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# Teaching Self-Regulated Learning in Classrooms

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**Abstract**—The purpose of this paper is to look at various ways on how self-regulation is conducted in schools in order to promote better academic performance among learners. Different studies were reviewed where self-regulation was implemented as an instructional intervention with different measures of performance. Aside from looking at self-regulation as a powerful mental resource that helps students learn, this paper presented some ways on how it is facilitated in classroom. Recent studies on self-regulation showed that it becomes a powerful way to facilitate learning when it is integrated with technology using some applications, and when the learning model is parallel with the skills in the subject area.

**Keywords**—*Self-Regulated; Learning in Classroom;*

## I. INTRODUCTION

Over the past two decades, researchers have devoted on studying the constructed self-regulation as an important factor that promotes student's learning. Self-regulation is defined by Zimmerman (2002) as self-generated thought, feeling, and action that are oriented to attaining goals [24]. Zimmerman (2000) further explains that self-regulated learners are characterized to be "proactive in their efforts to learn because they are aware of their strengths and limitations and because they are guided by personally set goals and task-related strategies" (p. 66) [25]. Learners who are academically self-regulated are independent in their studies, diligent in listening inside the classroom, focused on doing their task inside the classroom, inclined to get high scores in tests, able to recall teacher's instruction and facts, and submitting qualified works [13].

Numerous studies have indicated that learners who adapt effective strategies of self-regulation in their studies and tasks are able to perform well [12,4,7,9,6,13]. A metanalysis that was conducted by Dignath, Buetner, and Langfeldt (2008) across 48 studies reported an overall effect size of .69 where self-regulation largely affects student performance [8]. The studies demonstrating effects of self-regulation in terms of design are twofold. The first tradition of studies looked at self-regulation as self-report where it pertains to dispositional characteristics of learners. These set of characteristics include setting specific goals for themselves, adapting powerful learning strategies for attaining the goals, monitoring one's performance for signs of progress, restructuring one's physical and social context to make it compatible with ones' goal, managing one's time efficiently, self-evaluating one's methods, attributing causations to results, and adapting future methods. These factors were further extracted by Magno (2010) in a seven factor model that includes memory strategy, goal-setting, self-evaluation, seeking assistance, environmental structuring, learning responsibility, and organizing [14]. On studies where self-regulation is measured, the factors are commonly used as predictors of students' performance [15].

The second tradition of studies includes experimental designs where self-regulation is used as an intervention on different task performance [19, 23]. These instructional strategies

applying self-regulation were categorized by Bokaerts (1996) as (1) cognitive strategies that includes repetition, elaboration, organizational, and problem solving strategies. (2) Metacognitive strategies include metacognitive knowledge and metacognitive skills. (3) Motivational strategies that includes causal attribution and self-efficacy beliefs, action control, and feedback [5].

The present study focuses on different ways on how self-regulation is implemented as an instructional strategy inside the classroom. The previous studies on self-regulation as an intervention shows to be effective when it is integrated with technology and when it is subject-specific.

## II. METHOD

### A. *Self-regulation when integrated with technology*

Self-regulation instruction in recent studies are implemented with the use of technology. When computer-based lessons are presented to students, they tend to focus on the cognitive processes involved in learning, such as selecting relevant information, mentally organizing the material into a coherent organization, and integrating it with relevant prior knowledge activated from long-term memory [17].

Moos and Azevedo (2008) explained that in order for students to successfully navigate and study the materials presented in a computerized system, they need to make use of effective self-regulation strategies in order to enhance their learning. When studying materials through a computerized system, students are required to monitor, evaluate, and plan their own task, and think of new strategies to learn the lessons in a different mode.

There are several studies demonstrating that self-regulation skills are developed through LMS delivery modes. The study by Moos and Azevedo (2008) was able to extract self-regulation process during students' engagement in an LMS called hypermedia through think-aloud techniques. The LMS was also varied as to groups with conceptual scaffolding and no scaffolding. It was found in the study that self-regulation increased at the onset of studying the LMS and when there was the presence of conceptual scaffolding. Much of these findings supported the results of the previous study of Azevedo, Cromley, and Seibert (2004). It was consistent that adaptive scaffolding increased students specific self-regulation skills like activating prior knowledge, monitoring their emerging understanding by using several strategies, and engaging in adaptive help-seeking. In another study Magno and Ocampo (2015) investigated how self-regulation strategies used in an open high school program using online materials predict students' formative assessment markings [16]. Formative assessments results in English, mathematics, science, and social studies were used to see if students have progressed overtime with self-regulation strategies. It was found in the study that

self-regulation strategies had large effect sizes for each of the subject areas.

### III. RESULTS AND DISCUSSION

#### A. Self-regulation when taught as subject specific

Self-regulation instruction is effective when it is used to teach students on specific skills on different subject areas such as mathematics (problem solving) and language skills (reading comprehension and writing). Examples of studies implementing self-regulation in these learning areas are described.

The study by Perels, Dignath, and Schmitz (2009) created a learning environment in a mathematics class for three lessons. The learning environment is based on the phases of self-regulation by Zimmerman (2002). The intervention includes (1) teaching students the self-regulation strategies they will use in the math lessons. (2) Students worked on different strategies (positive attitude towards mathematics and learning, motivation, goal-setting, planning, dealing with distractions (internal and external), concentration, handling mistakes) in so called “expert groups” (jigsaw learning). (3) Students created a poster on the self-regulation strategies they used. (4) The lessons ended with the assignment of the strategies to the pre-action, action and post-action phases, whereby the students received a first impression of the self-regulation model. (5) Students were made to become aware of their positive and negative attitudes towards mathematics. (6) The students were told how to reach a long-term goal by planning small, precise steps. (7) The students talked about personal experiences with self-motivation. (8) Students were taught how to plan and concentrate. (9) Lessons how to deal with distractions were taught. The results showed that the experimental group that received the self-regulation instruction in mathematics were significantly favorable in all measures of self-regulation and the math test than the control group.

In the same way, the study by Cleary, Velardi, and Schnaidman (2017) applied a Self-Regulation Empowerment Program to teach students mathematics remediation. The instructional program included a foundational module to the students which engaged interactive self-regulation activities with students. This was followed with a strategy and practice module where explanation, modeling, and guided practice opportunities for students to use different strategies to directly enhance their learning were provided. The final step was the self-reflection module where students receive feedback on their performance on the target. The group that went through the self-regulation empowerment exhibited a statistically significant and more positive trend in achievement scores in mathematics over two years in middle school relative to the comparison condition.

Moreover, Schmitt, McClelland, Tominey, and Acock (2015) implemented self-regulation intervention for eight weeks among children in a head-start program. The intervention program on self-regulation involves using classroom-

based movement and music games to help children practice integrating working memory, attentional flexibility, and inhibitory control. Group comparisons also revealed that the intervention was related to significantly higher math skills for children who were English language learners.

The effect of self-regulation was also notable in studies where language is the dependent variable. In experimental designs, the most common dependent variable used for language is reading comprehension and writing. Spörer and Schüneemann (2014) combined reciprocal teaching and self-regulation strategy procedures on reading comprehension [22]. When the reciprocal teaching was combined with strategy instruction and self-regulation outperformed students on their reading comprehension who only went through reciprocal reading instruction. Likewise, Souvignier and Mokhlesgerami (2006) combined self-regulation strategies with cognitive self-regulation and motivational self-regulation to improve students reading comprehension. The combination of these three strategies had the strongest effect on reading comprehension.

In the domain of writing, Bailey, Zanchetta, Velasco, Pon, and Hassan (2015) built a six-step process that includes self-regulation, to build a scholar of writers [3]. They found that understanding and critical writing skills were developed overtime. Likewise, the study by Bai (2015) applied nine strategy based lessons [2]. The findings show that the intervention achieved a significant treatment effect on both the participants' writing competence and their strategy use, namely, text-generating, feedback handling, and revising. The most common self-regulation strategy for writing used in studies is the Self-Regulated Strategy Development (SRSD). For example, Festas et al. (2015) examined the effects of the SRSD on students' opinion essay [11]. Multilevel modeling for repeated measures indicated SRSD instructed students made statistically greater gains in composition elements than the comparison students immediately after instruction.

### IV. CONCLUSION

Examples of studies showing how they implemented self-regulation strategies were presented in the present report. The two focus on the self-regulation intervention integrated with an online or technology environment and teaching the strategies consistent with the learning area such as mathematics and language was consistent with the categories noted by [8]. They mentioned three categories of self-regulation implementation: when being situated in a context, and fostering a high amount of student activity. However, in the present report, the context is further seen as the different learning domains such as problem solving, reading comprehension and writing. On the other hand, fostering high amount of student activity is mostly facilitated in contemporary studies with the use of online resources where students independently accomplish the task.

On context specific implementation of self-regulation such as in teaching mathematics and language, there are other domains such as scientific inquiry skills, social studies investiga-

tions, arts, and crafts that needs further reviews. The studies presented for mathematics and language are the common areas where self-regulation are implemented. Further, research needs to be conducted in the other learning area.

Self-regulation implemented with online resources needs to be further investigated in the following areas: (1) Identify categories of software applications needs to be made to see how self-regulation works in these variations. (2) Determine the specific self-regulation skills being developed at every stage of the technology integration. (3) When the specific self-regulation components are identified at each stage of technology use, the sequence of these strategies can be identified and further see how it is consistent with the phases that Zimmerman (2002) has established [24]. This allows the model to be tested when mediated with technology.

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