



การพัฒนาแบบวัดการเรียนรู้แบบกำกับตนเองของนักศึกษาภูมิพวาระดับปริญญาตรี

THE DEVELOPMENT OF A SELF-REGULATED LEARNING SCALE FOR CAMBODIA UNDERGRADUATE STUDENTS

นายบุญเฮียง ซอ \*

Bunheang Chhar

อ.ดร.ธมรัตน์ ศิริภาพ \*\*

Thomrat Siriparp, Ph.D.

บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์เพื่อตรวจสอบคุณภาพของแบบวัดการเรียนรู้แบบกำกับตนเองของนักศึกษาระดับปริญญาตรี เครื่องมือวิจัยคือแบบวัดที่ประกอบด้วย 3 ตัวบ่งชี้ แต่ละตัวบ่งชี้มี 3 ข้อคำถามซึ่งอยู่ในรูปมาตรวัดของลิเคิร์ตแบบ 5 ระดับ ข้อมูลในการวิจัยนี้เก็บรวบรวมจากนักศึกษาระดับปริญญาตรีของประเทศกัมพูชาจำนวน 200 คน การวิเคราะห์ข้อมูลประกอบด้วยการวิเคราะห์ความเที่ยงแบบความสอดคล้องภายในโดยใช้สัมประสิทธิ์แอลฟาของครอนบาค และการตรวจสอบความตรงเชิงโครงสร้างโดยใช้การวิเคราะห์องค์ประกอบเชิงยืนยัน

ผลการวิจัยพบว่าแบบวัดมีความเที่ยงทั้งฉบับ 0.869 โดยมีค่าความเที่ยงขององค์ประกอบทั้งสามอยู่ระหว่าง 0.615 ถึง 0.740 การตรวจสอบความตรงเชิงโครงสร้างด้วยการวิเคราะห์องค์ประกอบเชิงยืนยัน พบว่า โมเดลมีความสอดคล้องกลมกลืนกับข้อมูลเชิงประจักษ์โดยพิจารณา ( $\chi^2 = 1.002$ ,  $df = 1$ ,  $p = 0.316$ ,  $GFI = 0.938$ ,  $AGFI = 0.630$ ,  $RMR = 0.013$ ,  $RMSEA = 0.022$ ) ค่าน้ำหนักองค์ประกอบสูงสุด คือ ตัวแปรการกำกับดูแล (0.751) รองลงมาคือ การวางแผน และ การสะท้อนคิด (0.687, 0.666 ตามลำดับ)

\* นิสิตมหาบัณฑิตสาขาวิชาวิธีวิทยาการวิจัยการศึกษา ภาควิชาวิจัยและจิตวิทยาการศึกษา

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

E-mail Address: [bunheang.chhar@gmail.com](mailto:bunheang.chhar@gmail.com)

\*\*อาจารย์ประจำสาขาวิชาวิธีวิทยาการวิจัยการศึกษา ภาควิชาวิจัยและจิตวิทยาการศึกษา

คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

E-mail Address: [thomrat.s@chula.ac.th](mailto:thomrat.s@chula.ac.th)

ISSN1905-4491

## Abstract

This study aimed to examine the quality of a self-regulated learning scale for Cambodian undergraduate students. The scale consisted of 3 indicators and each indicator comprised of 3 Likert scale items with 5 levels for each item. Data of this study were collected from 200 Cambodian undergraduate students. Data analyses included the internal consistency reliability analysis by means of Cronbach alpha coefficient, and construct validity assessment using a confirmatory factor analysis.

The results showed that the overall reliability was 0.869 and the reliability of each indicator ranged between 0.615 and 0.740. The confirmatory factor analysis showed that the measurement model of this scale was fit with the empirical data ( $\chi^2 = 1.002$ ,  $df = 1$ ,  $p = 0.316$ ,  $GFI = 0.938$ ,  $AGFI = 0.630$ ,  $RMR = 0.013$ ,  $RMSEA = 0.022$ ). In this model, the monitoring indicator had the highest factor loading (0.751), followed by the planning and reflecting indicators (0.687, 0.666 respectively).

**คำสำคัญ:** การเรียนรู้แบบกำกับตนเอง

**KEYWORDS:** SELF-REGULATED LEARNING

## Introduction

The effective use of self-regulated learning helps to increase learning outcomes (Zimmerman & Kitsantas, 2014). Self-regulated learning has been a very important skill in higher education which contributed to students' learning outcome. Students who use self-regulated learning are responsible for their learning activities and habits. Once students are responsible for their learning activities they are actively involved in learning strategies and they control their learning by organizing their time, setting a plan, and monitoring and evaluating their own learning development in order to meet their goals. Many researches focused on self-regulated learning in which researchers tried to explore or understand what ways students regulated their cognition, motivation, metacognition and task management (Abar & Loken, 2010; Arbor, 1990; Pintrich, 1999, 2005). Self-regulated learning was a way that students deal with academic tasks and it was assumed to be an active and constructive process. To be successful in learning, students must actively engage in various activities to control the academic learning which self-regulated learning was the process by which learners personally activate and sustain cognitions, affects, and behaviors that were systematically oriented toward the attainment of learning goals (Zimmerman & Schunk, 1989). Self-regulated learning was as an important aspect in academic learning and the research topics have been increasing over the past 30 years (Hall & Goetz, 2013). During 1980, the research focused in the fields of social and personal psychology, and educational psychology. Later in 1990s, the research of self-regulation was increased the interests in specific contexts such as learning and achievement performance and continue to be focused extensively in the fields of educational psychology. The concepts of self-regulation have been originated from Bandura's social cognitive theory of human functioning. Later, many others author such as Zimmerman, (2002) and Pintrich (1999) tried to develop further

explanation. Although, the differences in the models from different theoretical perspective, most of them shared common important aspects with three features such as: cognitive learning strategies, self-regulatory strategies to control cognition and resource management strategies (Pintrich, 1999).

There were many different models of self-regulated learning derived from different theoretical perspectives (Zimmerman & Schunk, 1989). The models shared the common important aspect of self-regulated learning, was that the student used various cognitive and metacognitive strategies to control and regulate their learning. According to Pintrich (1999), the model of self-regulated learning consists of three categories of strategies: (1) cognitive learning which consists of rehearsal, elaboration and organizational strategies. (2) self-regulatory strategy to control cognition consist of students' monitoring, controlling and regulating their own cognitive activities and actual behavior such as planning, monitoring and regulating. (3) resource management strategies were about how students use the strategies to manage and control their environments. The components of self-regulated learning have been used differently by many researchers to measure the self-regulated learning constructs. Based on the review of the related researches, measurement factors in each research used different factors and items.

#### **Cognitive learning strategies and meta-cognitive in self-regulated learning**

Meyer (1996) has proposed three main components of cognitive learning strategies such as rehearsal, elaboration and organizational strategies. These were considered as the main cognitive learning strategies in academic performance. Rehearsal strategy was a repetitive learning exposure which student struggle to learn many times. For example, repeating a definition, highlight materials in the text again and again. There were two kinds of rehearsal learning strategies. One was passive learning strategy which basically was the mind as a mental muscle, promoted simple repetition and did not so much involve in cognitive processing. In contrast, active rehearsal learning strategies were more effective to reach the goals. Using of active rehearsal strategies was to set up more opportunities to understand and to learn to take place. Elaboration Learning Strategies: Using and setting elaboration strategies, learner needs to be active cognitive process. It involved adding one material to be more meaningful and memorable. The strategies can be taken in many forms such as paraphrasing, creating analogies, summarizing and trying to use comparing, contrasting strategy, and creating possible answers to test questions. The simple one was paraphrasing and summarizing. Learners repeated something that was easy for them to memorize, do in order to require any understanding. But transforming into a new or our own word or summarize important information or ideas need some level of cognitive processing (Pintrich, 1999). Organization strategy was a kind of elaboration strategies which focused on reorganizing and elaborating materials in some forms such as outlines, diagrams, maps in which these things students could use to create new meaning of what they are studying

(Nilsson & Mayer, 2002). Many of these graphic organizers have common characteristics of requiring active and complex cognitive process the same as elaboration strategies. Moreover, students try to get main idea in the text by using specific techniques such as sketching, mapping of important ideas and identify the main point in the text

Metacognitive knowledge was very important components influenced learning achievement. According to Pintrich (2002), there were two components of metacognitive knowledge all of which are cognition knowledge and self-regulation. Self-regulation referred to monitoring, controlling, and regulating their cognitive activities. Planning activities included goal setting, skimming and asking questions before reading and task analysis of the problem. These kinds of activities would help them to plan cognitive strategies and activate relevant knowledge. Monitoring was another important aspect in self-regulated learning strategies. Students set their goal to compare their progress achievement to the setting goal and guide as a monitoring process. All of these activities gave information that help students to change or adapt the regulation strategies.

Regulation strategy was a process that required having regulation to indicate behavior to reach the goal. For example, students set a question before reading in order to know how much they understand the text and then reread the text again. Another kind of strategies is to read slowly and focused on the text when it was difficult. Resource management strategies referred to the use and the control of learning environment (Pintrich, 1999). Students manage and control their time, effort, and study environment. Moreover, they keep contact with others people such as teachers and friends in case of needing helps and this is called help-seeking strategies. Students manage their resources to reach the goals and needs.

In higher education, self-regulated learning was considered as the most important part of students' learning outcome. Marzano (2001) has found that self-regulated learning accounted for 80 percent toward academic performance of the student in higher education. Self-regulated learners initiated the ways to study by themselves, initiated their learning needs, setting goals, identified the necessary learning materials and assessed learning results (Pintrich, 2005). Self-regulated learner were more likely have higher achievement than those who had low self-regulated learning (Zimmerman & Kitsantas, 2014). Students utilized the learning strategies to guide and to address the learning challenges by using cognitive and metacognitive strategies. The idea of self-regulated learning provided a positive perspective on college students. Some students have more self-regulated learning while others have less self-regulated learning. In fact, self-regulated learner considered learning as a controlled process which they were able to plan their learning tasks, organized the processes with monitoring and evaluating their learning processes. In Cambodia, one of the most important concerns in higher education is to increase students' achievement. Even though Cambodia has made a lot of progress toward the quality of student achievement in higher education

through the recent efforts by Accreditation Committee of Cambodia (ACC, 2011) there is still scarce of research on self-regulated learning within Cambodia universities. Therefore, the current study attempts to validate the measurement model of self-regulated learning from the Cambodian student' perspective.

### **Research objective**

To develop and validate the measurement model of self-regulated learning

### **Methods**

This study aimed to examine the quality of a self-regulated learning scale for Cambodian undergraduate students. The objective of the study was to validate a measurement model of self-regulated learning. The detail of the research method will be specified as below.

#### **Sample**

A sample of 200 undergraduate students in Phnom Penh, Cambodia was chosen to participate in this study. Stratified random sampling was used to select participants from different departments within two fields: Social Science and Science.

#### **Instrument**

Nine items for a self-evaluation questionnaire were developed by Pintrich (1991) which were used to assess self-regulated learning. This study utilized the data collected from a self-reported survey. The questionnaire used a five-point Likert scale, ranging from 1 to 5 (strongly disagree – strongly agree) and assessed three dimensions: Planning, Monitoring and Reflecting.

#### **Operational definition**

Self-regulated learning means a process of learning in which students are personally activated their ways of learning to achieve their goals. Self-regulated learning was operationally defined by a set of indicators:

- 1) Planning: activities such as setting a goal that students set for upcoming study or events.
- 2) Monitoring: activities that student tracking, self-testing and questioning to discover the lacking points
- 3) Reflecting: self-evaluation of performance and adjustment of learning activities checking and correcting their behaviors as they proceed on a task.

## Results

The purpose of this study was to validate the measurement model of self-regulated learning which consisted of three indicators: Planning, Monitoring and Reflecting.

### Confirmatory factor analysis

Before generating the confirmatory factor analysis, a correlation among factors was produced. The relationship among the factors ranged from 0.682 – 0.698, with the highest correlation being between monitoring and reflecting. The factor that showed the highest mean level was planning (mean = 3.700, SD = 0.720) followed by reflecting (mean = 3.629, SD = 0.634) and monitoring (mean = 3.471, SD = 0.650), respectively

Table 1. Correlation coefficient among indicators

	Planning	Monitoring	Reflecting
Planning	(0.869)		
Monitoring	0.697**	(0.869)	
Reflecting	0.682**	0.698**	(0.869)
Mean	3.700	3.471	3.629
SD	0.720	0.650	0.634

Note: \*\* indicates that the correlation is significant at the 0.01 level; reliability coefficients are in () on the diagonal.

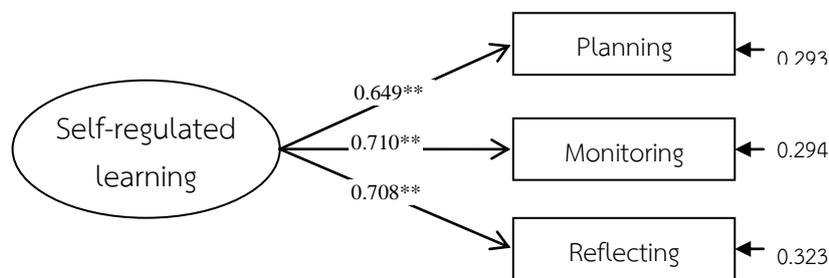
To assess the Goodness of fit for the confirmatory factor analysis model, chi-square statistic, GFI, AGFI, and RMR were used. The Acceptable fit was judged according to the criteria recommended by Joreskog & Sorbom (1984): GFI and AGFI value was greater or equal to 0.90, RMSEA and RMR less than or equal to .05 respectively.

As the result of Confirmatory Factor Analysis, it was found that self-regulated learning factor structure was showed the acceptable fit to the data ( $\chi^2 = 1.356$ ,  $df = 1$ ,  $p = 0.244$ , GFI = 0.986, AGFI = 0.917, RMR = 0.003 and RMSEA = 0.022) (see table 2). All factor loading were statistically significant, with highest loading on monitoring ( $\beta = 0.710$ ), followed by reflecting ( $\beta = 0.708$ ), and planning ( $\beta = 0.649$ ).

Table 2 The results of confirmatory factor analysis of a scale measuring self-regulated learning

Factor	b	SE	t	$\beta$	Factor Score Coefficient	R <sup>2</sup>
Planning	1.00	-	-	0.649	0.305	0.707
Monitoring	0.907	0.035	25.774	0.710	0.334	0.706
Reflecting	0.867	0.035	25.119	0.708	0.306	0.677

$\chi^2 = 1.356$  ,  $df = 1$  ,  $p = 0.244$ ,  $GFI = 0.986$  ,  $AGFI = 0.917$ ,  $RMR = 0.003$ ,  $RMSEA = 0.022$



$\chi^2 = 1.356$ ,  $df = 1$ ,  $p = 0.244$ ,  $GFI = 0.986$ ,  $AGFI = 0.917$ ,  $RMR = 0.003$

Fig.1 Construct validity of self-regulated learning

## Discussion

In present study we aimed to identify the construct validity of self-regulated learning measurement model. The following is a summary of the conclusions that can be drawn from the study. The validity testing results showed that the measurement model of self-regulated learning contains construct validity which is workable as its measurement consistent with the empirical data. There were relationships among indicators are consistent with Lee et al. (2014) research that proposed three indicators of self-regulated learning all of them are planning, monitoring and reflecting. Further studies, should develop cause model or integrate others variables into the model.

## Recommendation

Based on the literature review we pick only three indicators to study followed the measurement model of Lee et al. (2014) which we may have excluded some important indicators. The results might have been different if we used a longer and more reliable measure of self-regulated learning. So, next research should include these aspects or more indicators in measuring self-regulated learning for the future research.

## Reference

- Accreditation Committee of Cambodia. (2011). *Guideline on institutional accreditation process*. Phnom Penh: Author.
- Abar, B., & Loken, E. (2010). Self-regulated learning and self-directed study in a pre-college sample. *Learn Individ Differ*, 20(1), 25-29. doi: 10.1016/j.lindif.2009.09.002
- Arbor, A. (1990). Motivational and Self-Regulated Learning Components of Classroom Academic Performance. *Journal of Educational Psychology*.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hall, N. C., & Goetz, T. (2013). *Emotion, Motivation, and Self-regulation: A Handbook for Teachers*: Emerald Group Publishing.
- Joreskog, K. G., & Sorbom, D. (1984). LISREL VI user's guide (3<sup>rd</sup> ed.). Mooresville, IL: Scientefic Software.
- Lee, W., Lee, M.J., & Bong, M. (2014). Testing interest and self-efficacy as predictors of academic self-regulation and achievement. *Contemp Educ Psychol*, 39(2), 86-99. doi: 10.1016/j.cedpsych.2014.02.002
- Meyer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three. *Educational Psychology Review*, 8(4), 357.
- Marzano, R. J. (2001). A New Era of School Reform: Going Where the Research Takes Us.
- Nilsson, R. M., & Mayer, R. E. (2002). The effects of graphic organizers giving cues to the structure of a hypertext document on users' navigation strategies and performance. *International Journal of Human-Computer Studies*, 57(1), 1-26. doi: <http://dx.doi.org/10.1006/ijhc.2002.1011>
- Pintrich. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ).
- Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research*, 31(6), 459-470. doi: [http://dx.doi.org/10.1016/S0883-0355\(99\)00015-4](http://dx.doi.org/10.1016/S0883-0355(99)00015-4)
- Pintrich, P. R. (2002). The Role of Metacognitive Knowledge in Learning, Teaching, and Assessing. *Theory Into Practice*, 41(4), 219-225. doi: 10.1207/s15430421tip4104\_3
- Pintrich, P. R. (2005). Self-Regulated Learning: The Educational Legacy of Paul R. Pintrich.
- Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, 40(2), 85-94.
- Zimmerman, B. J. (2002). Becoming a Self-Regulated Learner: An Overview. *Theory Into Practice*, 41(2), 64.
- Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemp Educ Psychol*, 39(2), 145-155. doi: 10.1016/j.cedpsych.2014.03.004
- Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic achievement: Theory, research, and practice*: Springer-Verlag Publishing.