational process. Many studies back up the significance of cognitive and metacognitive techniques in academic learning (Zimmerman &Martinez-Pons,1988,1990;Boekaerts,1996 and Schwinger et al.,2009).Rehearsal, elaboration, organization, critical thinking and metacognitive self- regulation are the cognitive and metacognitive strategies that are clearly described and differentiated.

REHEARSAL

Practice techniques consists of tasks like recalling items from a list , actively reading items from a list, actively reading assignments with a plan, staying focused in lectures and reviewing materials and rewriting class notes to align with personal interests (Pintrich et al., 1991; Garcia & Pintrich,1995 and Talbot,1997). These techniques influence the encoding and attention processes, making them most effective for straightforward tasks and the activation of knowledge in working memory rather than the learning new material in long term memory (Pintrich et al., 1991 and Garcia & Pintrich, 1995). Repeating reading the text or notes is a basic rehearsal strategy. By reviewing notes and memorizing key terms a student can bring material into working memory.

It can be more like a rehearsal approach than an elaborative strategy to highlight or underline material in an uncritical, passive manner. These techniques are thought to effect the attention and encoding processes. Practice techniques include activities such as locating and repeating key passages in the materials. These techniques consist of memorization, reading aloud, concept lists, highlighting, specific marking, underlining , using mnemonic devices and keeping private notes.

ELABORATION

Elaboration techniques help students create internal connections between the terms being learned, aiding in the storage of material in long-term memory. Editing notes, comparing reading assignments to lecture notes, summarizing paraphrasing and creating their own examples from real events and issues are among the strategies these students must employ. Students who actively develop their own knowledge and do it in ways that improve information retention are said to be engaging in elaboration (Reder,1980).

By using elaboration techniques, students can better connect and integrate new information with their prior knowledge, condense and paraphrase the material, take notes, create mental maps, draw analogies and mentally expand on what they have learned, such as by asking themselves questions. Elaboration involves expanding on the material presented by adding new information from the learner with techniques such as using new words in sentences, paraphrasing information, summarizing, matching, using analogies, creating metaphors, making comparisons, composing questions and creating mental images.

ORGANIZATION

According to the definition of organization, it is a proactive endeavor that involves the students actively participating in the task (Pintrich et al., 1991 and Talbot , 1997). Clustering, outlining, grouping, choosing the primary idea from reading passages and focusing on headers and subheadings, diagrams, tables , figures, charts and graphs are some organizing techniques (Pintrich et al., 1991 and Garcia & Pintrich, 1995). For ease of use and to track their progress, students can organize the information into paragraphs, themes, and units. To better understand the material, some students group, outline, and identify the main ideas of the text. The identification of the unique structure of knowledge is a benefit of organization. Utilizing various specific techniques for selecting and organizing the ideas in the material, organization strategies involves behaviors such as identifying the main idea from text and outlining the content to be learned (See Weinstein & Mayer, 1986).

Organizational and elaboration tactics are both regarded as deep processing techniques (Weinstein & Mayer, 1986 and Garcia & Pintrich, 1995). According to studies on strategy use and information processing, pupils that utilize elaboration and organizational strategies as opposed to simple rehearsal techniques have a higher degree of comprehension (Entwistle & Marton, 1984 and Garcia and Pintrich, 1994). The link between rehearsal and short-term retention and recall , rather than deeper conceptual understanding has led to rehearsal being identified as a surface processing techniques.

CRITICAL ANALYSIS

Critical thinking is defined as “the ability of students to apply prior knowledge to new situations in order to solve problems, come to conclusions, or make critical judgements based on criteria of excellence” (Pintrich et al.,1991). It is a higher order learning approach that involves linking newly learned material with superior or connecting newly learned material, individualized knowledge. According to Paul (1992), critical thinking involves actively and skillfully conceptualizing applying, analyzing, synthesizing or evaluating knowledge. According to Halpern (1998), critical thinking is deliberate, reasoned, and goal-directed thinking used as solving problems, draw conclusions, estimate probabilities and make judgements.

CONCLUSION

In higher education, the development of personal and professional competencies is widely regarded as a key indicator of quality and equity, making it a priority for all stakeholders in the educational system. To achieve this goal the university should establish consistency, reassess

its mission and strengths and actively involve teachers and students in the process. The teaching learning process in higher education is differs from school education by emphasizing critical thinking along with transmission of knowledge and the development of intellectual, social, emotional and psychomotor skill, to prepare learners as socially and economically productive members of society. This focus is more specific in professional disciplines than in academic ones. Professional students are expected to be skill focused and more self regulated upon complete their education. Providing an optimal environment and condition that enhance learning and development of students is priority on the global educational reform agenda. The finding of this study and those pursuing academic courses. The finding of this study will also aid in developing teaching strategies aligned with the learning strategies and motivations of university students in both professional and academic courses. Overall ,this study is a modest effort to create a foundation for enhancing the quality of higher education with a particular focus on professional and academic educational learning strategies.

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