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SELF-REGULATORY LEARNING STRATEGIES FOR SCIENCE LEARNING

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Abstract:

Self- regulation of learning is a fundamental element for learning. Self-regulated learners engage in actions, thoughts and behaviours in order to pursue determined tasks. According to Bandura, self-regulation encompassed an essential component of humanness with self-control of individuals over their situations, environment and contexts. Individuals are not subjected to stimulus control; rather they exercise cognitive, emotional, and behavioural power over their surroundings. The key issue defining learning as self-regulated is not whether it is socially isolated, but rather whether the learner displays personal initiative, perseverance, and adaptive skill in pursuing it. A self-regulated learning perspective shifts the focus of educational analyses from student learning abilities and environments at school or home as fixed entities to students personally initiated strategies designed to improve learning outcomes and environments.

Key Words: Science Learning, Self-Regulated Learning Strategies & Characteristics

Introduction:

Science refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena. The term science also refers to the organized body of knowledge people have gained using that system. Science is one of those human activities that man created to gratify certain human needs and desire.Science education plays an important role in the development of innate potentialities of the child. Science education should help the child in developing desirable knowledge, attitude and skill for the effective use of scientific knowledge, which results in the expansion and reinforcement of the body of knowledge that comprises science. Biology literally means the study of "life and living things." It is a branch of science that encompasses the knowledge accumulated about the marvellous living world. Natural science, those dealing with phenomena of material world have all being included in one large area, Biology. Which give more importance to observation and experimentation; it should help the learners to acquire problem solving and decision-making skills.

For making science education more interesting, different learning strategies were used. Learning strategies are the rule, principles and procedure acquired in learning often discovered by learner himself and applicable in other learning context. Therefore, learning strategies will influence the science learning. Learning strategy factors are the favourable factors to the learner, so learning will only effective by reducing the barriers and increasing the strategy of the learner.Bandura (1997) proposed that inorder to attain vital goals, individuals influence and control their environment. From the social cognitive perspective, all individuals, in some ways, attend to self-regulate their action and manage their behaviour purposefully to secure attainment of goals (Zimmerman, 2000).

The framework for understanding the psychological basis of learning has gradually shifted from behaviourism to cognitivism since 1960s (Anderson, Reder& Simon, 1995; Brado, 1997). Increasingly learners are perceived to have more responsibility for their own learning; self-regulated learning has become a frequent area of educational research. Learners are no longer viewed as passively being "instilled" with information and knowledge; they are actively involved in reorganizing and reconstructing their existing knowledge with new knowledge (Perkins, 1992). Research shows, furthermore, that the personal capabilities that enable students to be independent learners and to develop a core of resiliency are highly related to achievement (Wang and Lindvall, 1984; Zimmerman and Martinez-ponz, 1986).

The construct of self-regulatory learning has been extensively studies since the late 1970's with which more attention in the 1980's and 1990's (Paris and Winograd 2001).Still it is relatively new as regards to implementation for improving students' performance and achievement in the classroom. Self -regulated learning suggests that students engage in their own learning process on metacognitive, behavioural and motivational levels (Zimmerman, 1986). Within self-regulated learning, students are empowered with a common set of self-regulating strategies in which they couple those strategies with a set of individually developed skills they have constructed over the course of their academic careers and personal experience.

Conceptual Background of Self-Regulatory Learning Strategies:

The context of educational psychology has been profound changes over the last 20 years; due to these self-regulated learning has become a current focus for research and one of the essential axes of educational practice. Currently learning is conceived as active, cognitive, constructive significant, mediated and self-regulated process.

Self-regulated learning requires both 'will' and 'skill'. For this reason, education should help students to be aware of their own thinking, to be strategic and to direct their motivation toward valuable goals. Students almost any age are capable of taking charge of their learning. Almost all the people are capable of self-regulation does not mean that all students actually do take-effective charge of their own learning.Self-regulated learners are flexible self-regulation refers to the use of processes that activate and sustain thoughts, behaviours and affects in order to attain goals. (Shunk & Zimmerman, 1997). Self-regulated learning is a vital prerequisite for the successful acquisition of knowledge in school and beyond, and thus this is a particular importance with respect to life-long learning. Self-regulated learning is to be seen as a central element in the dynamic model of knowledge acquisition.

Meaning of Self-Regulatory Learning:

Self-regulation of learning means having the ability to develop knowledge, skills and attitude which enhance and facilitate future learning and can be transferred to other learning situations. Self-regulatory learning can be described as a goal-oriented process of active and constructive knowledge acquisition, involving the guided interaction of an individual's cognitive and motivational / emotional resources.

Definition of Self-Regulatory Learning:

The numerous definitions of self-regulatory learning to be founded in the literature emphasis of cognitive, motivational/volitional and metacognitive processes. (Boekaertz, 1999) According to Zimmerman's definition of self-regulated learning: "students can be described as self-regulated to the degree that they are metacognitively, motivationally and behaviourally active participants in their own learning process" (1989). According Zimmerman & Martinez-pons (1990), Self-regulated learners have the motivational advantage of high levels of self-efficacy and intrinsic motivation.

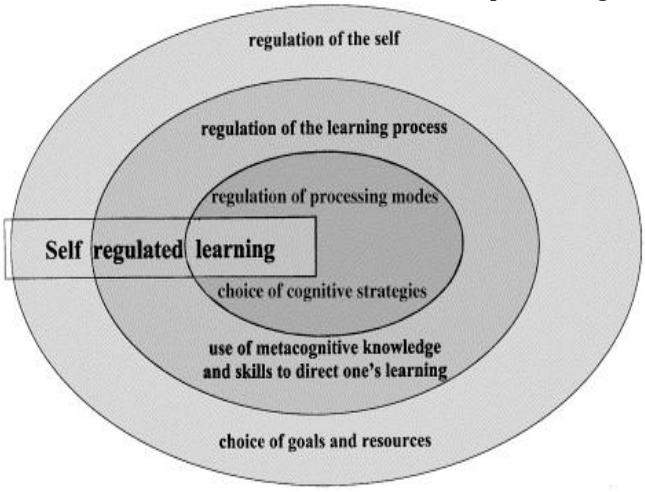
Self-Regulated Learning Strategies:

Self-regulated learning integrates learning strategies and mental processes that learners consciously engage to help themselves learn and achieve healthier gains academically (Shunk & Zimmerman, 1998). Various learning strategies can be employed when promoting self-regulated learning. Initially, students need to organize their information over their chosen topics. This can be done by outlining, summarizing, highlighting text, rearranging materials, brain storming and creating mental maps. Once the organizational steps have been implemented, students can then focus more on their overall goals. Students can develop goals in a variety of ways. Sequencing steps or delineating time management schedule will allow students to monitor their progression when concluding a problem.

Characteristics of Students Who Self-Regulate their Learning:

According to Zimmerman (2001, 2002) the characterizes self-regulating students is their active participation in learning from the metacognitive, motivational and behavioural point of view. The characteristics attributed to self-regulating persons coincide with those attributed to high-performance, high-capacity students, as opposed to those with low performance. The following are the characteristic differentiate the students who self-regulate their learning:

- They are familiar with know how to use a series of cognitive strategies.
- They know how to plan, control and direct their mental processes toward the achievement pf personal goals.
- They plan and control the time and effort to be used on tasks, and they know how to create and structure favourable learning environment.
- They show greater efforts to participate in the control and regulation of academic tasks, classroom climate and organization of works.
- They maintain their concentration, effort and motivation while performing academic tasks.



Pintrich (2000) proposed a theoretical frame work based on a socio-cognitive perspective. In this model, regulatory processes are organized according to four phases: (a) planning, (b) self-monitoring, (c) control and (d) evaluation. Within these phases, self-regulation activities are in turn structured into four areas; cognitive, motivational, behavioural, and contextual. Besides these four phases Zimmerman and Weinert (1996, 1998) also identified the metacognitive strategies of self-regulated learning.

What is Meant by Self-Regulated Learning?

Zimmerman and Schunk (1989) define self-regulated learning in terms of self-generated thoughts, feelings, and actions, which are systematically oriented toward attainment of students' own goals. Over the past decade the construct has been heavily researched. Many influential educational psychologists have proposed theoretical models and set up cross-sectional and longitudinal studies to produce theoretically relevant as well as pragmatic information about self-regulated learning.

SRL: the Search for Learning Or Processing Styles:

In the last decade it has become clear that one of the key issues in self-regulated learning is the students' ability to select, combine, and coordinate cognitive strategies in an effective way. Biggs (1987), Entwistle (1988), Marton and Säljö (1984), Pask (1988), and Vermunt (1992) have described students' learning styles as the characteristic modes of organizing and controlling cognitive processes. Learning style research has been mainly taxonomic in nature, seeking to identify the typical

SRL: How Students Steer and Direct their Learning Process:

A second key aspect of self-regulation is the students' ability to direct their own learning (the middle layer of the SRL process in Fig. 1). Researchers working within the tradition of "metacognition" have devoted much attention to these regulatory processes. They redefined successful learning as the attainment of metacognitive knowledge in the service of organizing one's learning in such a way that domain-specific knowledge and skills can be acquired.

SRL: How Students Try to Self-Regulate:

An up-to-date hallmark of self-regulated learning that has not been mentioned is the students' involvement in and commitment to self-chosen goals. This includes their ability to define ongoing and upcoming activities in the light of their own wishes, needs, and expectancies, and their ability to protect their own goals from conflicting alternatives.

Guidelines and Suggestions Provided in this Special Issue:

The contributors to this special issue present information that has accrued within specific subfields of self-regulation. They discuss several key issues of self-regulated learning, providing suggestions as to how the modelling, scaffolding, and fading of self-regulatory skills could be done. Most contributors defend the view that it is extremely important that educators and teachers know which strategies are part of self-regulated learning. Monique Boekaerts is Professor of Educational Psychology at Leiden University (The Netherlands) and chairs the Research Committee of the Faculty of Social Sciences. She has written over 100 scientific articles and book chapters. As a principal investigator, she is supervising a national school reform program in vocational schools. Her main field of interest is self-regulated learning with a focus on motivation, volitional control, coping with stress, and soliciting social support.

Conclusion:

Self-regulated learning is a vast field that serves as a lens through which to comprehend factors that affect students' learning. The previous two decades have seen the growth of SRL into one of the main topics of study in educational psychology, and the developments we are seeing now indicate that this will remain the case. The SRL models are advantageous for interventions under many conditions and populations, which is one finding from this review that needs additional consideration by academics and practitioners. Researchers can use the SRL models that best fit their study aims and focus because they cover a variety of research topics (such as emotion regulation and collaborative learning). Having a variety of models increases the effectiveness of researchers' and educators' interventions.more successfully I'd want to conclude by urging the next generation of researchers to take the initiative in creating fresh strategies, metrics, and, of course, SRL models or to keep verifying the ones that already exist. Future developments should encourage modifications to our knowledge of SRL and the methods used in study.

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