

ASSESSING SELF-REGULATED LEARNING IN PRIMARY SCHOOL: A SYSTEMATIC LITERATURE REVIEW

Dea Fikri Leila Qadaristin¹,
Universitas Pendidikan Indonesia,
fileiqadea@upi.edu

Received: January 10th 2021

Revised: February 20th 2021

Accepted: March 25th 2021

Abstract: Self-regulated learning needs to be instilled in elementary school-age children because it can help students discover new experiences by seeking information and actively learning independently. Students who organize themselves are theoretically more aware of the task's demands, can accurately predict whether they can meet these demands, are more efficient at learning, relate results to aspects of learning under their control, and have a list of the learning strategies they use appropriately. In a variety of learning situations. The growing interest in research on self-regulated learning has led to self-regulated learning measures, especially in elementary schools, which researchers rarely do. The method in this study uses systematic literature review by identifying instruments that measure self-regulated learning. Steps are taken through several stages of identifying and filtering articles with predetermined criteria. The results of this study will obtain an overview of the distribution of instruments used in elementary schools as a consideration in measuring the self-regulated learning of elementary school students effectively.

Keywords: Measurement, Elementary School, Self-regulated learning, Systematic literature review

OPTIMA: Journal of Guidance and Counseling
Website: <http://ejournal.upi.edu/index.php/OPTIMA>

Permalink:

How to cite (APA): Qadaristin. (2021). Assessing Self-Regulated Learning in Primary School: A Systematic Literature Review. *OPTIMA: Journal of Guidance and Counseling*, 1(1), Page.55-72



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Self-regulated learning is an active and constructive process where students set their learning goals, monitor, regulate, and control their cognition, motivation, and behavior during the learning process to achieve learning itself. Elementary school students are the most critical part of building character. In that position, characters can be easily formed compared to middle school students. This is because other thoughts have not contaminated elementary school students. Self-regulated learning has demonstrated a key concept in explaining student initiative, persistence, and adaptive capacity (Zalazar-Jaime

& Medrano, 2020). Many factors influence students' character building and academic success, one of which is the ability to self-regulate in learning activities in elementary schools. Self-regulated learning has a vital role in implementing the teaching and learning process, especially in determining the teaching and learning process success. Students whom self-regulated learning can manage and direct themselves and adjust and control themselves, especially when facing difficulties in the learning process. Self-regulated learning emphasizes the importance of personal responsibility and controlling the knowledge and skills acquired (Zimmerman, 2008).

In many situations, people are faced with new knowledge and skills that they want to learn or need to learn. When there is no external guidance, students must self-regulate the learning process (Kistner et al., 2010). Children develop the capacity to organize themselves during the primary school years (Lombaerts et al., 2009). In education, self-regulated learning has had a very significant effect, especially for middle school students. Regarding self-regulated learning across the age spectrum, primary school children have not been adequately researched (Xu et al., 2010). That needs to acquire knowledge and skills by taking on independent learning to become a learning individual. They are aware of what and how they have learned, and lack their knowledge and skills while learning, which allows them to organize themselves (Chaves-Barboza et al., 2017).

The importance of self-regulated learning for children to have to start from elementary school refers to the perspective of self-regulated learning requiring a striking schematic change from seeing students as passive recipients of knowledge to being active contributors in the classroom. As a result, the teacher's role has evolved from being a source of knowledge to being a facilitator of knowledge, focusing more on process than content. Self-monitoring is an essential aspect of the self-regulated learning process because it provides students with an income to assess progress against learning goals. Students who used self-monitoring were more successful academically than those who did not. Although several factors can lead to a lack of self-monitoring, research shows that students do not monitor adequately because they have a wrong perception of a task or goal; misunderstanding how cues are relevant to performance; overwhelmed by cognitive demands during monitoring, and; lack of motivation to change their approach to the task at hand (Barber et al., 2011). These problems are challenges for teachers to facilitate self-regulated learning student.

Self-regulated Learning

Self-regulated learning refers to how students become the 'masters' of their learning process—mental abilities and performance skills (Zimmerman, 2015). Self-regulated learning is a concept to explain how students actively participate in their learning and exhibit goal-directed behavior (Yang, 2005). theory Self-regulated learning emphasizes individual management's ability and recognizes that the overall process occurs in the social environment (Chaves-Barboza et al., 2017). The constructivist perspective in learning theory recognizes that what students learn is not a reflection of absolute reality. Students actively or based on experience build life and thinking patterns by observing and participating with others (Thoutenhoofd & Pirrie, 2015).

In the perspective of self-regulated learning, students are seen as active participants in the learning process. Students are assumed to construct their meanings, goals, and strategies from information available in the external environment and information in the internal environment. Self-regulated learning is organized in three phases: planning, performance, and self-reflection. Students analyze the task, set goals, plan how to achieve them in the planning phase, and several motivational beliefs energize the process and influence learning strategies. The "before learning" process is hypothesized to influence how students will engage during learning assignments or performance, such as the degree to which they use strategies and their efforts to monitor learning progress (Peters-Burton & Botov, 2017). In the performance phase, students carry out tasks, monitor how they develop, and use several self-control strategies to keep themselves cognitively engaged and motivated to complete the task. Finally, in the self-reflection phase, students assess how they have performed the task, making attributions about their success or failure. These attributions produce self-reactions that can positively or negatively influence how students approach their next assignment (Panadero, 2017). By applying self-regulated learning, students can regulate themselves in learning by involving cognition, metacognition, motivation, and dynamic behavior and controlled learning or, in other words learning based on self-regulation.

Research has well documented the importance of self-regulated learning in improving student academic achievement. Students who use more self-regulated learning strategies are more likely to get better academic performance (Bai & Guo, 2019). Students who have the ability to self-regulated learning are expected to influence the achievement of academic success. Students will be more independent and have high self-confidence not to be afraid to express

opinions or ideas during the learning process. Students will be better able to organize themselves and not easily give up when faced with learning difficulties. Students will have independence in carrying out assigned tasks, plan, manage, and become more competent in managing the time they have to learn. It is hoped that teacher autonomy and suitable teacher structures promote self-regulated learning because they enable them to meet students' basic psychological needs for competence and independence (Sierens et al., 2009).

Bandura's (Clark & Zimmerman, 1990) research on children noted that while parents and other adults act as external control agents and models for children's behavior, simply transferring behavioral control from external agents to the child does not equip them to be adaptive to the dynamic conditions that are usually encountered.

According to Schunk and Zimmerman, self-regulatory behavior can be developed from preschool age (Perels et al., 2009). Therefore, it is imperative to support self-regulated learning productive in the first years of primary school. Students need to be given sufficient time and opportunity to develop self-regulated learning competencies that enable deep-level learning and enable them to adapt to various learning strategies. However, promoting self-regulated learning in primary school students appears challenging because of the variation in content in study characteristics. This shows that differences in self-regulated learning are related to individual background characteristics (Heirweg et al., 2019). An essential part of integrating self-regulated learning instruction into regular primary school instruction is ensuring that it meets students' needs of various achievement levels. To ensure that both gifted students and those of average benefit equally from self-regulated learning intervention, all students need learning situations self-regulated learning tailored to each level of achievement and, thus, allowing them authentic to feel the benefits of self-regulated learning. Only once the intervention is self-regulated learning successful in offering appropriate learning content for students of varying achievement levels will all students be able to realize, through experience, that improving their learning behavior leads to higher achievement (Stoeger et al., 2015). Students take an active role in selecting appropriate learning resources, planning their study time, and monitoring and managing their cognitive learning activities. This process helps develop self-regulated learning skills by students (Van Den Hurk, 2006).

Measurement of Self-regulated Learning

This section will provide an overview of the various types of instruments and describe their specific characteristics, taking into account the general problems of self-regulated learning (Perry & Winne, 2006).

Questionnaires

Questionnaires are usually developed according to a three-slot script. After items have been collected or written, the sample responses' exploratory factor analysis was performed to examine the correspondence between the responses and the developer model self-regulated learning used to produce individual items. Second, reliability coefficients, almost always internal consistency coefficients, are reported for full scale and subscale if any. Finally, full scale and subscale correlate with external measures, almost always an achievement. We use this script to describe LASSI and MSLQ.

Interview

Interviews cover a variety of protocols ranging from simple questions such as, "Tell me about how you ..." to highly structured questions that include specific questions that are asked verbatim along with rules that control following or follow-up questions that are followed up, asked based on new information course connected by students. Suppose students are asked to describe self-regulated learning based on memory about what is "typical" of behavior under certain circumstances or provide judgments about typical behavior in a reasonable future situation. In that case, this protocol is the interview, and self-regulated learning is measured as talent. The stimulated recall is an interview in which respondents describe their behavior after completing a specific task and sometimes reviewing records of engagement with that task, such as a videotape or worksheet. In this sense, self-regulated learning can be interpreted as either event or aptitude, depending on the measurement intervention's details.

Think Aloud Protocol

Think aloud protocol is where a student reports about his thoughts and cognitive processes while doing a task. Teachers have been using this method for a long time when they ask students, "Describe your work." Think-aloud protocols can be unstructured or follow a formal, conditional script that dynamically adapts questions or comments that observers make depending on how students behave or whether students mention certain information. The primary purpose of using the Think aloud protocol is to map models of self-regulated learning.

Learning Diary

Learning diaries allow researchers to measure sensitively daily or weekly learning strategies over some time. Also, through the use of analysis time-series, the researcher makes graphical depictions of student development. Researchers have identified several indications of a helpful learning diary for assessing self-regulated learning. Students may be more open in the diary than in other forms of assessment. It is unclear whether this is due to the potential for limited validity in learning diaries or the utilization of rare low-level learning strategies (Roth et al., 2016).

Characteristics in Measuring Self-regulated Learning

This characteristic refers to (Roth et al., 2016), including (a) the intended focus of the measurement, (b) the level of situational specificity, and (c) the standard of measurement (quantitative vs. qualitative, online vs. offline).

First, instruments can be classified according to their intended measurement focus. Other authors focus on self-efficacy regarding self-regulated learning self-regulate, which is operationalized as a self-assessed ability to various academic learning forms such as studying and exam preparation (Kitsantas and Zimmerman 2009).

Second, the instruments differ in their degree of situational specificity. Lonka et al. (2004) distinguish between three levels of context: (a) general, (b) specific domains or courses, and (c) situation-specific. The technique thinks cloud measures self-regulated learning in particular learning situations with specifically defined learning tasks.

Third, instruments' self-regulated learning can be classified concerning their measurement standards. Wirth and Leutner (2008) distinguish between quantitative and qualitative standards offline and online (Desoete et al. 2003). The standard is offline based on a component-oriented model and can be used to assess student competence as a prerequisite for self-regulated learning without considering the process of self-regulated learning actual. In contrast, the online standard is based on a process model and is implemented to assess the process of self-regulated learning itself. Thus, online standards serve to assess whether students can use their competencies for self-regulated learning rather than simply checking whether students have specific prerequisites (Wirth and Leutner 2008).

Research Questions The

This systematic review aims to analyze the literature and produce an overview of instruments' self-regulated learning. Also, we aim to present the prescribed steps. In doing so, we answer the following questions regarding the

measurement of self-regulated learning in Primary. 1). Have types of instruments self-regulated learning are often used? 2). What instruments are widely used to measure self-regulated learning in the academic literature? What are the characteristics of their reliability, validity, and implementation?

METHOD

The current approach is based on the general paradigm of systematic literature review applied to articles on the measurement of self-regulated learning in higher education (Roth et al. al., 2016). This systematic literature review contains six consecutive stages as described below.

Stage I: Identification of Articles

He established the systematic literature review requirements for all categories using terms related to self-regulated learning, primary education, and learning. The initial search focused on the educational psychology and counseling guidance databases in SAGE, the Wiley Online Library, Springer, and Science Direct. The total number of articles collected was 162 articles.

Table 1
Interest categories and related terms for systematic literature review

Categories	Relate Terms
1. Self-regulated learning	Self-regulation, self-regulated learning
2. Measurement	Assessment, measurement, questionnaires, interviews, instruments, tools, scales, inventories, tests.
3. Population of interes	Basic education
4. Context of interest	Learning

We excluded 89 articles to meet at least one of the following exclusion criteria: the abstract did not mention a measure of self-regulated learning; articles do not focus on learning; it is not used in the primary school context.

Stage II: Secondary Search

At this stage, there are additional references that identify theoretical discussions, for example (Zimmerman 2015), (Winne, 2005), (Panadero, 2017). Several articles by the same researcher were also added as a compliment. Then added 15 additional articles, bringing the total to 104 articles.

Stage III: Filtering articles based on specific inclusion criteria

This stage involves reading the abstract and sections of the articles most relevant to the inclusion criteria (specifically the methodology). Stored articles are those that meet all of the following inclusion criteria: 1). The article contains measures of self-regulated learning, 2). Article available in English, 3). This study contains empirical results from the original study (excluding meta-analyzes, critiques, reviews, and case studies), and 4). This study focuses on the general student population and not on students with special needs. Of the 104 articles in stage II, 40 articles were excluded based on screening in stage III, so that 64 articles were obtained.

Stage IV: Gathering Additional Information Additional Information

This stage is obtained, especially in the topic of self-regulation, which explains how the process is carried out in primary school-age children.

Stage V: Filtering by Academic Attendance

At this stage, only retain instruments of international relevance that have been used in some articles. This results in 8 instruments used in 26 articles measuring self-regulated learning in primary schools.

Stage VI: Detailed Examination

The final steps are analyzed in depth. Critical data was extracted from the original article describing the development of the instrument. When analyzing the main instruments, we focus on their implementation characteristics and psychometric properties.

FINDINGS AND DISCUSSIONS

Specific Study Results

Table 2
Established Instruments

Name of Instruments	No 1	No 2	Total
Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al. 1991)	1	8	9
Online <i>Self-regulated learning</i> Questionnaire (OSLQ; Barnard et al. 2008)	0	6	6
Thinking aloud (Azevedo et al. 2004a)	2	2	4
<i>Self-regulated learning</i> Interview Schedule (SRLIS; Zimmerman and Martinez-Pons 1986)	1	1	2
Academic <i>Self-regulated learning</i> Scale (A-SRL-S; Magno 2009a)	1	1	2

Learning and Study Strategies Inventory (LASSI; Weinstein et al. 1987; Weinstein and Palmer 2002)	0	1	1
Self-Efficacy for Learning Form (SELF; Zimmerman and Kitsantas 2007)	0	1	1
Self-Efficacy for <i>Self-regulated learning</i> Scale (SESRL; Gredler and Schwartz 1997; Garavalia and Gredler 2002)	1	0	1

No 1 Number of studies exclusively using the instrument mentioned. No 2 Number of studies using instrument parts in the compilation of measurements The sample size of 26 articles ranged from 24 to 4,232 students. As much as 11% of the research focuses on learning mathematics, 15% focuses on students' reading and writing. Meanwhile, 74% focused on self-regulated learning in general, especially on learning motivation.

What types of instruments are self-regulated learning often used?

Research using instruments in the questionnaire category was 61.53%, including MSLQ, A-SRL-S, LASSI, SELF, and SESRL. Inner instrument category think-aloud was 15.38%, the category diary was 23.03%, namely the OSLQ instrument. Meanwhile, in the category interview, it was 7.69%, namely SRLIS.

What instruments are widely used to measure self-regulated learning in the academic literature? What are the characteristics of their reliability, validity, and implementation?

Table 3
Final Instruments: Scale and Characteristics

Instrument	No. Item	No. Scale	Scale	Format Response	Reliability
MSLQ	81	15	Motivation: Orientation purpose intrinsic, extrinsic goal orientation, task value, control belief learning, self-efficacy for learning and performance, test anxiety; Learning strategies: Exercise, elaboration, organization, critical thinking, self-regulation, metacognitive, studying environmental and time management, regulatory efforts, peer learning, seeking help.	Format Response 7-point Likert scale (1 = "absolutely not true for me" to 7 = "Very true to me.")	.52-.93 (Cronbach's alpha)

Assessing Self-Regulated Learning In Primary School: A Systematic Literature Review

LASSI	80	Three main scales, ten subscales	Skill: Information processing testing strategies, choosing main ideas; will: Anxiety, attitude; motivation; Self-regulation: Concentration, self-test, study aids, time management	5-point Likert scale (a = Not at all my typical to b = Very typical of me)	.73 - .89 (Cronbach's alpha)
A-SRL-S	55	7	Memory strategies, assignments goals, self-evaluation, seeking help, environmental management, responsibility, organizing a	4-point Likert scale (1 = "Strongly disagree" to 4 = "Strongly agree")	.73-.87 (Cronbach's alpha)
SQL	24	6	The environmental arrangement, determination goals, time management, seeking help, task strategy, evaluation self	5-point Likert scale (1 = "Strongly disagree" to 5 = "Strongly agree")	.85-.92 (Cronbach's alpha)
SELF	57	1	Overall scale: Self-Efficacy for Learning	100-point scale with 10 units (0% = "definitely	.98 (Cronbach's alpha)

Instrument	No. Item	No. Scale	Scale	Format Response	Reliability
				can't do it "up to 100% = " sure can do it")	
SRL	24	5	Organization and general planning, task preparation strategies, environmental restructuring, memory skills, typical study strategies	7-point Likert scale (1 = "Not good at all" to 7 = "Very good")	.63-.84 (Cronbach's alpha)

Assessing Self-Regulated Learning In Primary School: A Systematic Literature Review

SRLIS	-	15 categories - coding 38 categories - co-dean	System categories: Self-evaluation, organizing and transforming, goal setting and planning, information seeking, recording and monitoring, environmental structuring, self-consequence, practice, and memorization, seeking peer help, seeking teacher help, seeking Adult assistance, reviewing tests, reviewing notes, reviewing texts, other	Open response and a 4-point Likert scale (1 = "Rarely" to 4 = "Most of the time")	86 % (Interrater agreement)
Think aloud	-	38 categories - co-dean	System categories: Planning: Planning, goals, activation of previous knowledge, recycling of goals in working memory; Monitoring: Assessment of learning, feeling of knowing, self-questioning, evaluation of content, identifying adequacy of information, monitoring progress towards goals; Use of strategy: Selecting new sources of information [observation], coordinating sources of information, reading, review new paragraphs notes,	Open Response	.98 (Cohen's kappa)

Instrumen	No. Item	No. Scale	Scale	Format Response	Reliability
			memorization, free search, goal-directed search, summarize, take notes, draw, reread, conclusions, hypotheses, elaborate knowledge, mnemonics, evaluate content in response to goals, find locations in the environment; Difficulty and task demands: Planning time and effort, assisting in search of behavior, task difficulty, controlling context [observation], expectations of the adequacy of information; Motivation: Expressions of interest, positive feedback [tutor], negative feedback [tutor], ok [tutor], encouragement [tutor], choice [tutor]		

Several instruments were developed to assess self-regulated learning as a metacognitive construct, motivation, and behavior. The Learning and Study Strategies Inventory (LASSI) is a self-report inventory of 80 items of students' strategies to improve their learning practices (Zimmerman, 2008). LASSI involves ten scales assessing skills, volition, and self-regulation strategies, a classification system that fits definitions of metacognitive self-regulation, motivation, and behavior. The scale classified as a skill includes Concentration, Choosing the Main Idea, and Information Processing. The scale classified as volition includes Motivation, Attitude, and Anxiety. The scales classified as self-regulation (or behavior) include Time Management, Study Aids, Self-Tests, and Test Strategies. Students responded to the items on each subscale using a 5-point rating that ranged from entirely "not typical of me to very typical of me." Another questionnaire measure of self-regulated learning widely used is the Motivated Strategies for Learning Questionnaire (MSLQ). The 81-item questionnaire consisted of two main parts, namely Learning Strategy and Motivation. The

Learning Strategies section is further divided into a Cognitive-Metacognitive section, which includes practice, elaboration, organization, critical thinking, metacognitive self-regulation, and a Resource Management section, which includes managing the time and learning environment, business management, peer learning, and seeking help. The Motivation section involves a scale involving judgment, expectation, and influence. The grading scale includes Extrinsic-Intrinsic Goal Orientation and Task Value. The Expectation Scale includes Self-Efficacy and Learning Control, and the Affective section includes Anxiety Tests. The Motivation section, the Cognitive-Metacognitive section, and the Resource Management Strategy section deal with three elements in the definition of self-regulated learning, namely motivation, metacognition, and behavior. Students respond to questions on this scale using a 7-point rating that ranges from "completely untrue to me" to "very true to me."

The instrument used to assess self-regulated learning as a metacognitive construct, motivation, and behavior is the Self-regulated learning Interview Scale (Zimmerman & Martinez-Pons, 1988). During this structured interview, students are presented with six contexts of the problem they are asked to respond to, such as preparing for an exam or writing an essay. Answers to these open-ended questions were transcribed and coded into 14 categories of self-regulation that focused on motivation, metacognition, or behavior. Included among the motivation categories are self-evaluation reactions and self-consequences. The metacognitive categories are goal setting and planning, organizing and transforming, information seeking, and practicing and memorizing. Included among the behavioral categories are environmental structuring; keeping records and monitoring; reviewing texts, notes, and tests; and seek help from peers, teachers, and parents. Students' responses to each learning context were recorded for their frequency, and students were also asked to rate their consistency in using a particular strategy using a 4-point scale that ranged from infrequent to most of the time.

The Online Self-regulated learning Questionnaire (OSLQ) is a 24-item scale with a 5-point Likert response format that has values ranging from strongly agree (5) to disagree (1) strongly. SQL consists of six subscale constructs, including environmental structuring, goal setting, time management, seeking assistance, task strategy, and self-evaluation (Barnard-brak et al., 2010).

The Academic Self-regulated Learning Scale (A-SRL-S) was developed to measure self-regulation in their learning context. Each item was responded to by a four-point Lickert scale (Strongly agree, agree, disagree, and strongly

disagree). This scale consists of seven factors: memory strategy (14 items), goal setting (5 items), self-evaluation (12 items), seeking help (8 items), environmental setting (5 items), learning responsibility (5 items), and planning and organizing (5 items) (Magno, 2015).

The self-efficacy for self-regulated learning scale (SESRL) is a questionnaire designed to measure self-efficacy beliefs about general strategies and usage of certain SRL activities. It is a conceptual framework built on 13 SRL categories derived by Zimmerman and Martinez-Pons (Roth et al., 2016). As such, it is based on a component-oriented approach and uses quantitative offline standards. The factorial structure of the SESRL has been verified. However, some indications of convergent and discriminant validity were found.

The self-regulated learning interview schedule (SRLIS) is an interview designed to assess students' use of the SRL strategy in classroom and non-classroom contexts. In their primary publications, Zimmerman and Martinez-Pons (Roth et al., 2016) describe SRL as directed to acquire information or skills that involve agency, goals, and one's role as students. The SRL category comes from theory and research on social learning. This definition describes a component-oriented approach as well as the use of quantitative offline standards.

Loud-Thinking Techniques The Loud-Thinking Technique is designed to measure regulatory behavior in native learning situations. It is thus based on a process model and provides situational specificity and the use of quantitative online standards. Students' open responses were coded using a scheme consisting of categories classifying verbal information. Indications for discriminant validity indicate that the SRL strategy assessed by a hard-thinking technique distinguishes between two groups of separated students based on their improvement in conceptual understanding (Greene & Azevedo, 2007).

Discussions

The instrument most often used to measure self-regulated learning in elementary schools is the MSLQ. However, there is no self-regulated learning measure that simultaneously and fully represents all of these measurement targets (Winne & Perry, 2006). Because many abilities in constructs self-regulated learning reveal students' intrinsic motivation, it was decided that the self-report questionnaire was an excellent way to measure behavior self-regulated learning students' (Harding, Et al., 2018). Self-report questionnaires are the most commonly used protocols for measuring self-regulated learning, perhaps because they are relatively easy to design, administer, and assess. These steps inherently provide (a) information about students' memories and

interpretations of their actions and (b) their explanations of cognitive and metacognitive processes that the researcher cannot observe (Greene & Azevedo, 2007). Measurements are collected for purposes, and purposes can be served more or less valuable; that is, measurements have various utility levels for specific purposes. The most common objective measures of self-regulated learning are descriptive in baseline research. LASSI and MSLQ invite students to self-diagnose the quality of their approach learning and self-regulated learning, but formal studies of their diagnostic utility have not been conducted. (Winne & Perry, 2006).

Research on self-regulated learning and its measures so far includes a limited population distribution, most often involving post-secondary students as participants in studies. Very little is known about self-regulated learning in children. In measurements across the age spectrum, understanding measurement protocols and developmental trajectories will remain elusive. Self-regulated learning has important implications for students and teachers during the primary-secondary school transition years. Thus, it should not be underestimated that teachers will share responsibility and control of learning with students. Implementing daily classroom learning that strengthens students' self-regulatory capacities may require pedagogical changes by teachers who perceive they are in control of all learning in the classroom. Also, how teachers apply their collective understanding to this area of research has been identified as an under-explored area in theory self-regulated learning.

CONCLUSION AND RECOMMENDATION

Self-regulated learning has been widely discussed in educational research. However, the measurement of self-regulated learning remains a very challenging problem, especially for elementary school children. Based on a comprehensive multi-step process, a comprehensive set of scales was developed to assess children's perceptions of the use of self-regulated learning behaviors and strategies. This planning, monitoring, control, and regulatory process reflects the metacognitive component of self-regulated learning and can be applied to four areas: cognition, motivation, behavior, and context. Because the framework reflects the incremental structure and multi-component character of self-regulated learning, it is a valuable blueprint for developing a new comprehensive measurement instrument.

ACKNOWLEDGEMENTS

The author would like to especially thank Prof. Dr. M. Solehuddin, M.Pd, MA., Drs. Sudaryat Nurdin Akhmad, M.Pd., Dodi Suryana, M.Pd., and those who have guided and provided support so that the process of compiling this article can be completed

REFERENCE

- Bai, B., & Guo, W. (2019). Motivation and self-regulated strategy use: Relationships to primary school students' English writing in Hong Kong. *Language Teaching Research*, 3663. <https://doi.org/10.1177/1362168819859921>
- Barber, L. K., Bagnall, P. G., Grawitch, M. J., & Buerck, J. P. (2011). Facilitating Self-Regulated Learning With Technology: Evidence for Student Motivation and Exam Improvement. *The teaching of Psychology*, 38(4), 303–308. <https://doi.org/10.1177/0098628311421337>
- Barnard-brak, L., Lan, W. Y., & Paton, V. O. (2010). Learning Environment Self-Regulated Learning. *International Review of Research in Open and Distance Learning*, 11(1), 61–80. <https://doi.org/10.19173/irrodl.v11i1.769>
- Chaves-Barboza, E., Trujillo-Torres, J. M., López-Núñez, J. A., & Sola-Martínez, T. (2017). Actions and achievements of self-regulated learning in unique environments. Research on students participating in the Graduate Program in Preschool Education at the University of Granada. *Journal of New Approaches in Educational Research*, 6(2), 135–143. <https://doi.org/10.7821/naer.2017.7.236>
- Clark, N. M., & Zimmerman, B. J. (1990). A social cognitive view of self-regulated learning about health. *Health Education Research*, 5(3), 371–379. <https://doi.org/10.1093/her/5.3.371>
- Greene, J. A., & Azevedo, R. (2007). A theoretical review of Winne and Hadwin's model of self-regulated learning: New perspectives and directions. *Review of Educational Research*, 77(3), 334– 372. <https://doi.org/10.3102/003465430303953>
- Harding., S., Nibali., N., English., N., Griffin., P., Graham., L., Alom, B., & Zhang., Z. (2018). Self-regulated learning in the classroom: Realising the potential for Australia's high capacity students. Assessment Research Centre, Melbourne Graduate School of Education, June.
- Heirweg, S., De Smul, M., Devos, G., & Van Keer, H. (2019). Profiling upper primary school students' self-regulated learning through self-report questionnaires and think-aloud protocol analysis. *Learning and Individual Differences*, 70 (December 2017), 155–168. <https://doi.org/10.1016/j.lindif.2019.02.001>
- Kistner, S., Rakoczy, K., Otto, B., Dignath-van Ewijk, C., Büttner, G., & Klieme, E. (2010). Promotion of self-regulated learning in classrooms:

- Investigating frequency, quality, and consequences for student performance. *Metacognition and Learning*, 5(2), 157–171. <https://doi.org/10.1007/s11409-010-9055-3>
- Lombaerts, K., De Backer, F., Engels, N., Van Braak, J., & Athanasou, J. (2009). Development of the self-regulated learning teacher belief scale. *European Journal of Psychology of Education*, 24(1), 79–96. <https://doi.org/10.1007/BF03173476>
- Magno, C. (2015). Validating the Academic Self-regulated Learning Scale with the Motivated Strategies for Learning Questionnaire (MSLQ) and Learning and Study Strategies Inventory (LASSI) Validating the Academic Self-regulated Learning Scale with the Motivated Strategi. April 2011.
- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. <https://doi.org/10.3389/fpsyg.2017.00422>
- Frontiers in Psychology, 8(APR), 1–28. <https://doi.org/10.3389/fpsyg.2017.00422>
- Perels, F., Merget-Kullmann, M., Wende, M., Schmitz, B., & Buchbinder, C. (2009). Improving self-regulated learning of preschool children: Evaluation of training for kindergarten teachers. *British Journal of Educational Psychology*, 79(2), 311–327. <https://doi.org/10.1348/000709908X322875>
- Perry, N. E., & Winne, P. H. (2006). Learning from learning kits: gStudy traces of students' self-regulated engagements with computerized content. *Educational Psychology Review*, 18(3), 211–228. <https://doi.org/10.1007/s10648-006-9014-3>
- Peters-Burton, E. E., & Botov, I. S. (2017). Erratum to: Self-regulated learning microanalysis as a tool to inform professional development delivery in real-time (*Metacognition and Learning*, (2017), 12, 1, (45-78), 10.1007/s11409-016-9160-z). *Metacognition and Learning*, 12(2), 295. <https://doi.org/10.1007/s11409-017-9169-y>
- Roth, A., Ogrin, S., & Schmitz, B. (2016). Assessing self-regulated learning in higher education: a systematic literature review of self-report instruments. *Educational Assessment, Evaluation, and Accountability*, 28(3), 225–250. <https://doi.org/10.1007/s11092-015-9229-2>
- Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *British Journal of Educational Psychology*, 79(1), 57–68. <https://doi.org/10.1348/000709908X304398>
- Stoeger, H., Fleischmann, S., & Obergriesser, S. (2015). Self-regulated learning (SRL) and the gifted learner in primary school: the theoretical basis and empirical findings on a research program dedicated to ensuring that all students learn to regulate their learning. *Asia Pacific Education Review*, 16(2), 257–267. <https://doi.org/10.1007/s12564-015-9376-7>

- Thoutenhoofd, E. D., & Pirrie, A. (2015). From self-regulation to learning to learn: Observations on the construction of self and learning. *British Educational Research Journal*, 41(1), 72–84. <https://doi.org/10.1002/berj.3128>
- University, S. F. (n.d.). I measure self-regulated learning. [10.1016/B978-012109890-2/50045-7](https://doi.org/10.1016/B978-012109890-2/50045-7)
- Van Den Hurk, M. (2006). The relation between self-regulated strategies and individual study time prepared participation and achievement in a problem-based curriculum. *Active Learning in Higher Education*, 7(2), 155–169. <https://doi.org/10.1177/1469787406064752>
- Winne, P. H. (2005). Critical issues in modeling and applying research on self-regulated learning. *Applied Psychology*, 54(2), 232–238. <https://doi.org/10.1111/j.1464-0597.2005.00206.x>
- Xu, M., Benson, S. N. K., Mudrey-Camino, R., & Steiner, R. P. (2010). The relationship between parental involvement, self-regulated learning, and reading achievement of fifth graders: A path analysis using the ECLS-K database. *Social Psychology of Education*, 13(2), 237–269. <https://doi.org/10.1007/s11218-009-9104-4>
- Yang, M. (2005). Investigating the structure and the pattern in self-regulated learning by high school students. *Asia Pacific Education Review*, 6(2), 162–169. <https://doi.org/10.1007/BF03026784>
- Zalazar-Jaime, M. F., & Medrano, L. A. (2020). An Integrative Model of Self-Regulated Learning for University Students: The Contributions of Social Cognitive Theory of Carriers. *Journal of Education*. <https://doi.org/10.1177/0022057420904375>
- Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and prospects. *American Educational Research Journal*, 45(1), 166–183. <https://doi.org/10.3102/0002831207312909>
- Zimmerman, B. J. (2015). Self-Regulated Learning: Theories, Measures, and Outcomes. In *International Encyclopedia of the Social & Behavioral Sciences: Second Edition (Second Edi, Vol. 21)*. Elsevier. <https://doi.org/10.1016/B978-0-08-097086-8.26060-1>