Could Self-Regulated Learning be Taught to Students?

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Abstract

The high number of students with low capacity for self-regulated learning (SRL) indicates the poor contribution of teacher-organized instructional activities to foster students' independent learning. Cognizant of this situation, the present study aims to facilitate the development of students' SRL capacity. For this purpose, following the non-equivalent pre-test-post-test experimental design, the study applied the self-regulation based learning model (SRLM). Eighty-one (81) senior high school students were involved in this study. Their level of SRL was measured using the self-regulated online learning questionnaire (SOL-Q) and was further analyzed using the one-way ANOVA. This study confirmed the significant effect of SRLM on the development of students' self-regulated learning.

Keywords: *Self-regulated learning, learning, self-regulation-based learning model, educational psychology*

Introduction

Of the key questions the present education world—in relation to the 4.0 industrial revolution—should address is *what* knowledge, skills, attitudes, and values contemporary students need in order to develop as well as to improve the quality of their life and *how* the present instructional system could advance those knowledge, skills, attitudes, and values effectively. To prepare the students obtaining adequate readiness to face the increasingly changing societies and challenging future, schools are expected to facilitate the development of students self-independent learning, often called self-regulated learning (hereafter SRL) (OECD, 2018). Studies have found that SRL does not only boost academic achievement but also improves students' well-being (Sandhu & Zarabi, 2018).

Zimmerman and Schunk (2003) refer SRL to refers to "learning that results from students' self-generated thoughts and behaviors that are systematically oriented toward the attainment of their learning goals" (p. 59). It involves the ability to control and influence the process of an individual's learning, for example, its planning, goal setting, and choosing of strategies to be applied (Schunk, Pintrich, & Meece, 2008). Zimmerman (2008) furthermore emphasizes that SRL is not a mental ability or academic performance related skills, such as intelligence and reading skill. SRL is rather a *self-directive* process in which students modify their mental ability into academic skills. With this in mind, learning is seen as an activity performed by the students, who proactively seek for and identify what knowledge they really need to acquire. In other word, self-regulation refers to the students' thoughts, feelings, and actions that they develop and are oriented towards their goal attainment (Zimmerman, 2000). The students are proactive in their learning as they recognize their strengths and weaknesses and as they are guided by the goals they themselves set. Moreover, they monitor their behaviors whether or not they are in line with the goals they pre-set as well as reflect on their effectiveness to achieve those goals. This mechanism furthermore allows the improvement of their satisfaction, motivation, and learning strategies.

A number of studies have revealed that SRL shows significant contribution to academic achievement. A study by Eom (2015) of 372 students found that self-regulation strategy significantly influenced students' mastery of the learning outcomes. Another study by Alotaibi, Tohmaz, and Jabak (2017) of 356 samples furthermore shows positive relationship between self-regulation and academic success. Additionally, Latipah's (2010) meta-analysis concludes the positive correlation between self-regulation and academic achievement. SRL is also found to significantly contribute to health-problem resolution. In line with social-cognition theory, the process of regulating individual's health could be taught through social modeling, support, and feed-back. Once the patients are able to model the expected heathy behaviors and independently regulate their behaviors, those external supports are withdrawn. This self-regulated modelling for example was found effective to control patients with lung problems, especially in the case of asthma and smoking (Clark & Zimmerman, 2014). These studies shed light on the importance of facilitating the development of students' SRL.

A number of studies furthermore has been done on SRL. These studies employed varied learning models, which offer some elements that could be further elaborated to promote students' SRL. Alexiou and Paraskeva (Alexiou & Paraskeva, 2010), for example, employed *e-portfolio tool* to promote students' self-regulation. Their e-portfolio activities included "reflective questions" at the end of each stage of SRL—goal setting, performance monitoring, self-reflection. The work of Zuraida, Suryaningtyas, and Nurwijayanti (2017) examines the use of problem-based learning (PBL) to enhance students' self-regulation. Both the e-portfolio and the PBL approaches are seemingly were not specifically designed to enhance students SRL. They are oriented more towards the acquisition of learning contents. In this sense, learning tasks are seen to be fulfilled once the students demonstrate their mastery of the contents. In fact, to teach and to facilitate learning is not merely about content-mastery. It rather fundamentally is about positive learning behaviors, in which self-directed, positive attitudes and behaviors are the key for further academic success.

As this body of research has shown, studies into SRL have mainly focused on its use to enhance academic achievement including the mastery of subject contents. While it is valuable, the ways those studies approached SRL have left students' SRL skills and capacity remained untouched; indeed, students would benefit from SRL only if they have adequate SRL capacities. This is the gap that the present study aims to fill in, that is, not by testing the adequacy of SRL to improve students' academic performance, but rather by making SRL a set of new skills for students.

Self-regulation based learning

A number of studies have revealed that students could be a self-regulated learner and teacher could teach SRL to them. Through their learning activities, teachers could facilitate their students to be a self-regulated. The main key to SRL is that the students should have a great level of self-awareness of their behaviors, motivation, and cognition (Pintrich, 2000).

Self-regulation guidance-based learning refers to the learning activities that integrate teachers' choice of learning models with treatments designed to develop students' SRL. In this approach, students are taught to proactively set their goals and develop their plans to achieve those goals. Students are taught to actively and efficiently manage their learning through different ways (Boekaerts, Pintrich, & Zeidner, 2000).

Zimmerman (2000) suggests three cyclical phases of self-regulation: *forethought*, *performance control*, and *self-reflection* (Figure 1). In phase 1 (forethought), the learners are required to analyze the tasks, set the goals, develop the plans to achieve those goals, and develop various motivational beliefs that activate their learning strategies. In phase 2, the students are encouraged to engaged in self-instruction, attention-focusing, self-recording, and self-experimentation. In phase 3, the students assess how they met the task, make attributional judgment on their success or failures. These attributions will lead them either to positive or negative self-reaction that will in turn influence the way they will approach future tasks.
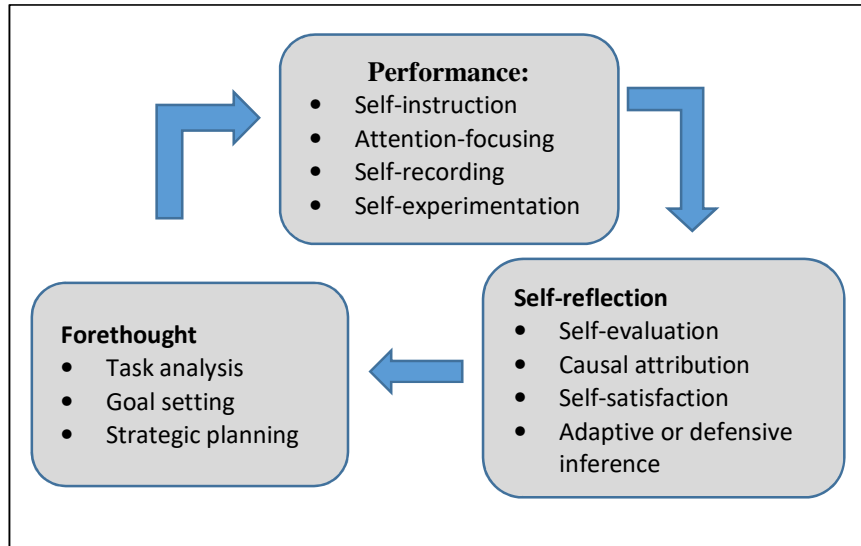
Figure 1 Cyclical phases of SRL

Method

Experimental design and subjects

This study employed *non-equivalent pretest-posttest control group experimental design*. The participants were selected from grade XI students of a Senior High School in Kota Semarang, Central Java, Indonesia. In total, 72 students participated in this study and were grouped into two, each with 36 students for the experimental and control groups respectively.

Instrument

The SRL measure used in this study was developed from the existing SOL-Q (The self-regulated online learning questionnaire), which was further validated for its usage for Indonesian users. The questionnaire includes 25 items, which cover the ability in goal setting, monitoring the learning progress, controlling the adoption of learning strategies, and self-reflection.

Procedure

A series of treatments was given to the subjects based on Zimmerman's (Zimmerman, 1990) SRL strategy, which was slightly modified. Table 1 shows the way the participants were guided to commit to the SRL strategy.

Table 1 SRL strategic actions

Strategic actions	Description
Goal setting and planning	The statements demonstrate clear formulation of students' learning objectives and sub-objectives, the plans of achievement stages, time schedule, and activities to achieve those goals.
Self-evaluating	The statements demonstrate students' initiatives for evaluating the quality and progress of the task at hand.
Seeking information	Statements demonstrate students' initiatives that show their efforts to gather information, such as collecting textbooks, journal articles, etc. when they are given the assignments.

Cont. Table 1. SRL

Keeping record and monitoring	Statements demonstrate students' efforts to record events or outcomes. For example, making a list of words that are wrongly spoken.
Environmental structuring	Statements demonstrate students' efforts to select or organize the space to make learning easier. For example, turning off the cellphone so they could concentrate on the task at hand.
Rehearsing and memorizing	Statements demonstrate students' efforts to memorize the subject matter directly such as writing mathematical formulas or in their mind.
Seeking social assistance	Statements demonstrate students' efforts to seek for help from their peers, teachers, and/or other adults. For example, when I found a difficult doing mathematical assignment, I ask a friend for help.
Reviewing record	Statements demonstrate students' efforts to reread notes, tests, or textbooks, to prepare lessons they would attend or tests they would sit in.

It should be noted here that continuous success in carrying out the assigned tasks is considered to be the main source of the increase self-efficacy (Purwanto, 2014). Consequently, when guiding their students to analyze the tasks and to set the learning goal (Table 1), teachers should ensure the levels of the goals. In other words, students are recommended to start from the goals that are not too difficult to achieve.

Results and discussion

The results of the Variance Analysis show the score of F = 294,554 with a significance score of 0,000. This means that there were significant differences in SRL between the participants in the experimental group and their counterparts of the control group (Table 2). The average score of the experimental group participants' achievement was 8.89 higher than the average of those of the control group.

The increase in SRL score is higher among the experimental group participants, especially in aspect of the use of strategies to make goal-setting, followed by aspects of controlling the implementation of learning strategies, and monitoring the learning progress. The use of SRL's strategy in the form of self-reflection on learning outcomes achieved, however was found to not significantly increase.

Table 2. Summary of the variance analysis results

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1605.556	1	1605.556	294.554	.000
Within Groups	381.556	70	5.451		
Total	1987.111	71			

The results of the measurements of the students' SRL, which was carried out one week after the application of SRL development program, show that the level of students' SRL remained high. Figure 1 shows the SRL mean increased significantly at posttest 01 and remained high at posttest 02.

This study found two main factors that led to the success of the SRL development program. Firstly, the SRL development was done in an integrated way, in which the development of students' capacities for self-regulation are combined with mastery of subject contents. Secondly, the students practiced

those capacities and skills in their daily learning activities. In this way, when a problem or issue, which was not in line with the overall design, emerged, an alternative or solution was immediately discussed. This is in line with the findings in previous study by Vandevelde, Vandenbussche and Keer (2012), that the key to the success of teachers in promoting SRL students is that teachers must be able to help students set the right learning goals, monitor their learning progress accurately, and make necessary adjustments.

In addition to those two factors, the study noted that contributed to the development of students' capacity was the teachers' capability to foster students' confidence that they are able to regulate their behaviors towards achieving the goals they want. Through so doing, students were encouraged to implement self-regulation strategies such as setting close targets to achieve, designing a number of activities to achieve them, and implementing each plan with high commitment, and celebrating success in achieving these targets. These activities had in turn enhance students' academic morale and commitment. Locke and Latham (2007) explain this mental mechanism as follows: a success in fulfilling a committed target is a reward for a person that will reinforce his commitment for future goals and targets.
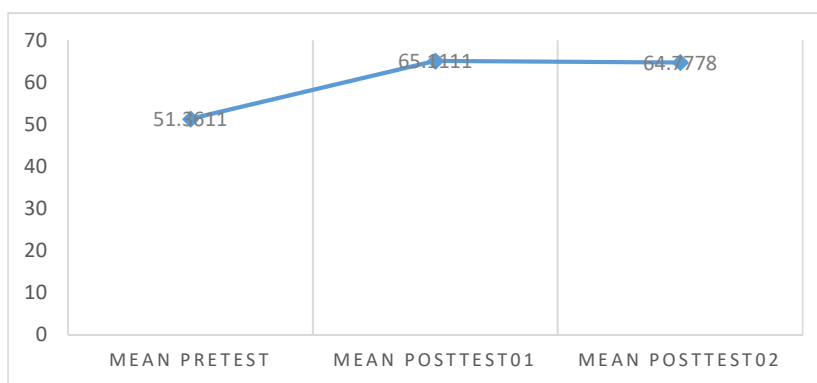

Figure 2. Graphic of students' respect score

The results of the random interviews of experiment group participants found that they had never been taught by the teacher how to regulate themselves. In this case, to set achievable learning goals by designing and applying appropriate learning strategies and monitoring learning progress was positively responded by the participants. This finding confirms the previous findings by Pintrich (2000) that SRL, indeed, can be taught. The finding is furthermore in line with Salter's (2012) study of the high school students that the application of the self-directed learning approach increased students' SRL.

The findings of the present study have clearly shown that the success of SRL promotion depends on teachers' ability to help students develop their positive learning behaviors and self-confidence. Given the small samples the present study involved, it is recommended that future study should expand the samples size. Additionally, in the present study the promotion of SRL was integrated into the conventional teaching schedule. It is assumed that promoting SRL in particular classroom meetings throughout a semester might be more effective more effective and less disruptive that what was done in the present study. Future study should try out this possibility, through which hopefully a reliable protocol of SRL promotion could be established for further replication purpose.

Conclusion

The use of self-regulatory instructional model is found to be effective to enhance students SRL. Through the subjects they taught, teachers could teach a number of SRL strategies in an integrative way. They could teach their students to analyze the assignments, set their learning goals, choose appropriate strategies, commit to their learning plan, monitor their progress, and reflect on their learning effectiveness and modify the less effective strategies.

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