

บทบาทของการเรียนรู้แบบกำกับตนเอง การมุ่งเป้าหมาย และการลงทุนพยายาม ในฐานะตัวแปร  
ส่งผ่านระหว่างความเชื่อประสิทธิภาพในตนและผลการเรียนรู้: กรณีศึกษาประเทศกัมพูชา



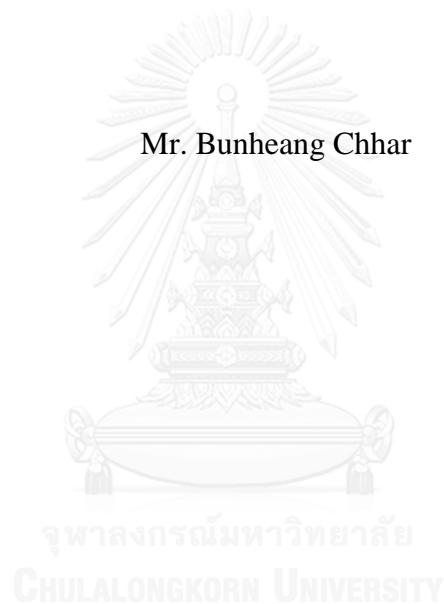
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เป็นแฟ้มข้อมูลของนิสิตเจ้าของวิทยานิพนธ์ ที่ส่งผ่านทางบัณฑิตวิทยาลัย

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาครุศาสตรมหาบัณฑิต  
สาขาวิชาวิธีวิทยาการวิจัยการศึกษา ภาควิชาวิจัยและจิตวิทยาการศึกษา  
คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย  
ปีการศึกษา 2557  
ลิขสิทธิ์ของจุฬาลงกรณ์มหาวิทยาลัย

ROLES OF SELF-REGULATED LEARNING, GOAL ORIENTATION, AND  
EFFORT INVESTMENT AS MEDIATORS BETWEEN SELF-EFFICACY AND  
LEARNING OUTCOME: A CASE STUDY OF CAMBODIA

Mr. Bunheang Chhar



A Thesis Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Education Program in Educational Research

Methodology

Department of Educational Research and Psychology

Faculty of Education

Chulalongkorn University

Academic Year 2014

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Thesis Title	ROLES OF SELF-REGULATED LEARNING, GOAL ORIENTATION, AND EFFORT INVESTMENT AS MEDIATORS BETWEEN SELF-EFFICACY AND LEARNING OUTCOME: A CASE STUDY OF CAMBODIA
By	Mr. Bunheang Chhar
Field of Study	Educational Research Methodology
Thesis Advisor	Thomrat Siriparp, Ph.D.

---

Accepted by the Faculty of Education, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

..... Dean of the Faculty of Education  
(Associate Professor Bancha Chalapirom, Ph.D.)

THESIS COMMITTEE

..... Chairman  
(Professor Suwimon Wongwanich, Ph.D.)

..... Thesis Advisor  
(Thomrat Siriparp, Ph.D.)

..... External Examiner  
(Assistant Professor Sungworn Ngudgratoke, Ph.D.)

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

บุญเสียง ขอ : บทบาทของการเรียนรู้แบบกำกับตนเอง การมุ่งเป้าหมาย และการลงทุนพยายาม  
ในฐานะตัวแปรส่งผ่านระหว่างความเชื่อประสิทธิภาพในตนเองและผลการเรียนรู้: กรณีศึกษา  
ประเทศกัมพูชา (ROLES OF SELF-REGULATED LEARNING, GOAL  
ORIENTATION, AND EFFORT INVESTMENT AS MEDIATORS BETWEEN  
SELF-EFFICACY AND LEARNING OUTCOME: A CASE STUDY OF  
CAMBODIA) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: อ. ดร.อมรัตน์ ศิริภาพ, 127 หน้า.

การวิจัยในครั้งนี้มีวัตถุประสงค์ 1) เพื่อพัฒนาและตรวจสอบความตรงของโมเดลเชิงสมมติฐาน  
ของผลการเรียนรู้ 2) เพื่อตรวจสอบอิทธิพลทางตรงและอิทธิพลทางอ้อมระหว่างการรับรู้ความสามารถใน  
ตนเองและผลการเรียนรู้ 3) เพื่อตรวจสอบบทบาทการส่งผ่านของการมุ่งเป้าหมาย การเรียนรู้แบบกำกับ  
ตนเอง และการลงทุนพยายามระหว่างการรับรู้ความสามารถในตนเองและผลการเรียนรู้ ตัวอย่างวิจัย คือ  
นักศึกษาระดับปริญญาบัณฑิตของประเทศกัมพูชา จำนวน 700 คน การเลือกตัวอย่างใช้การสุ่มแบบแบ่ง  
ชั้น (stratified random sampling) จำแนกเป็นสองกลุ่ม ได้แก่ สาขาวิทยาศาสตร์และสาขา  
สังคมศาสตร์ เก็บรวบรวมข้อมูลโดยใช้แบบสอบถาม วิเคราะห์ข้อมูลด้วย ค่าสถิติพื้นฐาน สถิติทดสอบที่  
ของกลุ่มตัวอย่างที่เป็นอิสระจากกัน (independent samples t-test) ความแปรปรวนพหุคูณแบบสองทาง  
(two-way MANOVA) และ โมเดลลิสเรล ผลการวิจัยสรุปได้ดังนี้

1) โมเดลเชิงสาเหตุและผลของผลการเรียนรู้มีความสอดคล้องกลมกลืนกับข้อมูลเชิงประจักษ์  
(chi-square = 27.787, df = 21, p = 0.146, GFI = 0.992, AGFI = 0.978, RMSEA = 0.021, RMR  
= 0.005)

2) การรับรู้ความสามารถในตนเองมีอิทธิพลทางตรงต่อผลการเรียนรู้มากที่สุด ( $\beta = 0.313$ )  
รองลงมา คือ การเรียนรู้แบบกำกับตนเอง ( $\beta = 0.177$ ) ส่วนการรับรู้ความสามารถในตนเองมีอิทธิพล  
ทางอ้อมต่อผลการเรียนรู้มากที่สุด ( $\beta = 0.237$ ) รองลงมา คือ การมุ่งเป้าหมาย ( $\beta = 0.226$ )

3) การเรียนรู้แบบกำกับตนเองเป็นตัวแปรส่งผ่านแบบบางส่วนระหว่างการรับรู้ความสามารถ  
ในตนเองและผลการเรียนรู้ ( $z = 2.344, p < .05$ ) ส่วนการมุ่งเป้าหมาย และการลงทุนพยายามไม่พบว่า  
แสดงบทบาทการเป็นตัวแปรส่งผ่านภายในโมเดล

ภาควิชา      วิจัยและจิตวิทยาการศึกษา      ลายมือชื่อนิสิต .....

สาขาวิชา    วิธีวิทยาการวิจัยการศึกษา      ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

ปีการศึกษา 2557

# # 5683458427 : MAJOR EDUCATIONAL RESEARCH METHODOLOGY

KEYWORDS: SELF EFFICACY, GOAL ORIENTATION, SELF-REGULATED LEARNING, EFFORT INVESTMENT AND LEARNING OUTCOME

BUNHEANG CHHAR: ROLES OF SELF-REGULATED LEARNING, GOAL ORIENTATION, AND EFFORT INVESTMENT AS MEDIATORS BETWEEN SELF-EFFICACY AND LEARNING OUTCOME: A CASE STUDY OF CAMBODIA. ADVISOR: THOMRAT SIRIPARP, Ph.D., 127 pp.

The purposes of this research were as follows: 1) to develop and validate a hypothetical model of learning outcome, 2) to examine the direct and indirect effects between self-efficacy and learning outcome, and 3) to examine the mediating roles of goal orientation, self-regulated learning and effort investment between self-efficacy and learning outcome. Research samples consisted of 700 Cambodian undergraduate students. Stratified random sampling was used to select sample from 2 fields which were Sciences and Social sciences. The data were collected using a questionnaire. Data analyses included descriptive statistics, independent samples t-test, two-way MANOVA and LISREL. The research findings were as follows:

1). The causal model of learning outcome was fitted to the data (chi-square = 27.787, df = 21, p = 0.146, GFI = 0.992, AGFI = 0.978, RMSEA = 0.021, RMR = 0.005).

2). Self-efficacy showed the highest direct effect on learning outcome ( $\beta = 0.313$ ), followed by self-regulated learning ( $\beta = 0.177$ ). Besides, self-efficacy had the highest indirect effect on learning outcome ( $\beta = 0.237$ ), followed by goal orientation ( $\beta = 0.226$ ).

3). Self-regulated learning was a partial mediator between self-efficacy and learning outcome ( $z = 2.344$ ,  $p < .05$ ). However, no mediating effects of goal orientation and effort investment were found in the model.

Department: Educational Research and Student's Signature .....

Psychology Advisor's Signature .....

Field of Study: Educational Research

Methodology

Academic Year: 2014

## ACKNOWLEDGEMENTS

First of all, my gratitude goes to Her Royal Highness Princess MAHA CHAKRI SIRINDHORN for granting scholarships to Cambodia, as well as for giving me the chance to study in Thailand. This scholarship has made an impact on my life, as well as on the lives of many Cambodian students. I am grateful to be one of many students who have received this wonderful opportunity.

My next gratitude goes to my adviser, Dr. Thomrat Siriparp, who has instructed and guided me in doing my thesis. Moreover, she has also given me tremendous support and help when I have had problems in writing up the research report and academic study.

In addition to my adviser, I would like to express my gratitude to Prof. Dr. Suwimon Wongwanich for her guidance and instruction in thesis writing. During my class with her, she monitored my work from the beginning until the end. Moreover, I would like to acknowledge and give thanks to all lecturers at the Department of Educational Research and Psychology for giving me the opportunity to gain knowledge through their teaching during my academic study.

I would also like to express my gratitude to Dr. Sok Uttara and Mr. He Mary, lecturers at Pannasastra University of Cambodia, who have helped me in checking the research questionnaire and translating from English to Khmer. I would like to express many thanks to the lecturers at the Royal University of Phnom Penh for allowing me to collect the data and also give thanks to all respondents. This thesis would not be possible without your participation.

I also want to express my sincere gratitude to the department of graduate school, Chulalongkorn University for giving me financial support in doing this research project.

Finally, I would like to express sincere gratitude to my parents, siblings, my dear classmates and friends for their help, consultation and emotional support since the beginning of my academic studies in Thailand.

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# CHAPTER 1

## INTRODUCTION

### **Problem statement**

In Cambodia, many students are struggling to achieve high academic outcomes. Effective use of self-regulated learning would help students to be able to apply better learning strategies, which in turn improve their learning achievement. Self-regulated learning was one of many important factors which contributed to students' learning achievement as when students regulated and adjusted their own learning habits, they learned more effectively (Cazan, 2013). There is strong evidence that self-regulated learning has been a very important skill in higher education, which has been confirmed by many researchers that found that self-regulated learning contributed to and affected students' achievement and performance (Ning & Downing, 2014; Wilson & Narayan, 2014; Zimmerman & Kitsantas, 2014). Students themselves were the most important part in improving their own academic study achievement by making them responsible for their learning activities and habits. Once students were responsible for their learning activities, they became actively involved in learning strategies and controlled their learning by organizing time, setting plans, monitoring and evaluating their own learning development in order to meet their goals. It was likely that students perform better at school because of their ability to make plans to regulate their behaviors in accordance to their goal.

The study of self-regulated learning showed that motivation constructs were also important in explaining learning achievement (Pintrich & De Groot, 1990). Goal orientation and self-efficacy were positively related to academic performance. Other researchers also suggested that the use of self-regulated learning is positively associated with goal setting and self-efficacy, and, in turn, these two constructs are very important factors effecting learning achievement among university students (Seaton, Parker, Marsh, Craven, & Yeung, 2014; Wilson & Narayan, 2014). Setting goals encouraged actions toward achieving outcomes and it made people act with purpose. Moreover, it provided structures and desires that focus individuals to use the knowledge, competence and skills to pursue outcomes. The benefit of goals depended on students' commitment to attain those goals and also depended on the goal properties of proximity, and level of difficulty (Locke & Latham, 2002). Goal setting

was a useful aspect linking stages of self-regulated learning, as when students set their plans and used self-regulated learning strategies such as cognitive and metacognitive strategies to attain their set goals (Elliot, McGregor, & Gable, 1999). The goals that students pursue in their academic setting have been studied in many achievement motivation researches (Ames & Archer, 1988; Friedel, Cortina, Turner, & Midgley, 2007; Pekrun, Elliot, & Maier, 2009).

Among motivational constructs such as self-efficacy, goal setting and effort investment also showed positive relationships and strongest effects on self-regulated learning (Sitzmann & Ely, 2011). According to Bandura's study (1977), self-efficacy became a strong, positive effect on performance through goal setting, effort investment and persistence. When students believed in their ability or self-efficacy, the level of goals was increased, and the more challenging the goal, the more strategies of learning and time and effort investment were integrated into performance (Venables & Fairclough, 2009). When people with a strong sense of self-efficacy, they started to believe in their actions and could produce the outcomes that they wanted to achieve.

In Cambodia, one of the most important concerns in higher education was to attempt to increase students' achievement. Graduate students in Cambodia cannot integrate themselves with the labor market and graduate skills frequently did not match the country's needs. This makes it very hard for universities or institutions to develop and improve their curriculums to better match with market demands. Cambodia Higher Education produce more graduate than the economy needs, and in turn those graduate skills do not significantly respond to the needs of the country (Chealy, 2009). Moreover, due to lack of both finance and human resources, the main issues in higher education still remain. Both the lack of qualified staffs and weak curriculum has contributed to effect on students' performances and achievement. Even though Cambodia has made a lot of progress toward the quality of student achievement in higher education, and despite the recent efforts by the Accreditation Committee of Cambodia (ACC, 2011) to ensure the quality of higher education, there is still a scarcity of research on self-regulated learning that links with motivational constructs which have an effect on achievement within Cambodian universities. Based on the problems, the current study attempts to propose a model to test with

empirical data of the self-regulated learning and its relationships with others constructs such as self-efficacy, goal orientation and effort investment that have an effect on learning achievement from Cambodian students' perspective.

### **Research questions**

- 1) Does the hypothetical model of learning outcome fit to the empirical data?
- 2) Are there any direct and indirect effects between self-efficacy and learning outcome?
- 3) What are the mediating roles of self-regulated learning, goal orientation, and effort investment between self-efficacy and learning outcome?

### **Research objectives**

- 1) To develop and validate a hypothetical model of learning outcome.
- 2) To examine the direct and indirect effects between self-efficacy and learning outcome.
- 3) To examine the mediating roles of self-regulated learning, goal orientation, and effort investment between self-efficacy and learning outcome.

### **Scope of the study**

The domains of self-regulated learning, goal orientation, effort investment, self-efficacy includes a range of theories that have emerged from different disciplines. Some of the most influential theories have emerged from social cognitive theory (Bandura, 1977), industrial and organizational psychology goal setting, (Locke & Latham 1990, 2002) and clinical psychology self-efficacy theory (Bandura 1977). The self-efficacy theory of Bandura and other researches proposed many factors that affect learning achievement such as self-efficacy, goal setting, task values, self-regulated learning emotion and many others motivational constructs. However, this study selected only four factors: self-efficacy, goal orientation, self-regulated learning, and effort investment as Bandura (1996) suggested that those who have high sense of self-efficacy set more challenging goals. Based on this idea, there are many researches that have developed the model, which consists of these three factors (Bernacki, Byrnes, & Cromley, 2012; Komarraju & Nadler, 2013; Lee, Lee, & Bong, 2014; Zuffianò, Alessandri, Gerbino, Luengo Kanacri, et al., 2013). However, beside self-efficacy, goal orientation, and self-regulated learning, students also need to commit effort in

their learning. That's why the researcher is interested in including effort investment into the model.

Self-regulated learning is important in higher education learner because older people are able to regulate their behavior in their learning. In self-regulated learning, the measurement factors were developed to cover the dimensions namely cognitive and metacognitive learning strategies and environment control strategies. Cognitive learning strategy was considered as students' learning strategies. Metacognition is the knowledge of cognition and how student regulate their behaviors. However, this research is interested in how they regulate their behavior and control their learning environment not their learning strategies.

### **Importance of the study**

The research intends to study self-regulated learning, goal orientation and effort investment as mediators between self-efficacy and learning outcome.

1) Policy advantage: the research provides a better understanding of the relationships among a group of variables in explaining learning outcome. Moreover, the study of learning outcome in higher education levels will explain the learning process in the Cambodian educational setting, identify the factors that influence the learning outcome which could improve the target intervention and support for students who have academic problems in higher education institutions, and provide deeper understanding of mediating roles of self-regulated learning, goal orientation, and effort investment in the model which contribute to explaining more about learning outcome.

2) Academic advantage: this study adopted many scales from existing instruments. So, the research may provide validated research tools and a model for further study in different culture and population. Moreover, the research will provide further understanding of the mediating roles of self-regulated learning, goal orientation, and effort investment in the model of learning outcome.

3) Advantages for students: the research provides ideas and learning strategies that contribute to increased learning outcomes.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Literature review**

The study of a causal model of learning outcome involved many factors. The model is primarily involved with the concepts of goal orientation, self-efficacy, effort investment and self-regulated learning. Each factor was seen as the main concept contributing to learning outcome. So, the review will examine obtainable literature covering relevant factors such as self-efficacy, goal orientation, effort investment, and self-regulated learning which focus on definitions, theoretical background and related literature.

#### **1. Definitions**

The definition of each construct was defined differently between authors. Many definitions of a concept in many text books and research publications may define a concept operationally different from each other. So, in this part, I will review different definitions of related constructs from various sources and scholars.

##### **1.1 Definition of self-regulated learning**

Self-regulated learning is a 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 is as an important aspect in academic learning, and the research into the topic has been increasing over the past 30 years (Hall & Goetz, 2013). During 1980, the research of self-regulated learning had focused in the fields of social, personal, and educational psychology. Later, in the 1990s, the research of self-regulated learning increased interest in specific contexts, such as learning and achievement performance, and continues to be focused on in the fields of educational psychology. The concepts of self-regulation originated from Bandura's social cognitive theory of human functioning. Later, many other authors such as Zimmerman, (2002) and Pintrich (1999) tried to develop further explanations. Although the differences in the models come from different theoretical perspectives, most of them shared common important aspects with three features: cognitive learning strategies, self-regulatory strategies to control cognition, and resource management strategy. The various definitions of self-regulated learning existed in both textbook and in many other scientific publications.

The definition of self-regulated learning was operationally different from each other based on their studies.

According to Hall and Goetz (2013), self-regulated learning was defined as the means of acquiring knowledge and skills in which learners find their own ways of learning to achieve their goals. Similarly, Schunk & Zimmerman (2012) defined self-regulated learning as the process by which learners personally activated and sustained cognition, affect and behaviors that were systematically oriented toward the attainment of learning goals. However, Pintrich (2000b) defined self-regulated learning as a constructivist learning process in which students were actively engaged in goal setting, progress monitoring and learning strategies controlling rather than passive knowledge reception from teachers.

On the basis of these three definitions, self-regulated learning can be defined as the process of learning activities in which students are personally activated in their ways of learning to achieve their goals.

### **1.2 Factor structure of self-regulated learning**

There were many different models of self-regulated learning derived from different theoretical perspectives (Schunk & Zimmerman, 1994; Zimmerman & Schunk, 1989). The models shared the common important aspect of self-regulated learning, which 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 consisting of students' monitoring, controlling and regulating their own cognitive activities and actual behavior such as planning, monitoring and regulating; and 3) resource management strategies, which were about how students use the strategies to manage and control their environments. Based on Pintrich (1999) components of self-regulated learning were summarized as follows.

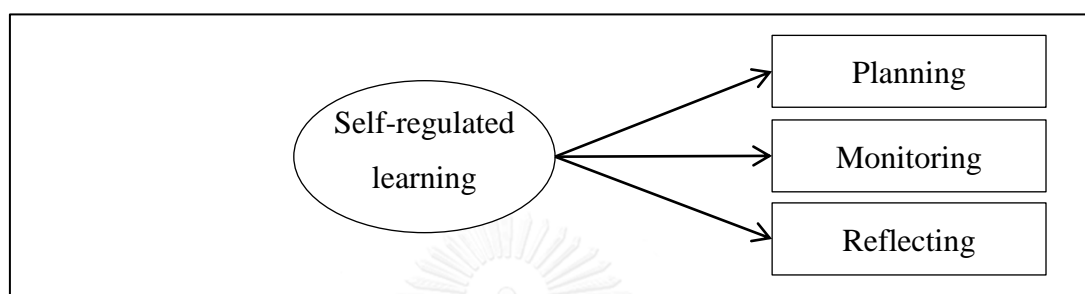


**Table 1.** Self-regulated learning strategies

Strategy	Indicators	Description
Cognitive learning strategy	Rehearsal	Repetitive learning exposure in which students struggle to learn many times. For example, repeating a definition, or highlighting or underlining text or important information in the materials.
	Elaboration	Paraphrasing or summarizing the material to be learned, creating analogs or generative note taking
	Organization	Specific technique of selection and organizing ideas in the materials. The behavior of selecting main ideas from the text, and outlining the text or material
Self-regulatory strategies	Planning	Setting goals for studying, skimming a text before reading or generating questions before reading
	Monitoring	Student tries to monitor learning activities by checking their understanding.
	Regulating	As students monitor their learning activities against set goals or criteria, the monitoring process needs regulation to bring behavior back in line with the goal.
Resources management strategies	Time management	Managing and controlling learning time
	Effort regulation	Controlling their effort, spending time and commitment toward their studying
	Controlling environment	Preparing everything around, trying to find quiet a place to learn.
	Help seeking	Students try to find help when they have problems about their learning.

Source: Pintrich (1999)

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. However, researchers chose these three aspects because they represent the process of self-regulated learning and these three indicators were used by a recent research study which were applied in the learning outcome model (Lee et al., 2014).



**Figure 1.** Measurement model of self-regulated learning  
Source: Pintrich (1999)

### 1.3 Definition of self-efficacy

Bandura (1977) has proposed diverse effects of self-efficacy and provided a measurement scale of self-efficacy as well as definition in studying self-efficacy. In this study, researchers reviewed the theoretical definitions and conception in order to distinguish the definition used to develop guidelines for measurement scales. According to Bandura, self-efficacy was defined as the belief in one's personal judgments of one's ability to organize and execute courses of action in order to attain some desired goal or outcome. Moreover, Bandura also suggested assessing its level and strength across activities and context. The level here in self-efficacy focuses on the level of dependence on difficulties of the task. The more difficult the task, the more variation of self-efficacy would be different and the strength of perceived self-efficacy would change based on the certainty of performing a task.

### 1.4 Factor structure of self-efficacy

The beliefs of self-efficacy was divided into two sub-dimensions, namely, beliefs of personal efficacy and perceived efficacy for academic attainment (Bandura, 1977; Zimmerman & Bandura, 1994). Perceived efficacy measures the students' belief in their abilities. According to Pintrich (1991), self-efficacy was assessed by two aspects of expectancy, expectancy for success and self-efficacy. Expectancy for success refers to performance expectation, and is related to task performance.

Personal-efficacy is the self-judgment of personal abilities in doing a task. Moreover, self-efficacy also includes the judgments about one's ability to do a task as well as personal confidence in one's own skill to perform a task. The measurement structure of self-efficacy was designed in different performance contexts. Following Bandura's idea, self-efficacy was measured by questionnaire items. Various researches have used questionnaire items from MSLQ in their study of self-efficacy (Diseth., 2011; Komarraju & Nadler, 2013; Lane & Lane, 2001). Thus, self-efficacy in this study would use the questionnaire items as measurement of self-efficacy.

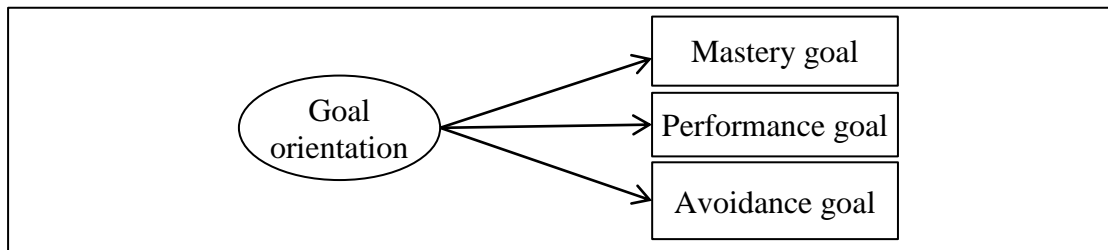
### **1.5 Definition of goal-orientation**

Goal orientation was an object or outcome to aim for with a standard judging satisfaction (Locke & Latham, 2002). A student trying to get a good grade means that they will not be satisfied unless they get grade A. So, goal is the reflection point and standard for satisfaction versus dissatisfaction. Goal orientation has been increasingly examined in both psychological and educational research. Goal orientation was considered dichotomously as mastery goal and performance goal (Seaton, Parker, Marsh, Craven, & Yeung, 2013). In this research, goal orientation was assumed as goal orientation which referred to the related competence that students strive for in achievement setting (Pekrun et al., 2009). Different goals will promote different cognitive, affective and behavioral patterns. Moreover, it was also defined as why and how people are struggling to reach various objectives (Anderman & Maehr, 1994).

### **1.6 Factor structure of goal orientation**

According to Dweck (1986), the goal orientation was identified as two basic orientations, learning goal-orientation and performance goal-orientation. Later, VandeWalle, Cron, and Slocum (2001) proposed three dimensions of goal orientation including mastery goal-orientation, performance approach goal-orientation and performance avoidance goal-orientation. Many studies used the three dimensions to measure goal orientation (Diseth., 2011; Komarraju & Nadler, 2013; Seaton et al., 2014). Mastery goal refers to one's purpose of developing competence (Ames, 1992). It focused on learning, understanding, developing skills and mastering information. Performance goal-orientation referred to the purpose of demonstrating competence (Ames, 1992). Performance avoidance means the feel of the possibility of failure and the attempt to avoid it. Elliot et al. (1999) have used the trichotomous goal orientation

framework in studying with college students and the results supported hypothesis, the same as the current study which applies the standards in a higher education context. Thus, the current study chooses three indicators to apply in the same context.



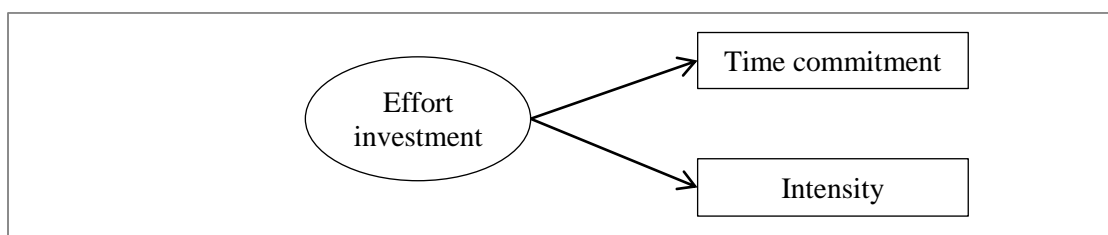
**Figure 2.** Measurement model of goal orientation

### 1.7 Definition of effort investment

The concept of effort investment is increasingly interesting in study of academic achievement. The effort investment construct was described in terms of intensity (Yeo & Neal, 2004). The measurement of this constructs have been insufficient. A single item has been used to measure students' effort investment. Later, Meltzer et al. (2004) has defined effort investment as a conscious attempt of trying to achieve a particular goal through persistence over time. Finally, researcher has added time on task and behavioral measures to self-report measures into the studying student's effort.

### 1.8 Factor structure of effort investment

Various researches have measured effort investment with different indicators as well as aspects. Effort may be invested in response to their goal or related task. This aspect is associated with the task difficulty. The effort investment of learners was examined in two aspects such as amount of effort and type of effort (Fisher & Ford, 1998). Indicators focus on time spent on tasks which was used to express intensity and persistence. So, the measurement model of effort investment is as follows.



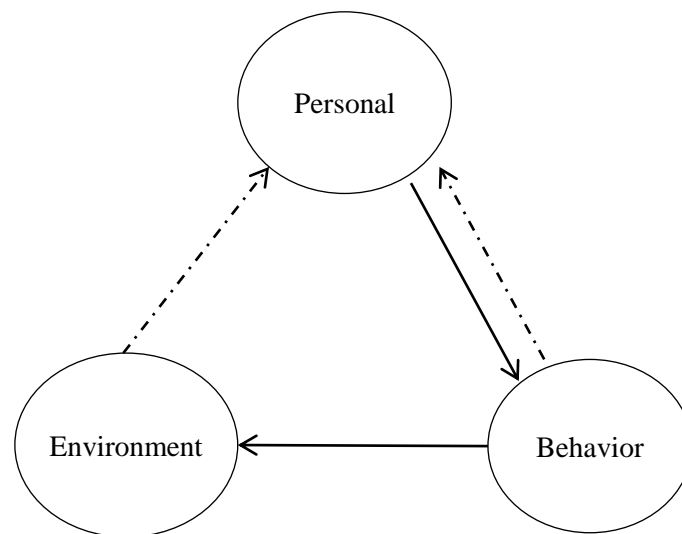
**Figure 3.** Measurement model of effort investment

## **2. Theoretical background**

The study of a causal model of learning outcome involved in many constructs. The model primarily involved with the concepts of grade goal, self-efficacy, effort investment and self-regulated learning. Each factor was seen as the main concepts contribute to Learning achievement. So, the review will examine the related theories.

### **2.1 Social Cognitive Theory**

Many researchers are interested in studying self-regulated learning. Researchers may begin to understand its components, meanings and its process that students use to regulate their learning. The social cognitive theory of Bandura of triadic components has been presented to explain the conception of self-regulated learning. The theoretical framework used for self-regulated learning was Bandura's social cognitive theory which referred to functioning as a reciprocal interaction between personal influences, behavior and environmental features (Bandura, 1986). Personal factor referred to the form of cognition, affect, and biological events. Behavioral and environmental influences established interactions in which result a triadic dimension. The theory constructs human functioning as an interaction between personal influences, environmental features and behaviors. For example, personal beliefs such as self-efficacy beliefs about their learning ability could influence on their learning behaviors of choosing of learning activities, effort investment and persistence. Moreover, self-efficacy also affected environmental features; for example, a student with high self-efficacy who is trying to do some activities where there is no distraction. In contrast, environmental feature also affected personal and behavioral features. For example, the feedback from teachers may make students feel more efficacious and invest more effort to work harder to succeed. Behavior also affected the environment; for example, students may find a quiet place to study to avoid distraction form the environment.



**Figure 4.** A triadic analysis of self-regulated functioning.

According to Bandura (1986), self-regulation was assumed to be influenced by three processes. The personal process, environmental process and behavioral process and the importance of Bandura's triadic formulation are represented in both self-generated and external influences. The influence of each factor was not equal in strength. Environmental influences might be stronger than other factors (behavioral and personal) in some contexts. The personal process was used to regulate behavior and regulate the learning environment. Additionally, environmental and behavioral aspects also contributed to effects on self-regulation. For example, in mathematic problem solving, students' solutions were also influenced by environmental factors such as encouragement from teacher to help them to get correct answers.

Personal influence consisted of four parts: students' knowledge, metacognitive process, goals, and affect. Students' knowledge here referred to declarative knowledge and self-regulative knowledge. Second, declarative knowledge was about subjects and predicates which were related to external events in the world. This knowledge was not affected by context conditions and assumed to be different from procedural knowledge. Third, procedural knowledge was organized within conditions and actions in which the actions related to students' goal, level of motivation, content of short-term memory, and the external environment. Procedural knowledge referred to the knowledge of how to use strategies and knowledge of when and why the strategies are effective based on task contexts. Students used self-regulated knowledge because of their knowledge of strategies and they also depended on the

metacognitive process and performance outcome. Finally, the metacognitive strategy is associated with students' long term goals based on the aforementioned definition of self-regulated learning. Learners' long term goal and metacognitive control depended on self-efficacy, affect and self-regulatory knowledge. According to Bandura (1986), those who have a high sense of self-efficacy will set more challenging goals for themselves to accomplish.

Behavioral influences consist of three classes of analyses of self-regulated learning all of them are self-observation, self-judgment, and self-reaction. Self-observation referred to students' monitoring their own performance toward their goals. It was influenced by various personal processes such as self-efficacy, goal setting, metacognitive planning, and by behavioral influences as well. There were two methods of self-observation, verbal or written reporting and number of recording of actions and reactions. Second class was self-judgment. Self-judgment referred to students' response that compared their performance with setting goal. Two methods of self-evaluating are checking behaviors and rating their answers. The third class of self-regulation was self-reactions. Self-reaction referred to one's performance. It involved personal processes, such as goal setting, self-efficacy, metacognitive planning and behavioral outcome. Self-reaction was classified into three different factors such as behavioral self-reaction, personal self-reaction and environmental self-reaction (Zimmerman, 1989).

Environmental influences refer to students' use of environmental manipulation strategy. According to Zimmerman (1983), human learning depends on social environmental context, for example, changing from an academic task to increase the difficulty level or changing from noisy place to a quiet place. Moreover, Bandura (1986) assumed that learning from observing their own behavior and from enactive outcomes was the most influential method for changing learners' perceptions of efficacy and improving retention knowledge. Students use environmental strategies to regulate their behaviors such as finding a quiet place for studying or doing homework, arranging lighting and a proper place. Another important form of social experience was verbal persuasion. It was less effective than other forms because it depended on students' level of verbal comprehension. The last type of environmental influence on student self-regulated learning was the structure of the learning context.

### **2.1.1 Cognitive learning strategies**

Social cognitive learning strategies came from the social cognitive theory of Albert Bandura. In social cognitive learning theory, learning from the effects of action is a special case of learning. People function as active agents in their learning process. Cognitive processes are the ways that students used to monitor, control and regulate their behavior and learning (Pintrich, 2002). They represent the tasks of checking, planning and generating in their learning activities. Meyer (1996) has proposed three main components of cognitive learning strategies: rehearsal, elaboration and organizational strategies. These were considered as the main cognitive learning strategies in academic performance. The rehearsal strategy was a repetitive learning exposure in which students struggled 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 strategies which basically were the mind as a mental muscle, promote simple repetition and did not so much involve in cognitive processing. In contrast, active rehearsal learning strategies were more effective to reach the goals. Use 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 comparison, 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, 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 Strategies are a kind of elaboration strategy which focuses 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 the same active and complex cognitive processes as elaboration strategies. Moreover, students try to get the main idea in the



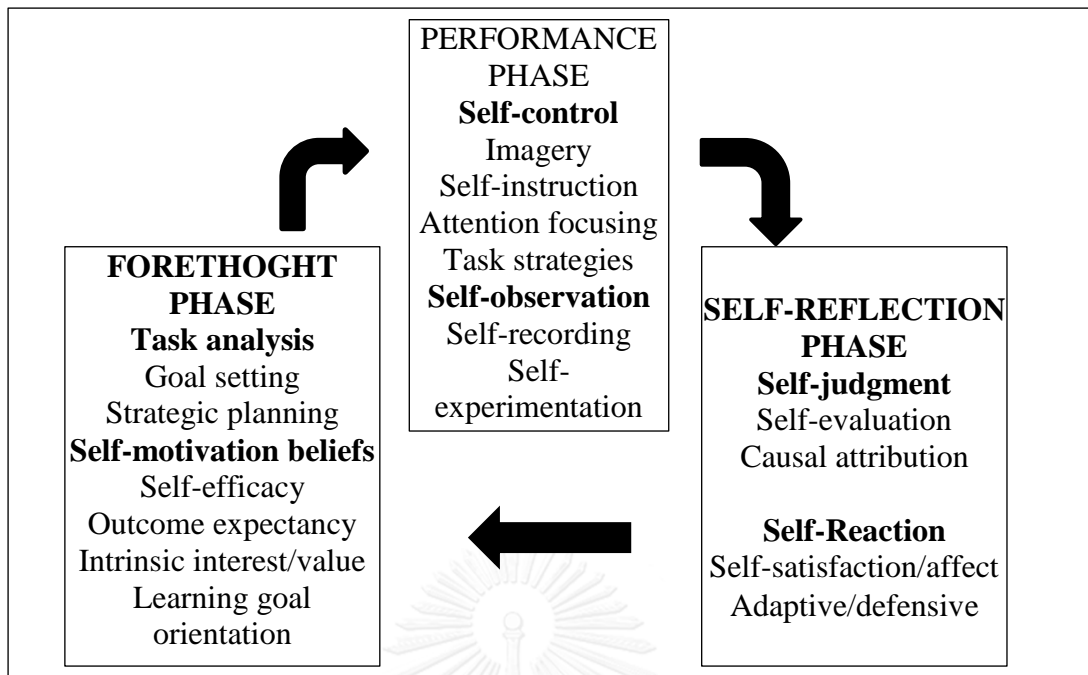
text by using specific techniques such as sketching, mapping of important ideas and identification of the main point in the text.

### **2.1.2 Metacognitive learning strategies**

Metacognitive knowledge concerns the awareness of one's own cognition which helps students become more responsible for their own learning activities and more knowledgeable in their own thinking. Metacognitive knowledge involves the strategies student used in reading and learning, for example, monitoring and checking their comprehension when they read, and identifying their strengths and weaknesses in doing a task. Metacognitive knowledge is a very important component influencing learning achievement. According to Pintrich (2002), there were two components of metacognitive, 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 regulations 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 strategy is to read slowly and focus 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 other people, such as teachers and friends in case of needing help and this is called the help-seeking strategy. Students manage their resources to reach the goals and needs.

Similar to the social cognitive theory of Bandura (1986), Zimmerman, Boekarts, Pintrich, and Zeidner (2000) had categorized the self-regulation into three phases including forethought, performance control, and self-reflection. First, forethought referred to the process that set for action such as setting goals and choosing effective learning strategies. Before students engage in learning task, they

have a set of cognition (e.g. goal setting and planning) and self-beliefs (task interest and self-efficacy) which will affect how they approach the task. There are two classes of forethought process, which are task analysis and self-motivation (Zimmerman, 2002). Task analysis related to goal setting and strategic planning. Self-motivation involve students' beliefs about their learning such as self-efficacy or the belief of one's own ability (Bandura, 1997). Second, performance phase referred to process during the learning that affects attention and action, such as social comparisons, feedback and use of strategies. In this phase student required particular behaviors to achieve their goal. Performance phase involved two major classes namely self-control and self-observation. Self-control referred to the taking of methods and strategies chosen during the forethought phase. There are several main types of self-control methods which are the use of imaginary, self-instruction, attention focusing and task strategies (Zimmerman, 2002). Self-observation referred to self-recording of events and experimentation to find out the causes of the events. For example, students are asked to record their own time in order to let them know how much time they needed for their studying. Third was the self-reflection phase, it occurred after performance, when learners evaluated their goal progress, made attribution for performance, and adjusted strategies toward achievement goal. There were two dimensions of self-reflection phase, self-judgment and self-reaction. Self-judgment means the comparisons of their own performance to their own prior performance or comparison with other performance. Another kind of self-judgment was causal attribution involving the beliefs of the one's success, for example, the test score. A negative score can be damaging to motivation. However, negative outcomes or poor grades can be controlled by choosing different strategies of learning. Self-reaction referred to the feeling of self-satisfaction and positive affect regarding to performance. Increase in satisfaction enhanced the motivation and further effort investment to learn (Schunk, 2001). Moreover, there are two sub-process of self-reaction. The first one was defensive reaction which means the effort to avoid withdrawing learning opportunities and performance. In contrast, adaptive reaction involved adjustment of method to increase effectiveness of learning.



**Figure 5.** Phase and sub-process of self-regulation

Source: Zimmerman (2002)

## 2.2 Theory of Self-efficacy

Self-efficacy had been a subject interest in human behavior of learning. Since the construct of self-efficacy was introduced, the construct has been debated and greatly studied. Social cognitive theory suggested that self-efficacy was a motivational orientation that provide persistence in the face of difficulties, increase intentionality and long term planning, promote self-regulation and self-correcting actions (Bandura, 2001). Self-efficacy was assumed as the central role in the exercise of personal agency to analyze the changes in fear and avoidant behavior (Bandura, 1989). According to Bandura (1977), expectation of personal self-efficacy determined the ways to deal with initiated behaviors, how much effort will be invested, and how long it would remain when facing challenges. Outcome expectancy was defined as one's estimation of a given behavior which leads to certain outcome (Bandura, 1977). The students were able to execute their behavior that required producing the outcomes if they believe in a particular course of action. However, if they feel unsure about their performance, the important activities will not influence their behavior. So, based on these assumptions, the initiation and persistence of dealing behavior were influenced by expectations of personal efficacy. At this initial level, perceived self-

efficacy affects choice of behaviors. However, students will avoid a particular situation when they believe the task exceed their skills or abilities. In contrast, students will participate in activities when they believe they are capable of handling situations. Another factor that influences activities was the expectation of success. It affected the dealing effort as soon as expectation was initiated. Efficacy expectation referred to how much effort students invested when they faced problems or obstacles. Both perceived self-efficacy and expectations together influence the performance. Only expectation will not produce desired outcome without component capabilities. So, efficacy expectation determined peoples' choice of activities, effort expenditure, and the duration of sustained effort in coping with situations.

### **2.3 Theory of Goal Orientation**

The concept goal orientation falls in cognitive psychology and was an important component of social learning theory (Bandura, 1977). A goal was an object or an aim of action that individual tries to accomplish (Locke & Latham, 2002). Goal setting focuses on motivation in work setting which was a cause of action. Goal causes action within four mechanisms (Locke & Latham, 2002). First, goals function as a direction; they direct relevant activities and effort toward goal which occurs in both behavior and cognition. Second, a goal energizes performance. The higher the goal individuals set, the greater effort they spend. Third, goals affected persistence in which individuals control their time spending on a task. When they are faced with a difficult task, they may work faster and more intensely for a short period and a long time with less intensity. Another example was tight deadlines, which would force a student to work more quickly than loose deadlines. Fourth, goals indirectly affect actions by leading toward the discovery, task relevance and strategies (Wood & Locke, 1990).

Locke (1991) proposed a conceptual framework which he called the motivation hub. It means that action consists of personal goals, goal commitment and self-efficacy. Assigning goals affected performance through personal goals as well as self-efficacy. Students expect an outcome from setting goals such as receiving a scholarship, receiving excellent grades or getting a good job. Similarly, goals were defined as why and how people are struggling to reach various objectives (Anderman & Maehr, 1994). There are many different types of goals such as social goals

(creating and maintaining social contacts), goal orientations (meeting demand), or emotion-related goals (avoiding boredom). Approaching goals was something when students can achieve the desirable state, and avoidance goals were something resulting from an undesirable state. From a motivational perspective, students who perceived moderate goals of difficulty as challenging, but attainable are most effective. Pintrich & de Groot, (1990) said that difficult goals led to better performance than specific easy goals and no goals. They have also proposed two kinds of goals which are goal commitment and choice goal. Choice goal means the real goal that students are trying to get and trying to get at some level. However, goal commitment showed the strengths of an individual committed to reach the goal. Goal commitment was higher when they think they can achieve the goals. A partial list of factors that Locke and Latham have identified as influencing goal choice and goal commitment was as below. The first category was about numbers of personal factors. Past performance and actual ability as well as skill level will influence goal choice and commitment. Students were more likely to try to attain goals that they have had some success at previously; for example, good students trying to attain high grades, while it is more unlikely that students will try to attain goals that are very much far from their actual skill level or previous performances; for example, a student with a long history of poor grades setting their goals of getting all high grades. Based on achievement goal orientation theory, Dweck and Leggett (1988) proposed that learning achievement and effort can be explained by goal orientation which depended on students' beliefs in themselves. Goal orientation led to many different ways of solving, participating and responding to learning achievement.

According to Pintrich (2000a), achievement goal or goal orientation divided into two groups, mastery and performance groups. Mastery goal focused on acquiring and developing competence and performance goals focused on demonstration the competence. Another evidence from Vandewalle, Cron, and Slocum (2001) proposed three dimensions of goal orientation: mastery goal-orientation, performance approach goal-orientation and performance avoidance. Research from Vandewalle et al, (2001), supported the idea of separating goal orientation into three and the positive relation between mastery and performance approach which these dimensions together promote motivation and further effect on learning achievement (Elliot et al., 1999; Locke &

Latham, 2002; Pintrich, 2000a). The studies further generated the perspectives of goal orientation to a multiple goal perspective which provide greater understanding of learning achievement. A student who has mastery goal-orientation was trying to understand a particular task and strive for self-improvement by comparing the current achievement with their previous achievement. Performance goal referred to demonstration of ability compared with others. Performance-oriented students were interested in competition, demonstrating abilities, and compared performance with others. At the second level, goal-orientation was further divided mastery and performance into approach and avoidance goal. Avoidance goal focused on avoiding misunderstanding task or avoiding appearing incompetent (Pintrich, 2000a). Nicholls (1984) assumed performance-avoidant goals as that which refer to avoiding challenging tasks. He further suggested that goals could provide both the measurement progress and encourage them to establish strategies to compare to unsuccessful ones in the previous tasks. The benefit of goal setting depends on students commit to attain those goals and also depends on the goal difficulty. In conclusion, goal force actions through mechanism and lead action toward relevant activities through speeding effort and time.

### **3. Related literatures**

The current research is interested in self-regulated learning, goal orientation, effort investment and self-efficacy in predicting learning outcome as well as the direct and indirect effects of variables in the research model. So, in this part, the researcher focuses on how each factor has a cause and effect on one another.

#### **3.1 Effects of self-regulated learning on learning outcome**

Recently, self-regulated learning has become an important theoretical framework in psychological and educational research and it was also very important for researchers to understand the complex process of self-regulation. Self-regulated learning was shown to describe students' learning strategies by regulating their studying and ways of thinking (Bandura, 1986; Zimmerman, 1989; Pintrich, 1999). Many researches focused on self-regulated learning research on learning achievement 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). In recent years, self-regulated learning has been

proved as a main construct in predicting learning outcome in both secondary and higher education contexts (Huie, Winsler, & Kitsantas, 2014; Zuffianò, Alessandri, Gerbino, Kanacri, et al., 2013).

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 learning was proved to be effective when students adopt the cognitive and metacognitive learning strategies, in turn these strategies positively predicted learning outcome in both in higher education and secondary students (Lee et al., 2014; Ning & Downing, 2014). 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 learners were more likely to 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 learners considered learning as a controlled process in which they were able to plan their learning tasks, organized the processes with monitoring and evaluating their learning processes (Ley & Young, 2001). They set the goals to struggle to achieve for their learning then monitored the progress which adapted and regulated their behavior in order to reach their goals (Pintrich, 2004). The set goals would challenge and help students to adapt or continue the same way in learning process (Muis, 2007). Self-regulated learning was the way students dealt with academic tasks, and it was assumed to be an active, constructive process. To be successful in the learning, students must actively engage in various activities to control the academic learning. So, self-regulated learning was appropriate to the college context. College students mostly try to find their own way to learn by themselves. Besides learning in class, college students try to find ways to learn by themselves, they initiate their learning strategies, without helps from others, to identify their learning needs and assess the learning process. If students can manage their learning time, they are able

to adapt to the academic needs. In this manner, research on self-regulated learning is more relevant to learning achievement in higher education.

### **3.2 Self-efficacy, self-regulated learning and learning outcome**

Self-efficacy was known as the influences of people's feeling, thought and action (Bandura, 1995). He believed that self-efficacy contributes to both choice of activities and learning achievement. Moreover, students with high sense of self-efficacy will set challenging learning activities which lead to expend more effort to reach high achievement outcome. In addition, not only has self-efficacy been found to have an effect on learning achievement, it was also viewed as a key construct that effect on self-regulated learning as well and these assumptions were confirmed by (Lee et al., 2014; Zuffianò, Alessandri, Gerbino, Luengo Kanacri, et al., 2013). Self-efficacy provided learners with representations of future consequences, which lead learners in setting their own goals (Bandura, 1997). The higher the degree of self-efficacy, the more likely it is for a student to have confidence on tasks and believe in their actions to make differences and is able to produce outcome. These kinds of learners generally have a strong sense of control on their work and were more likely to select tasks of higher difficulty if given the choice. In contrast, students with low self-efficacy may feel negative toward their thoughts, behaviors and motivation. However, students with high self-efficacy develop a strong sense of personal competence. As a result of these influences, self-efficacy is a strong determinant of accomplishment. Therefore, it contributed mainly to intellectual development which leads toward learning achievement. This relationship between self-efficacy was found significantly related in a study as the predictors of academic self-regulation and learning achievement (Lee et al., 2014). Those who have higher self-efficacy to acquire a skill or perform a task join more work harder, longer when they face difficulties and success at higher levels of achievement.

### **3.3 Goal orientation, self-regulated learning and on learning outcome**

Goal orientation was considered as one of the main motivational constructs in predicting academic performance. Students who take challenge goals, will show higher performance (VandeWalle, Cron, & Slocum Jr, 2001). Goal orientation was proved as force for students to employ self-regulated learning strategies (Miller, Behrens, Greene, & Newman, 1993). Self-regulated learning was proven to be



influenced by goal orientation and both of these constructs affected learning outcome (Elliot & Thrash, 2002). When students set their goal, they will try to find the way by adapting their behavior toward goal. They try to steer their self-regulated learning activities to meet their set goal through goal relevant activities. Another study proved self-regulated learning as the mediator between goal orientation and academic performance (Elliot et al., 1999). In his study, goal orientation was measured by three indicators such as mastery goal, performance goal, and avoidance goal and the results showed that goal orientation was a predictor of self-regulated learning strategies and exam performance. Those students consisted of goal orientations tended to use self-regulated learning strategies such as planning their learning activities, monitoring their strategies toward goal and reflecting what they have done.

#### **3.4 Self-efficacy, goal orientation, self-regulated learning and learning outcome**

Self-efficacy was proven to be a strong predictor for learning outcome (Komarraju & Nadler, 2013; Putwain, Sander, & Larkin, 2013; Zuffianò, Alessandri, Gerbino, Luengo Kanacri, et al., 2013). The results showed consistency with the social cognitive theory of Bandura. The theory suggested that self-efficacy was a motivational orientation that keeps persistence in the face of difficulties, increases intention and long term planning, and promotes self-regulation and self-correcting actions (Bandura, 2001). People mostly avoid difficult situations in which they believe that this situation exceeds their ability to cope or to deal with but they will mostly involve in the situations which they believed that they can do or cope with their skills or ability (Bandura, 1995). Students will have higher self-efficacy when they perceive that they have done something well or more better even lack of success and slow improvement will not lower their self-efficacy if they believe that they can perform better by spending more time, effort as well as more effective strategies (Schunk, 1990). Students with a high sense of self-efficacy or belief in their abilities are also good self-regulated learners, who are confident in their ability to deal with challenging tasks in learning context (Bandura, 1991; Klassen, 2002; Schunk & Pajares, 2005). Bandura (1996) suggested that those who have a high sense of self-efficacy set more challenging goals for themselves to accomplish. As soon as students set their goal, they will regulate their learning behavior, monitor, and evaluate their

behavior toward setting goal. His suggestion was consistent with the study of (Wood & Loocke 1987); the results showed goal orientation functions as the mediator between self-efficacy and learning outcome (Wood & Locke, 1987). These three constructs self-efficacy, goal orientation and self-regulated learning were proved to have close relationship in turn they effected on learning outcome (Lee et al., 2014; Liem, Lau, & Nie, 2008). Based on the above researches, we can conclude that self-efficacy, goal orientation, and self-regulated learning are closely related in contributing to learning achievement. As when people believe in their abilities, they will set challenging goals with initiated learning strategies to achieve the set goal.

### **3.5 Goal orientation, effort investment and learning outcome**

Previous researches have proven a positive relation between effort investment and performance (Venables & Fairclough, 2009). Effort was invested to serve the goal. The level of goals related to the commitment of effort. Once people feel satisfied with their needs in the tasks, they will engage more and invest greater time and effort in organizing work. This is similar to Bandura's (1977) findings, when students feel or believe in themselves in their tasks, they will engage in challenge tasks through goal setting, effort investment and persistence. These processes will lead to productivity and performance as when they set their goal, they will plan their activities which monitor and reflect their action toward setting goals and in turn the goal commitment will drive the willingness to invest effort into the task. Students showed different degrees of learning strategies, disorganization, persistence and effort during learning depending on whether they adopted mastery goal, performance approach and performance avoidance goals which in turn will lead to effect on learning achievement. Goal orientation has a positive effect on learning achievement directly and indirectly affects achievement through effort investment (Elliot et al., 1999). Goals lead to action and relevant activities through time commitment and effort investment. By clarifying the intentions to achieve which determined in the level of effort needed to invest (Pintrich, 2004). Moreover, students were more likely to be persistent, hardworking, invested in their efforts and in making effective use of self-regulating processes such as planning, self-monitoring and self-evaluation (Zimmerman, 2000).

## **Methodology for research**

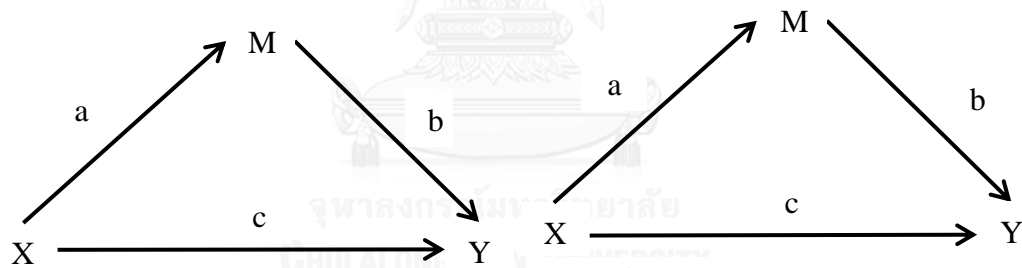
### **3.6 Structural equation modeling (SEM)**

In this part, research will review what the structural equation modeling is and how it is applied in this research. First, structural equation model (SEM) was defined as a tool to explore as well as to contrast hypotheses on causal relationships between variables or observed variables (Iriondo, Albert, & Escudero, 2003). Similarly, structural equation modeling is a group of statistical models that explain the relationship among variables (Hair, 2010). Structural Equation Modeling was first introduced by Wright (1921). He proposed the method of breaking down the observed correlation into a system of equations that described the hypotheses concerning about the causal relationships in which represented in path diagram and it was known as path analysis. Then, this method was developed by Jöreskog (1970). He changed from path analysis into a new method called structural equation modeling which combined factor analysis with path analysis. Structural Equation Model (SEM) was a study of causal relationships within observational data which assumed the linear relationships and non-linear relationship also can be modeled. Moreover, it assumed that there was an underlying mechanism that leads to theoretical covariance structure among variables. Below are the processes which help to understand the SEM process in order to identify the type of causal relationship between variables which made variations between two variables. 1) Direct causal relationships means one variable causes and directly affects other variables. 2) Indirect causal relationship means one variable affects another through a third variable. 3) Spurious relationships mean two variables which have one common variable effect on them. 4) Association without causation means the two variables have a common variable which cannot be determined if the common variable contributes to covariance the two former variables through indirect or spurious relationships. In the present study, the researcher applies SEM to study the factors affecting learning outcome and to study the causal relationships among variables as well as the direct and indirect effects between variables.

#### **3.6.1 Mediator in structural equation modeling**

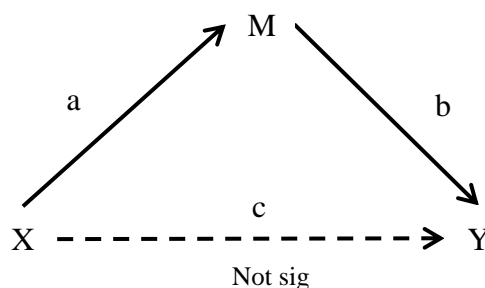
Mediator refers to cause and effect of three variables in which one variable was called as a mediator, or as an intervening or process variable (Kenny, 2014b). Similarly, mediator refers to a variable that explains the relationship between a

predictor and outcome (Frazier, Tix, & Barron, 2004). Consider that a variable X affects variable Y, Variable X is called a causal variable and Y is called outcome. Moreover, another variable M is called mediator or mediating variable. If variable M functions as the mediator, the effect of X on Y is mediated by M. In this case, variable X is significantly related to variable M (mediator), M is significantly related to Y (dependent variable) and both the relationship of X and Y diminishes when M is in the model as in Figure 6. In addition, these three constructs must show evidence of nonzero correlation with each other and the relationship between X and Y must decrease when adding M in the model or as a predictor of Y. There are two kinds of mediation effects. One is partially mediational effect which means that variable X partially affects Y even when M is controlled, as in Figure 7. However, full mediation is when variable X no longer affects Y when M is controlled, as in Figure 8. One of the main reasons to study mediation is to understand the mechanism between the causal variable and the outcome. The three figures will explain the characteristic of mediator.



**Figure 6.** Mediating effect  
Source: Kenny (2014a).

**Figure 7.** Partial mediation  
(Every line is statistically significant)  
Source: Kenny (2014a).



**Figure 8.** Full mediation  
(Line C is not statistically significant)  
Source: Kenny (2014a).

### 3.6.2 Mediator testing

After understanding the concept mediation or mediator, now we focus on how we can test mediators with statistical performance. Base on the above definition, SEM was a family of statistical performance. To test causal effects within a model involved the estimation of some equations. The common approach in testing mediation is called Causal Inference approach which is relatively common in structural equation modeling. Here are the equations used to estimate mediation model.

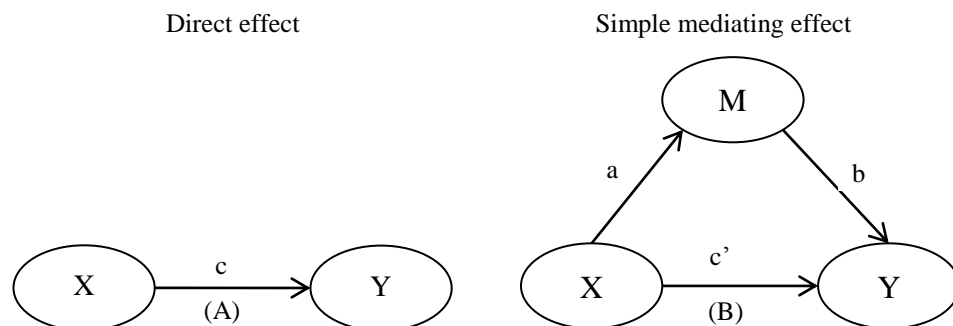
$$Y = \beta(1) + \tau X + \varepsilon \quad (1)$$

$$Y = \beta(2) + \tau X + \beta I + \varepsilon \quad (2)$$

$$M = \beta(3) + \alpha X + \beta M + \varepsilon \quad (3)$$

In the equations,  $X$  represents independent variable,  $Y$  represents dependent variable, and  $M$  represents mediator.  $\beta$  represents population regression.  $\tau$  represents correlations between  $X$  and  $Y$ .  $\tau$  in equation (2) represents relationship between  $X$  and  $Y$  adjusted for the effects of mediation variable ( $M$ ).  $\alpha$  represents the relation between  $X$  (independent variable) and  $M$  (mediator variable) in equation 3. Beta ( $\beta$ ) represents the relation between  $M$  (mediation variable) and  $Y$  (dependent variable) and  $\varepsilon$  represents residual in equation.

In a mediation study, researcher interested in explaining causes and effects of independent variables and dependent variables when there is another variable included in the model or included between the independent variable and dependent variable. Mediator variables will help to explain the relationship between independent and dependent variables by testing direct effects and indirect effects.



**Figure 9.** The relationship between variables  
 (A) Relationship between  $X$  and  $Y$   
 (B) Relationship between  $X$  and  $Y$  in which  $M$  is the mediator

Figure 9 (A) showed the direct effect and indirect effect of variables in the model in which figure (A) shows the direct effect from X to Y which C represent total effect, and figure (B) shows the mediation effect in which X affects Y and M is mediating variable of intervening in which “a” was the effect of independent variable on mediator, “b” was the effect of mediator on dependent variable and “c” was the indirect effect in which the indirect effect in the model based on the differences between the direct effect of (X) on (Y) without controlling mediator (M) and direct effect of X on Y when control variable (M) in the line of  $c - c'$  ( or resulted in multiple between the direct effect of (X) on (M) with a direct effect of (M) on (Y).

There are four steps in mediation testing (Baron & Kenny, 1986). First, examine the relationship between independent variable X and dependent variable Y in which these two variables must be correlated with each other to a statistically significant degree. Second, independent variable X must affects mediating variable M. Third, use regression analysis technique to examine the effect of mediating variable M on dependent variable. Finally, examine what type of mediator it is by using regression analysis. When X and Y are correlated, the effect of X on Y is controlled by M. So, the relationship between X and Y is expected to be zero due to mediation indicating only the effect of line “a” and “b”, excluding the direct effect from X to Y, and these two variables are not correlated anymore. This kind of effect is called complete mediation and mediation variable (M) is full mediation (Kenny, 2014b). However, in the case that M is already controlled but there is a statistically significant relationship between X and Y that still exists, so that the mediating variable (M) is called a partial mediator. Moreover, in case that the effect of X on Y when M is controlled indicate the opposite relationship different from the effect of X on M and from M to Y indicating that mediating effect of M resulted in a variable that we called “Suppressor”. So, we can conclude that if we did not control (M), then there is no relationship between the independent variables and dependent variables. However, if (M) is controlled, the relationship between X and Y will increase.

Based on the above discussion, we can conclude that the role of the mediating variable is fully mediated when all of the 4 conditions are assumed. However, if only three conditions are met (1 to 3), the role of the mediating variable is partially mediated. Moreover, in case M functioned as the suppressor variable which we can

examine whether M is fully or partially mediated by using a technique called the Sobel test which we can take the indirect effect to test for significant indirect effects Sobel (1982, 1986 cited in Preacher & Hayes, 2008).

### **3.6.3 Assumptions in Mediation test**

There are four main assumptions to study the mediation test using structural equation modeling (Kenny, 2014b). First, there is no unmeasured confounding of the relationship between X and Y which means that all variables that cause X and Y are included in the model. Second assumption is that there is no unmeasured confounding of relationship between M and Y. Third, there is no unmeasured confounding of the relationship between X and M. Finally, independent variable must not cause any confounding of the relationship of M and Y. If all of these conditions are met, the mediational path will be identified. Elliot et al. (1999) have studied a mediational analysis took three main assumptions to be considered in mediational analysis which followed the idea of (Judd & Kenny, 1981). First, there must be a relationship between a predictor and outcome variable. Second, there must be a relationship between the predictor and hypothesized mediator variable. Third, there must be a relationship between mediator and outcome when control for the predictor variable and the relationship between predictor and outcome should be reduced.

### **3.6.4 Sobel Test**

It is very important to know which of the indirect effects are statistically significant from zero. In this section, the researcher will introduce what Sobel test is and its importance. Sobel test was a technique to examine the significance of a mediating test. It was started by Mochale E. Sobel. He was the first to initiate this technique in order to study why independent variable effect on dependent variable and mediator is a relation between independent and dependent variable when third variable come to contribute to effect indirectly on dependent variable. When there is a mediator in the model, the effect of an independent variable is decreased and the effect of mediator still affects dependent variables to a statistically significant degree.

Sobel was a technique of testing t value in which the test determines whether the reduction of independent variables affects dependent variables when there is a mediator in the model. Thus, when putting the mediator in the model, the significant effect of independent variable on dependent variables will be reduced. The Sobel test

was done by taking effect size to divide with standard error. So, the z score must be bigger than 1.96, indicating the significance at the level of .05.

### 3.6.5 Moderator

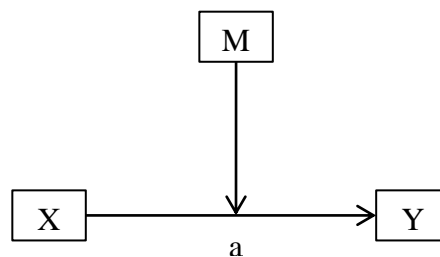
A moderator variable is a variable that changes the strength of the causal relationship. For example, self-efficacy may be high for men; then consider that variable X affects Y and variable M is a moderator variable. The effects of X on variable Y depend on the level of variable M.

### 3.6.6 Measurement in moderation

In testing moderation, it simply provides a nonlinear combination of the two variables which accounts for the amount of variability in Y (dependent variable). In general, the effects of a moderator indicated by the interaction of independent variable (X) and moderator (M) which both of them contribute to explain dependent variable (Y). The estimation is expressed as below equation:

$$Y = i + aX + bM + cXM + E$$

In Figure 10, Y represents dependent variable, X represents independent variable, M represents moderator variable and XM represents interaction between X and M. Path “a” represents simple effect or main effect of X on Y. “c” represents coefficient which measure moderation effect. Base on equation 1, we can conclude that Y is effected by X which is equal to “a” + cM. So, effect of X on Y due to the value of M. Sometimes we may say that higher levels of M may cause the effect of X on Y.



**Figure 10.** Moderating effect

**Source:** Frazier et al. (2004)

Unlike the mediator, a moderator stays at the same level as an independent variable which functions as causal variables. Moreover, moderator always has a role as independent variable or causal variable, whereas a mediator can shift the roles from effects to causes.

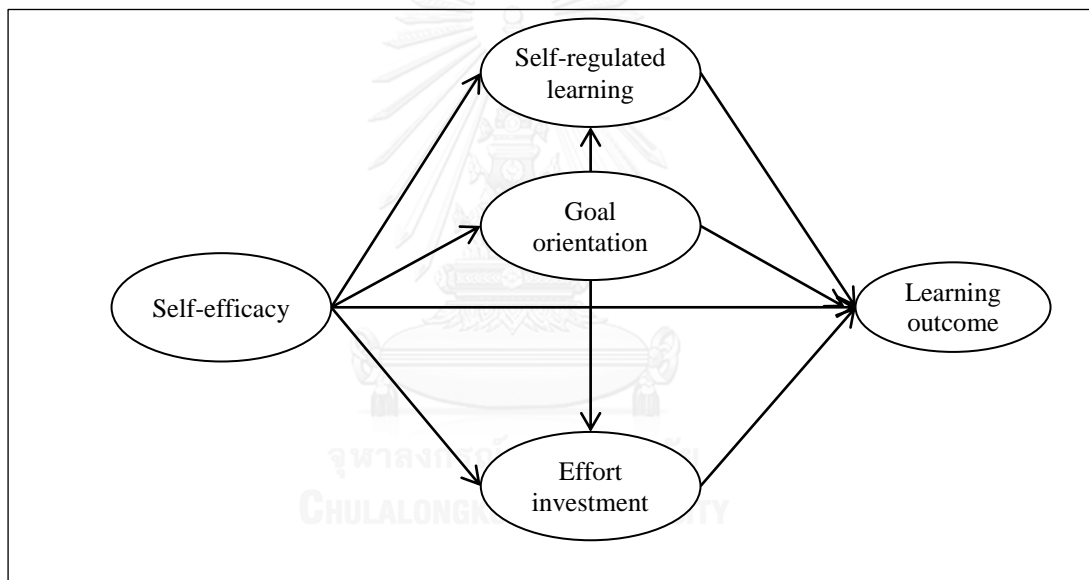


### 3.7 Conceptual Framework

The current study is further developed from the research of Lee et al (2014). This part will discuss how the previous model was developed. Based on the description of his paper, the previous model was developed from theories and researches. He used many steps to develop the research model. First, he hypothesized academic self-efficacy and individual interest as two correlated and as independent predictor of academic self-regulation and learning achievement in which this hypothesis was derived from the research of Hini (2006). Second, lee et al, (2014) hypothesized that academic self-efficacy predicted self-regulation directly and indirectly through academic grade goals as a mediator. Third, based on the theory of the self-regulatory process of Zimmerman & Schunk, (2008), they hypothesized that the relationship between academic grade goals and learning achievement would be mediated by self-regulation.

His research intended to test the interest and self-efficacy as predictors of academic self-regulation and achievement. The study collected data from 500 secondary schools in four different subjects. The study tried to test two models and each model tested four different subjects, namely Korean, Mathematics, English, and Science. The analysis of structural equation modeling was employed to generate two models. The results showed that the first model, the hypothesized model, best fit the data in all subjects and significantly effect on learning achievement. However, when the variable of interest was included as the alternative model, the result showed that the model was not to fit with the empirical data. Moreover, the added path in alternative models did not show statistically significant effects among variables on learning achievement. In the alternative model, the variable interest in the subjects predicted only on academic self-regulation. However, it does not significantly directly affect learning achievement. For the hypothesized model, the results showed consistently fit to empirical data in all subjects. In addition, the results showed significant affects among variables as a solid path shown in the table. At the end of the study, the researcher also shows the limitations in his task. First, he suggested that in his model there were a missing of an important construct in the academic self-regulation process. That missing construct that deserve attention was effort investment. So, the previous researchers suggested integrating effort investment into

the model for future research. Moreover, researchers indicated that the missing construct should stay between grade goal and learning achievement. According to Elliot et al. (1999), the degree of effort investment depends on the levels of goal. The integration of effort investment into the model as the suggestion of Lee et al, (2014) and the support from the research of (Venables & Fairclough, 2009). Although other researches considered effort investment as part of self-regulated learning, for example (Pintrich, 1999; Pintrich & De Groot, 1990), the definition of self-regulated learning here does not include this element. Moreover, the current study will dismiss the interest variable from the previous model because this variable only affects academic self-regulation and does not directly affect learning outcome. The conceptual framework was as figure 11.



**Figure 11.** Research framework

## **CHAPTER 3**

### **RESEARCH METHODS**

This research study was a causal relation research which was designed to examine how self-efficacy, goal orientation, self-regulated learning and effort investment can improve learning outcome. The research intended to study three objectives: 1) to develop and validate a hypothetical model of learning outcome, 2) to examine the direct and indirect effects between self-efficacy and learning outcome, and 3) to examine the mediating roles of self-regulated learning, goal orientation and effort investment between self-efficacy and learning outcome. The details of the research methods will be specified as below.

#### **Population and sample**

The population of this study was undergraduate students who were studying in public universities in Phnom Penh, Cambodia. To determine the sample size, the researcher followed the rule of thumb technique. To study structural equation modeling, a suitable sample size should consist of 10 to 20 times of the number of parameters in the research model (Hair, 2010; Tanaka, 1987). In this study, the number of parameters was 34. Therefore, a proper sample size for this study was at least 340 to 680. Stratified random sampling was used to select participants from two different fields, Social Science and Science.

#### **Research variables**

The research consisted of five latent variables which four were endogenous latent variables such as self-regulated learning, goal orientation, effort investment and learning outcome and one exogenous variable was self-efficacy

#### **Operational definitions**

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

- 1) Planning means activities including setting goals that student set for upcoming study or events.
- 2) Monitoring means activities where student track, self-test and question to discover the lacking points.

3) Reflecting means self-evaluation of performance and adjustment of learning activities, checking and correcting their behaviors as they proceed on a task.

**Self-efficacy** means the beliefs in ones' judgment of their abilities to learn or to accomplish in their academic learning and confidence in performing a task.

**Goal orientation** means an object or outcome to aim for and a standard for judging satisfaction that students expect to achieve in their academic setting.

1). Mastery goal means an individual's behaviors of seeking or developing competence.

2). Performance goal means the behaviors of individuals seek to gain favorable judgments of their competence.

3). Performance avoidance means action or activities that avoid the possibility of failure, and on the attempt to avoid it.

**Effort investment** means the organization of time to carry out behavior, persistence and effort when faced with challenging of academic situations. In this research effort investment includes time commitment and intensity.

1) Time commitment means the perceptions of the duration of learning student invests or spends in their learning

2) Intensity means the perception of commitment students invest in their learning even when they feel tense

### **Research instruments**

The instrument utilized in this study consisted of two parts: part 1 consisted of five questions asking about background information and part 2 consisted of 29 questions measuring self-efficacy, goal orientation, self-regulated learning, effort investment. Learning outcome was measured by English examination score. The school provided the actual scores obtained by the participating students in their second-semester final examinations for English subject. The summarized table of measurement factors and items were specified in details as below:

**Part 1** Five questions were asked about background information such as gender, age, field of study and subject study, students' name and students' ID.

**Part 2** Twenty nine self-report questions using a 5-point Likert scale were used to assess each variable in the research model. The details were specified as below:

1) To assess self-efficacy, six items were used. The items were derived from (MSLQ) Motivated Strategies for Learning Questionnaire (Pintrich, 1991).

2) To assess the goal orientations, 3 items were developed by researcher and 6 items derived from Elliot and McGregor (2001).

3) To assess the self-regulated learning, the questions were adopted from the self-regulation measurement of the MSLQ (Pintrich, 1991; Pintrich & De Groot, 1990) which covered three indicators such as planning, monitoring and reflecting. 2 items were developed by researcher and 7 items were derived from (Pintrich, 1991).

4) To assess effort investment, researcher adopted the questionnaire from (Meltzer et al., 2004). The questionnaire was used to assess self-perceived effort investment by rating on their effort investment for marking-period of their course associated with their perceived academic struggling. The measurement includes aspects of effort that consists of working through boredom, dealing with difficulty, working hard and invested needed amounts of time. The scale consists of 6 items rating on a five-point Likert scale ranging from “1. Strongly disagree” to “5. Strongly agree”. 2 items were developed by the researcher, and 4 items were derived from (Meltzer et al., 2004).

**5) Learning outcome** was measured by English exam scores.

### **Development and quality of research instruments**

The research tools in this research were adopted from previous studies. The steps of research tools development were specified as below:

**Step 1** The researcher reviewed related literatures and researches in order to develop operational definitions and then researcher developed research items based on the operational definition. The items specification was shown as in the table below.

**Table 2.** Table of specification

Variable	Items	Item number
1. Self-efficacy (6)	1-6	6 items from Pintrinch (1991)
2. Goal orientation (9)		
2.1 Mastery goal	3	6 items from Elloit and McGregor (2001) 3 items by the researcher
2.2 Performance goal	3	
2.3 Avoidance goal	3	

Table 2 (Con.t)

Variable	Items	Item number
3. Self-regulated learning (9)		
3.1 Planning	3	7 items from Pintrich (1991)
3.2 Monitoring	3	2 items by the researcher
3.3 Reflecting	3	
4. Effort investment (6)		
4.1. Time commitment	3	4 items from Meltzer et al. (2004)
4.2. Intensity	3	2 items by the researcher

**Step 2** the researcher prepared a draft questionnaire based on the contents that need to be measured. Then, the researcher took the draft questionnaire to discuss with advisor for feedbacks and edition.

**Step 3** To ensure the quality of research instruments, researcher took the items to check content validity with 5 experts, then trail out for reliability and construct validity.

1) Content validity, the researcher brings the draft questionnaire with summarized proposal to 5 experts to check whether each question consistent with the research content and the language usage. There were 4 experts from research methodology and measurement fields checked the content of the questions and 1 expert checked the consistency of translation from English to Khmer. The criteria of content validity index values to consider the questions were between 0.500 and 1.000. The criteria were used by experts to judges that each question consistent with the operational definition, appropriateness of language usage and comments on the other problems. The score of consistency in judging was 1 = consistent, 0 = not sure, and -1 = not consistent. The questions were chosen only if the score was higher than 0.600.

The results of content validity followed the experts' ideas. Experts commented to change or revise words as well as questions that were not clear or consistent with dimensions or components that are going to measure. The results showed as in below

**Table 3.** IOC and comments from experts

Indicator	IOC values			IOC index	Comments from experts
	-1	0	1		
<b>1. Self-efficacy</b>					
Item 1	0	0	5	1	
Item 2	0	0	5	1	
Item 3	0	0	5	1	
Item 4	0	0	5	1	
Item 5	0	0	5	1	
Item 6	0	0	5	1	
<b>Self-regulated learning</b>					
<b>2.1 Planning</b>					
Item 1	0	0	5	1	
Item 2	0	0	5	1	
Item 3	0	1	4	0.8	
<b>2.2 Monitoring</b>					
Item 1	0	0	5	1	
Item 2	0	2	3	0.6	
Item 3	0	2	3	0.6	
<b>2.3 Reflecting</b>					
Item 1	0	2	3	0.6	
Item 2	0	1	4	0.8	
Item 3	0	1	4	0.8	
<b>Goal-orientation</b>					
<b>3.1 Mastery goal</b>					
Item 1	2	0	3	0.2	Revised question to be consistent with definition
Item 2	2	0	3	0.2	Revised word usage to be easy to understand
Item 3	0	1	4	0.8	
<b>3.2 Performance goal</b>					
Item 1	0	2	3	0.6	
Item 2	0	2	3	0.6	
Item 3	0	0	5	1	
<b>3.3 Avoidance goal</b>					
Item 1	0	1	4	0.8	
Item 2	0	1	4	0.8	
Item 3	0	2	3	0.6	- Deleted some words that were not consistent

Note: item refers to the questions in the questionnaire (see appendix B)

Table 3 (Con't)

Indicator	IOC value			IOC index	Comments
	-1	0	1		
Effort investment					
4.1 Time commitment					
Item 1	0	0	5	1	
Item 2	0	0	5	1	
Item 3	0	0	5	1	
4.2 Intensity					
Item 1	0	0	5	1	
Item 2	0	0	5	1	
Item 3	0	1	4	0.8	

Note: item refers to the questions in the questionnaire (see appendix B)

The results of content validity showed that the IOC score of 5 items was between 0.500 – 0.700, 5 items were at 0.710 – 0.900 and 20 items was at 1.000. When considering the criteria of IOC, all items passed the criteria (Lynn, 1986; Turner & Carlson, 2003). So then all items were proposed to advisor for trailing out.

**Step 4** After receiving comments from experts, researcher took the questionnaire to try out with 30 undergraduate students. The time spent on answering the questionnaire was around 10 to 15 minutes. The data was generated for reliability followed Cronbach's alpha coefficient. The results of the reliability showed that the research tools contained the reliability in an acceptable manner and when taking this research tools to test with larger sample size, 700 undergraduate students, the results showed a similar value of reliability. The details of the reliability is shown in the below table 4.



**Table 4.** Comparison of reliability

Variables	Items	Cronbach's alpha coefficient	
		Test with (30 students)	Test with (700 students)
<b>Self-efficacy</b>	6	0.831	0.689
<b>Self-regulated learning</b>	9	0.894	0.869
1. Planning	3	0.774	0.620
2. Monitoring	3	0.869	0.683
3. Reflecting	3	0.825	0.616
<b>Goal orientation</b>	9	0.933	0.789
1. Mastery goal	3	0.737	0.732
2. Performance goal	3	0.740	0.618
3. Avoidance goal	3	0.615	0.681
<b>Effort investment</b>	6	0.900	0.818
1. Commitment	3	0.696	0.628
2. Intensity	3	0.610	0.724

**Step 5 Construct validity:** There are 5 latent variables in the research model which two variables measured by only one indicator such as self-efficacy and learning outcome. So, these two indicators we did not validate the construct validity. A confirmatory factor analysis was used to examine the consistency between empirical data and the research model.

### 1. Self-regulated learning

Three observed variables were used to measure self-regulated learning: planning, monitoring and reflecting. A confirmatory factor analysis was performed to verify the validity of the measurement model of self-regulated learning. To be able to run the confirmatory factor analysis, a correlation among variables was needed.

The results of correlational analysis showed that the relationship among observed variables was statistically significant at a level of .01 ( $p < .01$ ) the relationship value ranged from 0.682 - 0.698 indicating that if one variable increase, another variable also increases or if one variable decrease, another variable also decreases. Among three factors, the highest mean level was planning followed by monitoring and reflecting, respectively.

In order to explore and assess the suitability of data, Bartlett's Test of Sphericity and Kaiser –Meyer-Olkin (KMO) were generated. The results indicated

that the correlation matrix was not identity matrix (Chi-Square = 1037.985, df = 1, p = 0.000) which is statistically significant different at the level of .01 and consistent with the results of KMO in which the value was close to 1 (KMO = 0.741) means that the correlation matrix of observed variable was not identity matrix and the correlation was high enough to take further analysis in the confirmatory factor analysis in order to validate the construct validity of the measurement model of self-regulated learning.

The detail as in table 5

**Table 5.** Mean, SD and correlations of observed variables in the measurement model of self-regulated learning

Variable	Correlations between observed variable		
	PLA	MON	REF
PLA	1.000		
MON	0.697**	1.000	
REF	0.682**	0.698**	1.000
Mean	3.700	3.471	3.629
SD	0.720	0.650	0.634
Bartlett's Test of Sphericity = 1037.985, df = 1, p = 0.000, KMO = 0.741			

Note: \*\*p < .01

The results of confirmatory factor analysis indicated that the measurement model of self-regulated learning contained the construct validity (Chi-square = 1.356, df = 1, p = 0.244, GFI = 0.986, AGFI = 0.917, RMSEA = 0.022, RMR = 0.003) which p-value was higher than .05 and chi-square was statistically significant different from zero means that the measurement model of self-regulated learning contains construct validity. All factor loading were statistically significant at the level of .01 which the highest loading on planning ( $\beta = 0.841$ ), followed by monitoring ( $\beta = 0.840$ ), and reflecting ( $\beta = 0.823$ ), respectively. For reliability, the coefficient of each observed variable which was measured by  $R^2$  indicated the covariance between observed variable with latent variable ( $R^2$  ranged from 0.677 to 0.707). The details as in table 6

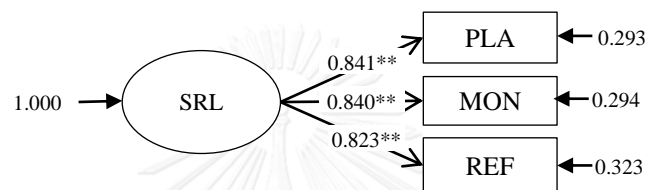
Based on the results, the equation of measurement factor of self-regulated learning can be written as below

$$\text{SRL} = 0.305^{**}(\text{PLA}) + 0.334^{**}(\text{MON}) + 0.306^{**}(\text{REF})$$

**Table 6.** Confirmatory factor analysis of measurement model of self-regulated learning and construct validity

Variable	Factor loading		t	R <sup>2</sup>	Factor score coefficient
	b(SE)	$\beta$			
Self-regulated learning					
PLA	1.000	0.841	-	0.707	0.305
MON	0.907(0.035)	0.840	25.774**	0.706	0.334
REF	0.867(0.035)	0.823	25.119**	0.677	0.306

Note: \*\*p < .01



Chi-square = 1.356, df = 1, p = 0.244, GFI = 0.986, AGFI = 0.917, RMSEA = 0.022, RMR = 0.003

**Figure 12.** Measurement model of self-regulated learning

## 2. Goal orientation

Three observed variables were used to measure goal orientation. All of these three variables were mastery, performance and avoidance. A confirmatory factor analysis was performed to verify the validity of the measurement model of goal orientation. To be able to run confirmatory factor analysis, correlation among variables were needed.

The results of correlational analysis showed that the relationship among observed variables was positively statistical significant at level of .01 which ranged from 0.498 - 0.592.

In order to explore and assess the suitability of data, Bartlett's Test of Sphericity and Kaiser–Meyer–Olkin (KMO) were generated. The results indicated that the correlation matrix was not identity matrix (chi-square = 624.628, df = 3, p = 0.000) which is statistically significant different at the level of .01 and consistent with the results of KMO in which the value was close to 1 (KMO = 0.697), which means that the correlation matrix of the observed variable was not an identity matrix, and the correlation was high enough to take this value to further analyze in a confirmatory

factor analysis in order to validate the construct validity of the measurement model of goal orientation. The details as in table 7

**Table 7.** Mean, SD and correlations of observed variables in the measurement model of goal-orientation

Variable	Correlations between observed variables		
	MAS	PER	AVO
MAS	1.000		
PER	0.498**	1.000	
AVO	0.592**	0.578**	1.000
Mean	4.090	3.659	3.967
SD	0.670	0.692	0.675

Bartlett's Test of Sphericity = 624.628, df = 3, p = 0.000, KMO = 0.697

Note: \*\*p < .01

The results of the confirmatory factor analysis indicated that the measurement model of goal orientation contained the construct validity (chi-square = 1.213, df = 1, p = 0.270, GFI = 0.988, AGFI = 0.928, RMSEA = 0.026, RMR = 0.005) p-value was bigger than 0.05 and chi-square was statistically significant different from zero which means that the measurement model of goal orientation contains construct validity. All factor loading was statistically significant at the level of .01 which the highest loading on avoidance ( $\beta = 0.579$ ), followed by performance ( $\beta = 0.469$ ), and mastery ( $\beta = 0.466$ ), respectively. For reliability coefficient of each observed variables which measured by  $R^2$  indicating the covariance between observed variable with latent variable ( $R^2$  ranged from 0.462 to 0.753). The detail as in table 8

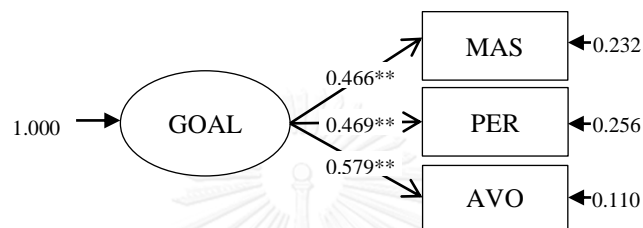
Based on the results, the equation of measurement factor of self-regulated learning can be written as below.

$$\text{GOAL} = 0.160^{**}(\text{MAS}) + 0.146^{**}(\text{PER}) + 0.420^{**}(\text{AVO})$$

**Table 8.** Confirmatory factor analysis of the measurement model of self-regulated learning and construct validity

Variable	Factor loading		t	R <sup>2</sup>	Factor score coefficient
	b(SE)	$\beta$			
<b>Goal orientation</b>					
MAS	1.000	0.466	-	0.483	0.160
PER	1.007(0.100)	0.469	10.056**	0.462	0.146
AVO	1.244(0.097)	0.579	12.850**	0.753	0.420

Note \*\*p < .01



Chi-square = 1.213, df = 1, p = 0.270, GFI = 0.988, AGFI = 0.928, RMSEA = 0.026, RMR = 0.005

**Figure 13.** Measurement model of goal-orientation

### 3. Effort investment

Two observed variables were used to measure effort investment, time commitment and intensity. A confirmatory factor analysis was performed to verify the validity of the measurement model of effort investment. To be able to run confirmatory factor analysis, correlation among variables were needed.

The results of the correlational analysis showed that the relationship among observed variables was positively statistically significant at a level of .01 which is equal to 0.692.

In order to explore and assess the suitability of the data, Bartlett's Test of Sphericity and Kaiser–Meyer–Olkin (KMO) was generated. The results indicated that the correlation matrix was not an identity matrix (chi-square = 455.030, df = 1, p = 0.000) which is statistically significant different at the level of .01 and consistent with the results of KMO in which the value was close to 1 (KMO = 0.500) means that the correlation matrix of observed variable was not identity matrix and the correlation was high enough to take this value to further analyze in confirmatory factor analysis in order to validate the construct validity of the measurement model of effort investment.

**Table 9.** Mean, SD and correlations of observed variables in the measurement model of effort investment

Variable	Correlations between observed variables	
	TIME	INT
TIME	1.000	
INT	0.692**	1.000
Mean	3.670	3.732
SD	0.605	0.630

Bartlett's Test of Sphericity = 455.030, df = 1, p = 0.000, KMO = 0.500

Note: \*\*p < .01

The results of confirmatory factor analysis indicated that the measurement model of effort investment contained the construct validity (chi-square = 2.987, df = 1, p = 0.083, GFI = 0.953, AGFI = 0.858, RMSEA = 0.053, RMR = 0.004) p-value was greater than .05, and chi-square was statistically significant different from zero, which means that the measurement model of effort investment contains construct validity. All factor loading were statistically significant at the level of .01 which the highest loading on intensity ( $\beta = 0.935$ ), followed by time commitment ( $\beta = 0.890$ ), respectively. For reliability coefficient of each observed variables which measured by  $R^2$  indicating the covariance between observed variable with latent variable ( $R^2$  ranged from 0.792 to 0.875). The details as in table 10

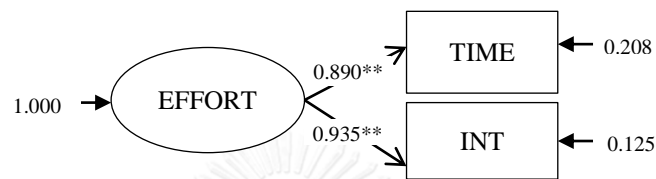
Based on the results, the equation of measurement factor of self-regulated learning can be written as below.

$$\text{EFFORT} = 0.037^{**}(\text{TIME}) + 0.065^{**}(\text{INT})$$

**Table 10.** Confirmatory factor analysis of the measurement model of effort investment and construct validity

Variable	Factor loading		t	R <sup>2</sup>	Factor score coefficient
	b(SE)	$\beta$			
<b>EFFORT</b>					
TIME	8.730(0.292)	0.890	29.910**	0.792	0.037
INT	9.146(0.279)	0.935	32.754**	0.875	0.065

Note \*\*p < .01



Chi-square = 2.987, df = 1, p = 0.083, GFI = 0.953, AGFI = 0.858, RMSEA = 0.053, RMR = 0.004

**Figure 14.** Measurement model of effort investment

### Data collection

In this study, the data was collected by the surveying classes of college students in Phnom Penh, Cambodia using self-report questionnaire. In addition, subjects' course grades were derived from academic staff. The permission letters to join in the research were asked from the president of the concerned university in the study in Phnom Penh, Cambodia. Once, students agreed to participation, they were given a questionnaire to answer about themselves during the class.

### Data analysis

The following statistical procedures were performed on the sample data. To answer the research questions, the analysis of the data was accomplished in two steps.

#### Preliminary analysis

To summarize the sample characteristic, descriptive statistic such as frequencies, means, standard deviation, coefficient of variance, skewness and kurtosis were generated in SPSS (statistical package for social science)

#### Data analysis for research objectives

Independent-sample t-test and two-way MANOVA was used to examine the mean-level differences in self-efficacy, goal orientation, self-regulated learning and effort investment by gender and study fields. Analysis of structural equation modeling

was used to analyze the data to answer the research questions as well as research objectives.

**Objective 1** was to develop and validate the hypothetical model of the learning outcome. The steps of analysis were first, researcher analyze the correlation between observed variables. The technique used in this analysis was Pearson's product-moment correlation. Second, analyze data to validate the consistency of causal model of learning outcome with empirical data. The analysis used the structural equation modeling technique from the LISREL program.

**Objective 2** was to examine direct and indirect effects between self-efficacy and learning outcome. The data was analyzed using the structural equation modeling (SEM) of LISREL.

#### **Assessing Validity of the Model**

Model validation depends on two things which is first to establish acceptable levels of goodness-of-fit for that measurement model and second is to find specific evidence of construct validity (Hair., 2010). So, this part researcher will focus on assessing goodness of fit of the model.

Goodness-of-fit indicates how well a model reproduces the observed covariance matrix among indicators and it is a fundamental measure of differences between the observed and estimated covariance matrices.

Goodness-of-fit index (GFI) produces a fit statistic which the value ranges from 0 to 1. The higher value of the GFI indicates the better fit of the model. Normally, GFI value greater than .90 was considered as good fit while now others said that greater than .95 should be used.

Adjusted Goodness of Fit Index (AGFI) tries to consider the differing degrees of model complexity. It calculates by adjusting GFI with the degree of freedom. AGFI value is normally less than GFI value in proportion to model.

Root Mean Square Error of Approximation (RMSEA) is one of the most widely used measures to correct for the tendency of the chi-square goodness of fit. Good RMSEA was range between .05 and .08, as in the previous researches. Recently, good RMSEA was range between .03 and .08 with 95 percent of confidence interval.



**Objective 3** was to examine the mediating roles of self-regulated learning, goal orientation, and effort investment between self-efficacy and learning outcome. The data was analyzed using structural equation modeling and test mediator by using the Sobel test from Kristopher J. Preacher's website (available at <http://quantpsy.org/sobel/sobel.htm>)



## CHAPTER 4

### ANALYSIS RESULTS

The research aimed to study roles of self-regulated learning, goal orientation and effort investment as mediators between self-efficacy and learning outcome. The study consists of three objectives. 1) to develop and validate a hypothetical model of learning outcome, 2) to examine the direct and indirect effects between self-efficacy and learning outcome, and 3) to examine the mediating roles of self-regulated learning, goal orientation, and effort investment between self-efficacy and learning outcome. The results were divided into two parts. In part I, the researcher analyzed the descriptive statistic to describe the characteristic of the data. In part II, the researcher analyzed the data to answer the research questions or research objectives.

#### Abbreviation of research variables

<b>SE</b>	<b>refers to</b>	<b>Self-efficacy</b>
PSE	refers to	Perceived self-efficacy
<b>SRL</b>	<b>refers to</b>	<b>Self-regulated learning</b>
PLA	refers to	Planning
MON	refers to	Monitoring
REF	refers to	Reflecting
<b>GOAL</b>	<b>refers to</b>	<b>Goal orientation</b>
MAS	refers to	Mastery goal
PER	refers to	Performance goal
AVO	refers to	Avoidance goal
<b>EI</b>	<b>refers to</b>	<b>Effort investment</b>
TIME	refers to	Time commitment
INT	refers to	Intensity
<b>LO</b>	<b>refers to</b>	<b>Learning outcome</b>
ENG	refers to	English final exam score

## Part 1: The results of preliminary data analysis

### Descriptive data analysis

The preliminary results of the analysis of the sample data are as follows: 1) Frequency and percentage were performed to generate background data such as gender and studying subjects. 2) Basic statistics such as mean, standard deviation, maximum score, minimum score, coefficient of variance, skewness and kurtosis were performed to analyze the characteristics of the sample data. The details of the results were as below.

The sample of this study was undergraduate students who are studying at university in Phnom Penh, Cambodia. Most of them are female (N = 467) or 66.7 percent of the sample, were from the field of social science while male (N = 233) or 33.3 percent of the sample, were from the field of science. The details as in table 11.

**Table 11.** Frequency of students by gender and field of study

Variable	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Respondents	233	33.3	467	66.7	700	100
Field of study	Science		Social science		Total	
Subject	339	48.4	361	51.6	700	100

### 1. Description of sample data

In order to examine the description of data, means, standard deviation, coefficient of variance, maximum, minimum, skewness and kurtosis were generated in order to see the normality of the data.

#### 1.1 Descriptive statistic of self-efficacy

Self-efficacy was measured by one single indicator which consists of 6 items. The results of descriptive statistic showed that the mean of self-efficacy was at middle level ( $\bar{x} = 3.310$ ,  $SD = 0.455$ ). Coefficient of variance (cv), skewness (sk) and kurtosis (ku) of self-efficacy were the value that shows the variance and normality distribution of data. The negative skewness of self-efficacy indicated that the mean of self-efficacy was relatively high.

### 1.2 Descriptive statistic of goal orientation

Goal orientation was measured by three indicators, 1) mastery goal, 2) performance goal and 3) performance avoidance goal. The results of descriptive statistic showed that the mean value of all variables were at high level in which the highest level mean was mastery goal ( $\bar{x} = 4.090$ ) followed by avoidance goal ( $\bar{x} = 3.967$ ) and performance goal ( $\bar{x} = 3.659$ ). When considering the value of the coefficient of variance (cv) of the three indicators, the strongest variance indicator was performance goal (cv. = 18.912), followed by avoidance goal (cv = 17.015) and mastery goal (cv = 16.381). Moreover, when considering skewness, all of the indicators contain negative skewness mean that the mean level of data of these three indicators are relatively high.

Based on the above data, we can conclude that students' goal orientation was going in a good direction, indicating that students have higher mastery goal in which intend to develop their competencies, performance goals in which they try to show their ability to others that they can perform well in class, and avoidance goals in which they try to avoid bad performance in their studies.

### 1.3 Descriptive statistic of self-regulated learning

Self-regulated learning was measured by three indicators, 1) planning, 2) monitoring, and 3) reflecting. The results of descriptive statistics showed that the mean of all variables were at high level, in which the highest level mean was planning ( $\bar{x} = 3.700$ ) followed by reflecting ( $\bar{x} = 3.629$ ) and monitoring ( $\bar{x} = 3.471$ ). When considered the value of coefficient of variance (cv) of all three indicators, the most variance factor was planning (cv = 19.459) followed by monitoring (cv = 18.726) and reflecting (cv = 17.470). Moreover, when considering skewness, all of the indicators contain negative skewness, which means that the mean level of data of these three indicators is relatively high.

Based on the above data, we can conclude that student's self-regulated learning was going in a good direction means that students are able to plan their learning, monitor their learning process and reflect on their lacking points.

#### 1.4 Descriptive statistic of effort investment

Effort investment was measured by two indicators, 1) time commitment and intensity. The results of descriptive statistics showed that the mean of both variables were at high levels in which the highest level mean was intensity ( $\bar{x} = 3.732$ ) followed by time commitment ( $\bar{x} = 3.670$ ). When considering the value of coefficient of variance (cv) of both indicators, the strongest variance factor was intensity (cv = 16.881) followed by time commitment (cv = 16.485). Moreover, when considering skewness, all of the indicators contain negative skewness meaning that the mean level of data of these two indicators is relatively high.

Based on the above data, we can conclude that the student's effort investment was going in a good direction means that students make a strong investment of time in their learning, and even when they feel tense they still spend their time learning. The details as in table 12.

**Table 12.** Summary of descriptive variables

Characteristic of sample data (N = 700)							
Variable	Mean	SD	CV (%)	Min	Max	SK	KU
SE							
PSE	3.310	0.455	13.76	2.000	5.000	-0.045	0.433**
GOAL							
MAS	4.090	0.670	16.381	1.000	5.000	-1.163**	2.170**
PER	3.659	0.692	18.912	1.000	5.000	-0.431**	0.220
AVO	3.967	0.675	17.015	1.000	5.000	-1.090**	2.530**
SRL							
PLA	3.700	0.720	19.459	1.000	5.000	-0.337**	0.001
MON	3.471	0.650	18.726	1.000	5.000	-0.094	0.125
REF	3.629	0.634	17.470	1.000	5.000	-0.239**	0.245
EI							
TIME	3.670	0.605	16.485	1.000	5.000	-0.203**	0.132
INT	3.732	0.630	16.881	1.000	5.000	-0.580**	0.685**
ENG	73.531	10.308	14.018	50.000	100.000	-0.131	-0.349

**Note:**  $SE_{SK} = .092$ ,  $SE_{KU} = .185$ , \*\* p < .01

## Part 2: The results of data analysis for research purposes

The analysis of the data within this part was analyzed in 4 parts: 1) to compare mean levels of each construct in the research model, 2) to validate the hypothetical model of learning outcome, 3) to examine direct and indirect effects within the casual model of learning outcome, and 4) to examine the mediating roles of self-regulated learning, goal orientation and effort investment between self-efficacy and learning outcome.

### 1.1 The results of comparing means of self-efficacy, goal orientation, self-regulated learning, effort investment and learning outcome by gender

The analysis of this section was a comparison between variables in the model by gender. Overall, male students and female students have similar means in all variables. When considering about assumptions of equal variance of sample data in the two groups, the Levene's test for equality of variance was used. The results of independent sample t-test showed no significant difference between male and female in all variables ( $p > .05$ ). The details as in table 13.

**Table 13.** Mean, SD of each variable compared by gender

Variable	Male		Female	
	Mean	SD	Mean	SD
SE	3.356	0.484	3.287	0.439
SRL	3.619	0.611	3.590	0.588
GOAL	3.881	0.572	3.917	0.569
EI	3.743	0.582	3.680	0.560
LO	73.526	10.491	73.534	10.227

**Table 14.** Independent sample t-test compared by gender

Variable	Levene's Test for Equality of Variance		t	df	Sig
	F	Sig			
SE	2.437	0.119	1.898	698	0.058
SRL	0.384	0.535	0.606	698	0.544
GOAL	0.136	0.712	- 0.793	698	0.428
EI	0.231	0.631	1.364	698	0.173
LO	0.198	0.656	0.010	698	0.992

### 1.2 The results of comparing means of self-efficacy, goal orientation, self-regulated learning, effort investment and learning outcome by study field

The analysis of this section was a comparison between variables in the model by the field of study. Overall, students in social science and science have a similar mean for all variables. When considering the assumptions of equal variance of the sample data in two groups, the Levene's test for equality of variance was used. The results of independent sample t-test showed the two variables of goal orientation and learning outcome statistically significant differ at a level of .05 ( $p < .05$ ). The difference in means indicates that students who major in science have higher goal orientation than those who major in social science. Moreover, students majoring in science have higher learning outcomes than those in social science.

**Table 15.** Mean, SD of each variable compared by field of study

Variable	Social Science		Science	
	Mean	SD	Mean	SD
SE	3.296	0.468	3.325	0.441
SRL	3.600	0.595	3.600	0.597
GOAL	3.859	0.556	3.955	0.581
EI	3.706	0.564	3.696	0.573
LO	72.244	10.244	74.903	10.213

**Table 16.** Independent sample t-test compared by field of study

Variable	Levene's Test for Equality of Variance		t	df	Sig
	F	Sig			
SE	1.988	0.159	0.847	698	0.398
SRL	0.012	0.912	0.007	698	0.994
GOAL	0.139	0.710	2.246	698	0.025
EI	0.199	0.655	0.238	698	0.812
LO	0.021	0.884	3.437	698	0.001

Note: \* $p < .05$ , significant at level of .05

### 1.3 Compare means of self-efficacy, goal orientation, self-regulated learning and effort investment by gender and study field

The Box's Test of Equality of Covariance Matrices was used to check the assumptions of homogeneity of covariance across the groups. The results of the assumptions test in variance covariance matrix shows that Box's  $M = 51.508$ ,  $\text{sig} = 0.257$  indicating that there is no significant difference between covariance matrix. So, the assumption is not violated. Testing of the variance of the five dependent variables by Levene's test reveals the results of each variable to be SE ( $\text{sig} = 0.154$ ), GOAL ( $\text{sig} = 0.751$ ), SRL ( $\text{sig} = 0.757$ ), EI ( $\text{sig} = 0.852$ ) and LO ( $\text{sig} = 0.785$ ). All variables

contain higher sig values than the statistically significant level and follow the assumption. So, based on these we can further analyze multivariate.

The results of the testing relationship among the five dependent variables indicate that the Bartlett's Test of Sphericity of five dependent variables are statistically significant in their correlation at a level of .05 (sig = 0.000), which followed the assumption.

The following is the analysis of MANOVA using the Pillai's trace test. At the alpha level of .05, we can see that the test is significant between study field, Pillai's trace = 0.029,  $F(2.207)$ ,  $p < .05$ . This indicates that there are significant differences among the field of study group in a combination of the five dependent variables of self-efficacy, goal-orientation, self-regulated learning, effort investment and learning outcome (see table 18).

The results indicate no significant interaction effect between gender and study field effect for all dependent variables ( $p = 0.357$ ) higher than the level of statistical significance at .05. So, the researcher examined the main effect results. When considering the main effect of the study field, the results showed that only goal orientation and learning outcome indicate statistically significant means differ between study fields ( $p = 0.032 < .05$ ). This means that students studying in science have higher goal orientation and learning outcome than those in social science (see table 19).

**Table 17.** Means, SD of gender differentiated by field of study

Gender	Study field	N	SE		SRL		GOAL		EI		LO	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Male	Social science	109	3.372	0.522	3.667	0.635	3.831	0.602	3.807	0.609	3.643	0.524
	Science	124	3.343	0.450	3.579	0.590	3.926	0.544	3.687	0.555	3.705	0.524
Female	Social science	252	3.264	0.440	3.572	0.577	3.871	0.537	3.663	0.539	3.598	0.507
	Science	215	3.315	0.438	3.613	0.603	3.973	0.602	3.702	0.585	3.768	0.502

**Table 18.** Multivariate test for group differences in gender and field of study

Effect	Statistical Test	Value	F	p
Gender	Pillai's trace	0.016	2.207	0.052
Study field	Pillai's trace	0.029	2.207	0.001
Gender*Study field	Pillai's trace	0.008	1.104	0.357



**Table 19.** Test between gender and field of study effect

Source	Dependent variable	Type III Sum of square	df	MS	F	Sig
Gender	SE	0.717	1	0.717	3.468	0.063
	SRL	0.141	1	0.141	0.396	0.529
	GOAL	0.291	1	0.291	0.899	0.343
	EI	0.644	1	0.644	1.997	0.158
	LO	0.013	1	0.013	0.049	0.825
Study field	SE	0.021	1	0.021	0.100	0.752
	SRL	0.083	1	0.083	0.233	0.629
	GOAL	1.497	1	1.497	4.622	0.032
	EI	0.258	1	0.258	0.801	0.371
	LO	2.070	1	2.070	7.909	0.005
Gender*Study field	SE	0.246	1	0.246	1.188	0.276
	SRL	0.651	1	0.651	1.829	0.177
	GOAL	0.001	1	0.001	.004	0.949
	EI	0.983	1	0.983	3.052	0.081
	LO	0.447	1	0.447	1.706	0.192

**Note:** Box's M = 51.508, F = 1.128, df1 = 45, df2 = 595283.424, sig = 0.257

Bartlett's Test of Sphericity: Likelihood Ratio = 0.000, Approx. Chi-square = 1303.933, df = 10, sig = 0.000

## 2. To validate the hypothetical model of learning outcome

The analysis of this part was to confirm the fit of research model as well as to confirm the first objective which we hypothesized that the model fit with the empirical data. In this part, we present two steps, 1) a correlation among constructs, and 2) testing of the structural model.

### 2.1 Interrelationship among observed variables

A correlational analysis was performed to examine the interrelationship among observed variables. The results of correlations between observed variables showed that the relationship among all indicators was statistically significant different from zero at the level of 0.01. The relationship range from 0.319 to 0.698, and positively correlated. The highest correlation was between reflecting and monitoring ( $r = 0.698$ ) and the lowest correlation was between mastery and perceived self-efficacy ( $r = 0.319$ ).

**Table 20.** Mean, SD, and correlation coefficient among indicators

Variable	PSE	GOAL			SRL			EI		LO
	1	2	3	4	5	6	7	8	9	10
1. PSE	(.831)									
2. MAS	.319**	(.737)								
3. PER	.373**	.498**	(.740)							
4. AVO	.390**	.592**	.578**	(.615)						
5. PLA	.330**	.423**	.414**	.445**	(.774)					
6. MON	.375**	.345**	.365**	.354**	.697**	(.869)				
7. REF	.374**	.463**	.420**	.450**	.682**	.698**	(.825)			
8. TIME	.405**	.441**	.406**	.440**	.603**	.600**	.666**	(.696)		
9. INT	.455**	.466**	.457**	.475**	.585**	.567**	.610**	.692**	(.610)	
10. LO	.403**	.362**	.372**	.381**	.359**	.357**	.401**	.416**	.380**	(---)
Mean	3.310	4.090	3.659	3.967	3.700	3.471	3.629	3.670	3.732	3.71
SD	0.455	0.670	0.692	0.675	0.720	0.650	0.634	0.605	0.630	0.511

\*\* Correlation is significant at .01 level. Reliability coefficients are in parentheses on the diagonal.

## 2.2 Validation of research model

Considering the importance of each factor of the observed variables in a causal model of learning outcome by latent variables such as self-efficacy, self-regulated learning, goal orientation and effort investment showed that all factors loading were positive, different from zero and statistically significant at level of .01 which the loading was between 0.736 and 0.981. The factor loading of self-efficacy was 0.911 which derived from the square root of its items reliability ( $R^2 = 0.831$ ) with the standardized loading was ( $\beta = 0.755$ ). The factor loading of self-regulated learning showed that the highest loading was on reflecting ( $\beta = 0.783$ ), followed by planning ( $\beta = 0.754$ ), and monitoring ( $\beta = 0.736$ ), while the highest factor loading of goal-orientation was on avoidance goal ( $\beta = 0.863$ ), followed by master goal ( $\beta = 0.785$ ) and performance goal ( $\beta = 0.761$ ). For the effort investment which consists of two indicators showed the highest factor loading was on intensity ( $\beta = 0.834$ ) followed by time commitment ( $\beta = 0.830$ ).

Reflecting contains the highest covariance among the indicators of self-regulated learning, followed by planning and monitoring ( $R^2 = 0.613$ ,  $R^2 = 0.568$ , and  $R^2 = 0.541$ ), respectively. For goal orientation, avoidance indicator showed the highest percentage of variances ( $R^2 = 0.745$ ), followed by mastery goal indicator ( $R^2 = 0.616$ ) and performance goal indicator ( $R^2 = 0.579$ ) while indicators of effort investment, the

highest percentage of variance with effort investment was on intensity indicator ( $R^2 = 0.696$ ) and time commitment indicator ( $R^2 = 0.689$ ). Finally, learning outcome, which was measured by English final exam scores showed the highest variance ( $R^2 = 1.000$ )

**Table 21.** Factor loadings, t-value and item's reliabilities

Variable	b	SE	T	$\beta$	$R^2$
SE					
PSE	0.911 <sup>†</sup>	0.080	-	0.755	0.831
SRL					
PLA	1.000	-	-	0.754	0.568
MON	1.009	0.060	16.746	0.736	0.541
REF	1.047	0.062	17.000	0.783	0.613
GOAL					
MAS	1.000	-	-	0.785	0.616
PER	0.876	0.039	24.415	0.761	0.579
AVO	0.968	0.043	22.388	0.863	0.745
EI					
TIME	1.000	-	-	0.830	0.689
INT	1.046	0.044	23.756	0.834	0.696
LO					
ENG	1.000 <sup>†</sup>	0.010	-	0.981	1.000

Note: <sup>†</sup> Unstandardized loadings were constrained with the square root of their reliabilities

### 3. Causal model of learning outcome

The analysis result of this part was to answer the second objective of this research. The objective was to examine the direct and indirect effects between self-efficacy and learning outcome, which were goal orientation, self-regulated learning and effort investment function as mediators. A structural equation modeling (SEM) was performed to examine the direct and indirect effects among research constructs.

#### 3.1 Effects of variables in the model

When considering coefficient prediction ( $R^2$ ) of structural equation of latent variables such as self-efficacy ( $R^2 = 0.831$ ), self-regulated learning ( $R^2 = 0.415$ ) means that the effects of self-efficacy and goal orientation together predicted self-regulated by 56.5 percent. Goal orientation ( $R^2 = 0.339$ ) means that self-efficacy predicts the variance of goal orientation equal to 33.9 percent. Effort investment was affected by self-efficacy and goal orientation predicted ( $R^2 = 0.476$ ) equal to 47.6

percent. For learning outcome ( $R^2 = 0.303$ ) means that self-efficacy, goal orientation, self-regulated learning together predicted 30.3 percent of learning outcome.

### **3.2 The results of causes and effects in research model**

The analysis employed the structural equation modeling technique to examine the direct and indirect effect on learning outcome. The model was comprised of five latent variables which one was exogenous variable and four as endogenous variables. Among four endogenous variables, three variables were mediators: goal orientation, self-regulated learning and effort investment, which are mediators between self-efficacy and learning outcome. The results will be interpreted by variables.

### **3.3 Goal orientation**

When considering the direct effect on goal orientation, the results indicated that self-efficacy directly affects goal orientation at a statistically significant level of .01. Self-efficacy positively affects goal orientation with the effect equal to 0.582. This means that students who have high self-efficacy will set their challenge goal orientation. Moreover, the results also showed a statistically significant direct effect of goal orientation on self-regulated learning with the effect equal to 0.491 and direct effect on effort investment with the effect equal to 0.784 this indicated that when students set their goal orientation, they will regulate their learning activities and invest their effort in order to achieve their learning or to reach their set goal.

### **3.4 Self-regulated learning**

When considering the direct and indirect effect of self-regulated learning, the results showed that the variables that directly effect on self-regulated learning was goal orientation and self-efficacy in which effect was 0.491 and 0.358, respectively. This is indicating that students who believe in their ability or self-efficacy in doing a task would also regulate their behaviors in their learning as well as those students who have their goal in learning would adopt the regulated behaviors in their learning to reach their goal. Moreover, the results also showed the direct effect of self-regulated learning on learning outcomes, in which the effect is equal to 0.177, statistically significant at a level of .01. The results indicated that students who have self-regulated learning or have strategies in their learning such planning, monitoring and reflecting on the learning activities would achieve higher learning outcome.

### **3.5 Effort investment**

When considering the direct effect on effort investment, the results showed that self-efficacy, goal orientation have direct effect on effort investment with the effect was 0.233 and 0.784, respectively. This is indicated that students who have self-efficacy will invest their time more in their learning as well as when students possess their goal in learning they will invest their effort toward that goal. However, effort investment did not show statistically significant effect on learning outcome.

### **3.6 Learning outcome**

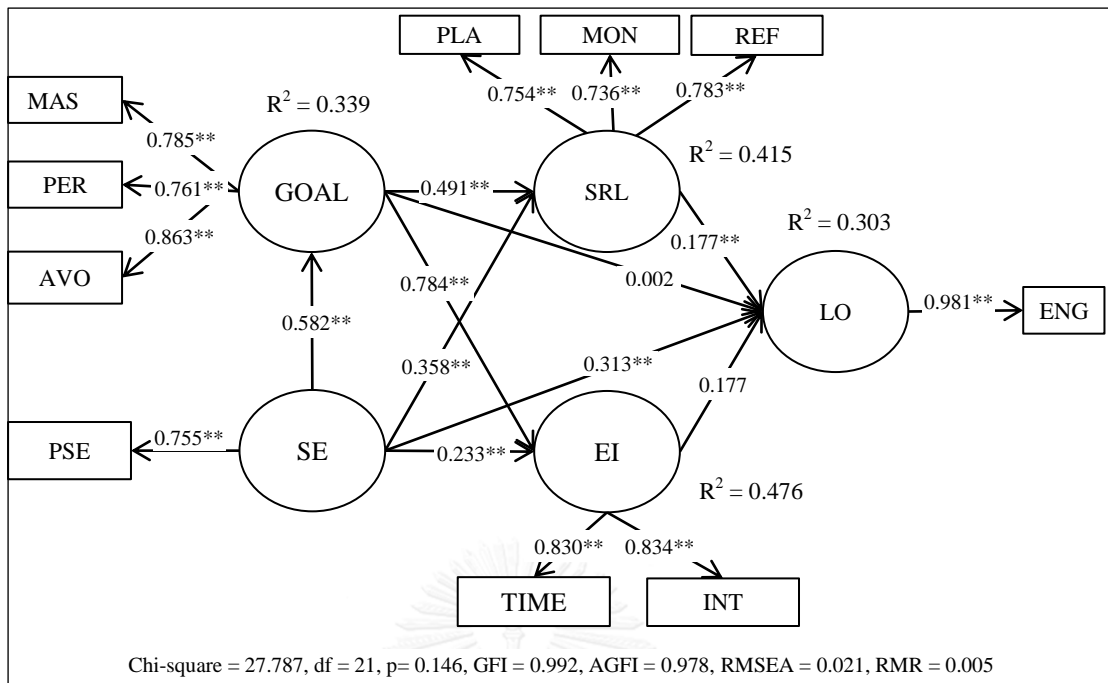
When considering the direct and indirect effect on learning outcome, the results showed that self-efficacy, and self-regulated learning effect directly on learning outcome with a statistically significant effect at level of .01 in which the effect was 0.313 and 0.177, respectively, while goal orientation and effort investment did not show significantly direct effect on learning outcome. Self-efficacy's effects on learning outcome both directly and indirectly through self-regulated learning had a total effect equal to 0.376, with indirect effect equal to 0.063 and direct effect equal to 0.313. This indicates that students who have high levels of self-efficacy will set their regulated learning, in which both of these two variables contribute to effect on learning outcome means that students who believe in their ability was not enough, students must have self-regulated learning or learning strategies in their learning in order to achieve higher outcome.

Although goal orientation did not directly affect learning outcome; however, goal orientation indirectly affects learning outcome through self-regulated learning outcome in which the indirect effect was equal to 0.086. This indicates that students have only goal orientation is not enough, students must regulate their learning activities or learning strategies in order to help improve or achieve their learning outcome. More detailed information (see table 22)

**Table 22.** Structural equation modeling statistics

	GOAL			SRL			EI			LO		
	TE	IE	DE	TE	IE	DE	TE	IE	DE	TE	IE	DE
SE	0.874**	-	0.874**	0.864**	0.384**	0.480**	0.920**	0.609**	0.311**	0.739**	0.319**	0.420**
	(0.087)	-	(0.087)	(0.079)	(0.051)	(0.087)	(0.077)	(0.066)	(0.070)	(0.069)	(0.096)	(0.132)
	<b>0.582</b>	-	<b>0.582</b>	<b>0.644</b>	<b>0.286</b>	<b>0.358</b>	<b>0.690</b>	<b>0.457</b>	<b>0.233</b>	<b>0.550</b>	<b>0.237</b>	<b>0.313</b>
GOAL	-	-	-	0.439**	-	0.439**	0.697**	-	0.697**	0.204**	0.202**	0.002
	-	-	-	(0.052)	-	(0.052)	(0.048)	-	(0.048)	(0.051)	(0.183)	(0.190)
	-	-	-	<b>0.491</b>	-	<b>0.491</b>	<b>0.784</b>	-	<b>0.784</b>	<b>0.228</b>	<b>0.226</b>	<b>0.002</b>
SRL	-	-	-	-	-	-	-	-	-	0.177**	-	0.177**
	-	-	-	-	-	-	-	-	-	(0.071)	-	(0.071)
	-	-	-	-	-	-	-	-	-	<b>0.177</b>	-	<b>0.177</b>
EI	-	-	-	-	-	-	-	-	-	0.178	-	0.178
	-	-	-	-	-	-	-	-	-	(0.248)	-	(0.248)
	-	-	-	-	-	-	-	-	-	<b>0.177</b>	-	<b>0.177</b>
Chi-square = 27.787, df = 21, p= 0.146, GFI = 0.992, AGFI = 0.978, RMSEA = 0.021, RMR = 0.005												
Items'	PSE			PLA			MON			REF		
Reliability	0.831			0.774			0.869			0.825		
Items'	MAS			PER			AVO			TIME		INT
Reliability	0.737			0.740			0.615			0.696		0.610
Structural	SRL			GOAL			EI			LO		
R-square	0.415			0.339			0.476			0.303		
Correlations of latent variables												
	SE	GOAL	SRL	EI	LO							
SE	1.000											
GOAL	0.430	1.000										
SRL	0.402	0.547	1.000									
EI	0.468	0.580	0.737	1.000								
LO	0.403	0.443	0.417	0.432	1.000							

Note: Total effect (TE), Indirect effect (IE), Direct effect (DE), Bold number is standardized effects, Value in parentheses is standard error and \*\* statistically significant at level of 0.01 (p<0.01)



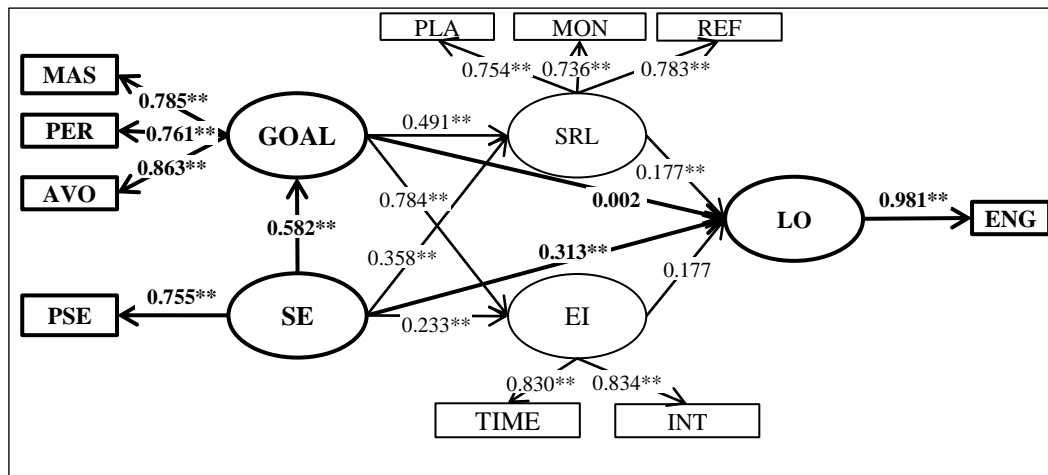
**Note:** \*\* Path coefficients are statistically significant at the level of .01

**Figure 15.** Causal model of learning outcome

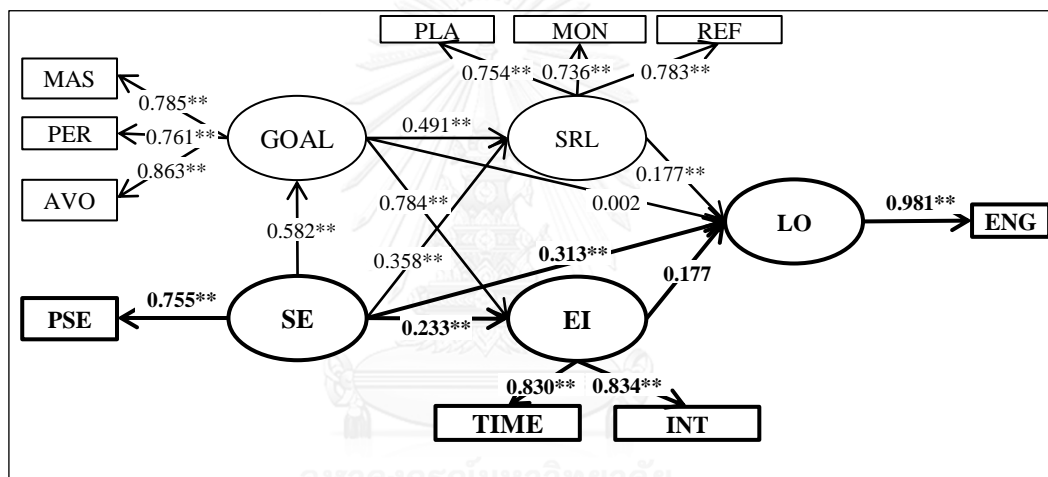
#### 4. Results of mediation testing

Based on the results of path analysis, goal orientation and effort investment did not show direct effect on learning outcome. Because of these non-significant paths from goal orientation and effort investment to learning outcome, we conclude that these two constructs were not the mediators between self-efficacy and learning outcome, the details as in figure 16 and figure 17. So, in this part, the researcher will not test the mediating roles of these two constructs.

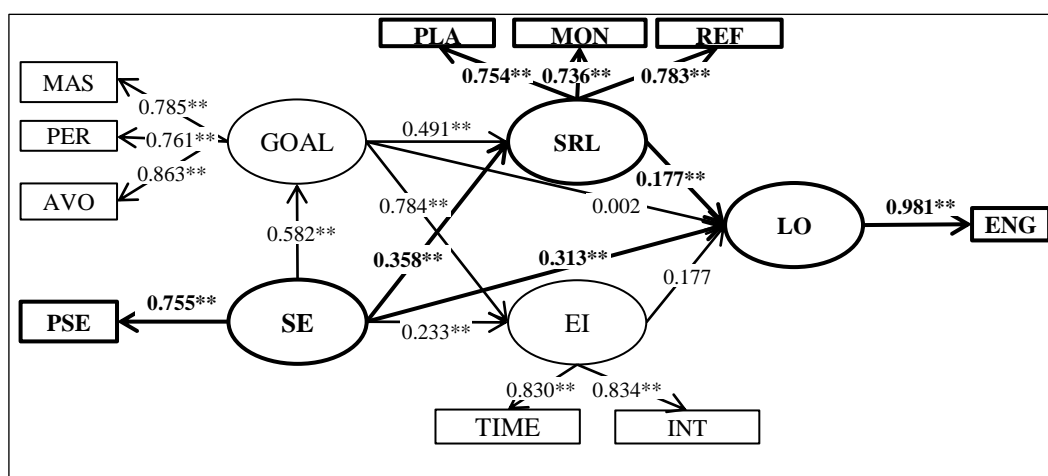
However, only the relations of self-regulated learning showed the direct effect on learning outcome between self-efficacy and learning outcome. So, the mediating role of self-regulated learning was tested (see the figure 18).



**Figure 16.** Mediating effect of goal orientation between self-efficacy and learning outcome



**Figure 17.** Mediating effect of effort investment between self-efficacy and learning outcome

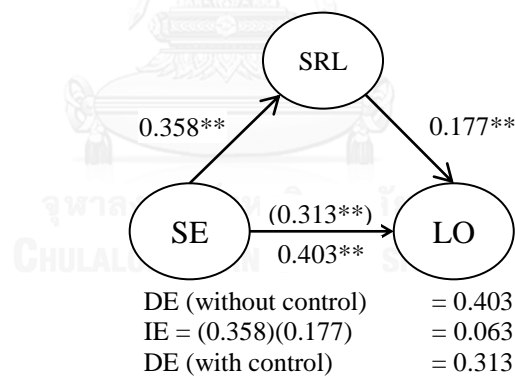


**Figure 18.** Mediating effect of self-regulated learning between self-efficacy and learning outcome



#### 4.1 Testing mediating role of self-regulated learning

According to Baron and Kenny (1986) the mediation testing was done by starting to test the effects from independent variables (self-efficacy) and dependent variables (learning outcome) when the mediator was not included. In this case, the effect of self-efficacy on learning outcome, when self-regulated learning was not included, was 0.403 (from correlation coefficient). Then, when mediator was included, the effect of self-efficacy on learning outcome was 0.313. The results showed that the direct effect of self-efficacy on learning outcome was 0.313 and statistically significant at the level of .01. The direct effect of self-efficacy on self-regulated learning was 0.358 with statistically significant at level of .01. The direct effect of self-regulated learning on learning outcome was 0.177 with statistically significant at level of .01. The indirect effect of self-efficacy on learning outcome through self-regulated learning was 0.063. Based on the mediation testing, we conclude that self-regulated learning was partially mediated between self-efficacy and learning outcome.



**Figure 19.** Indirect effect of SRL between SE and LO

#### 4.2 Mediator testing by Sobel Test

In this part, the researcher will test the mediating role of self-regulated learning between self-efficacy and learning outcome by Sobel test. The testing results indicated that self-regulated learning was the mediator between self-efficacy and learning outcome ( $z = 2.344$ ,  $p < .05$ ) which is statistically significant at level of .05 with indirect effect equal to 0.063. So, the result of the Sobel test was consistent with the results of the analysis from the LISREL program.

Based on the above results, we can conclude that self-regulated learning was a partial mediator between self-efficacy and learning outcome. The results of this analysis indicated the importance of self-regulated learning as the mediator which it helps to explain the relationships between independent variable (self-efficacy) and dependent variable (learning outcome). The partial mediation of self-regulated learning reflecting the direct effect was much stronger than that of the indirect effect.

**Table 23.** Analysis results of Sobel Test

The effects	Line A	Line B	Line C	Indirect effect	Standard error	Test statistic	p-value
SE→SRL→LO	0.358 (0.052)	0.177 (0.071)	0.403	0.063	0.027	2.344	0.019

Note: \* $p < .05$ , Line A was the direct effect of the independent variable on mediator.

Line B was the direct effect of the mediator on dependent variable.

Line C was the effect of the independent variable on dependent variable without controlling the effect of the mediator; standard error is in parentheses.



## CHAPTER 5

### CONCLUSION, DISCUSSION, AND RECOMMENDATIONS

The research topic was “Roles of self-regulated learning, goal orientation, and effort investment as mediators between self-efficacy and learning outcome” The research consisted of three objectives: 1) to develop and validate the model of learning outcome which include variables such as self-efficacy, goal orientation, self-regulated learning and effort investment as independent variables, 2) to examine direct and indirect effects of goal orientation, self-regulated learning and effort investment between self-efficacy and learning outcome, and 3) to examine the mediating roles of self-regulated learning, goal orientation, and effort investment between self-efficacy and learning outcome.

The research conceptual framework was developed from related researches and literature review to integrate each variable into one research model. The variables in the research model are self-efficacy, self-regulated learning, goal orientation and learning outcome. There are 5 latent variables, which 4 are endogenous latent variables (goal orientation, self-regulated learning, effort investment and learning outcome) and 1 is exogenous latent variable. Goal orientation was measured by 3 indicators: mastery goal, performance goal, and avoidance goal. Self-regulated learning was measured by 3 indicators: planning, monitoring and reflecting. Effort investment was measured by 2 indicators: time commitment and intensity. Learning outcome was measured by English final examination score. The exogenous latent variable was self-efficacy, and was measured by 6 items.

The population of this study was a sample of 700 Cambodian undergraduate students. The stratified random sampling was used to select participants from two different fields: social science and science.

The research tool was divided into two parts which consists of 34 items. Part 1 was about general information of respondents. Part 2 was about students' perception toward their self-efficacy, goal orientation, self-regulated learning and effort investment which all of the items were rated with 5 points Likert-scale. The highest reliability of the measurement scale was on self-regulated learning ( $\alpha = 0.869$ ), followed by effort investment ( $\alpha = 0.818$ ), goal orientation ( $\alpha = 0.789$ ), and self-efficacy ( $\alpha = 0.689$ ).

Means, standard deviation, coefficient of variation (cv), skewness and kurtosis were used to see the characteristic of data. Structural equation modeling was used to analyze the data in order to answer the research questions. The chi-square test was analyzed in order to check the consistency of the causal model of learning outcome with the empirical data, and analysis of structural equation modeling was applied to examine the effects of variables in the model.

### **Summary of research results**

The conclusion was separated into two parts. First, the results of background information and second was the results by objectives.

#### **1. Background information of the sample**

The results of background information of the sample data showed that most of the students are female ( $n = 467$ , or 66.7% of the sample), while male students made up 33.3 of the sample ( $n = 233$ ). The sample in this study came from two study fields: science and social science.

#### **2. The research results by objectives**

The research results will be summarized into two parts. First, the descriptive of data and the second part will summarize the research results based on each research objective. So, summary of results will be specified in detail below.

##### **2.1 Means level of each variable**

First, students have a medium level of self-efficacy (mean = 3.31, SD = 0.46), which means that students believe in their ability to perform their learning at a medium level. Second, students have high levels of self-regulated learning (mean = 3.60, SD = 0.59), in which students have highest level in planning for their learning activities (mean = 3.70, SD 0.72), followed by reflecting their learning abilities (mean = 3.63, SD = 0.63), while monitoring learning activities of student was at medium level (mean = 3.47, SD = 0.65). Third, students have their goal orientation at high level (mean = 3.90, SD = 0.57) which they have high level at mastery goal (mean = 4.09, SD = 0.67), followed by avoidance goal (mean = 3.97, SD = 0.68) and performance goal (mean = 3.66, SD = 0.69). Finally, students have high level of effort investment in their learning (mean = 3.70, SD = 0.56) which the highest level was intensity (mean = 3.73, SD = 0.63) while time commitment was also at high level (mean = 3.67, SD = 0.61).

The first objective was to develop and validate the hypothetical model of learning outcome. The results of correlation showed that 9 pairs of observed variables are positively correlated and statistically significant at a level of .01 which the correlation values range from 0.319 to 0.698. The analysis results of the competency of the developed model showed that the causal model of learning outcome was consistent with empirical data (Chi-square = 27.787, df = 21, p = 0.146, GFI = 0.992, AGFI = 0.978, RMSEA = 0.021, RMR = 0.005), in which the factor loading of self-regulated learning showed that the highest loading was on reflecting ( $\beta = 0.783$ ), followed by planning ( $\beta = 0.754$ ) and monitoring ( $\beta = 0.736$ ). For goal orientation, the highest factor loading was on avoidance goal ( $\beta = 0.863$ ), followed by mastery goal ( $\beta = 0.785$ ) and performance goal ( $\beta = 0.761$ ). For the effort investment which consists of two indicators, the highest factor loading was on intensity ( $\beta = 0.834$ ) followed by time commitment ( $\beta = 0.830$ ).

The second objective was to examine the direct and indirect effect of variables in the model. When considering the predictor and causal factors of learning outcome, the results showed that the variables that directly effect on learning outcome were self-efficacy and self-regulated learning. The effect of self-efficacy on learning outcome was equal to 0.313 which is statistically significant at the .05 level, indicating that students who have high self-efficacy or believe in their ability are more likely to achieve in their learning outcome. The other factor was self-regulated learning. It also showed the statistically significant effect on learning outcome directly which the effect was 0.177 indicating that student who employs self-regulated learning will plan their learning activities, monitor their learning process and reflect on what they have learned from class which in turn helps them succeed in their learning. For goal orientation and effort investment did not show statistically significant effect on learning outcome. However, goal orientation effect on learning outcome indirectly through self-regulated learning. So, the following is a summary of the conclusions of this study: 1) self-efficacy in ourselves or believe in our ability predicts learning outcome and it also predicts learning outcome indirectly through self-regulated learning, 2) self-regulated learning predicts learning outcome directly, and 3) even though goal orientation did not affects learning outcome directly, it indirectly affects through self-regulated learning.

The third objective was to examine the mediating roles of self-regulated learning, goal orientation and effort investment between self-efficacy and learning outcome. The results showed only self-regulated learning was the mediator between self-efficacy and learning outcome. However, goal orientation and effort investment failed to be the mediators between self-efficacy and learning outcome.

## **Discussion**

The discussion of this research was done separately by research objectives including overall discussion and limitations. In overall, the results were consistent with the conceptual framework. However, there are a few points that need to be discussed. The details of the discussion were as follows.

### **1. Validation of research model**

The validation of measurement model of learning outcome was analyzed by the structural equation modeling technique. The results indicated that the research model contains construct validity and is consistent with empirical data. Moreover, each measurement model of all variables contained construct validity, which can be measured directly from its indicators. The research results consistent with the hypothesis, the analysis of structural equation modeling showed the model fit and consistent with the empirical data this was due to The model was developed systematically based on literature and related researches, and research tools were developed following the principles of measurement, which are important points to contributing to make a quality of measurement model which is consistent with the idea of Hair (2010). The current research shows similar and consistent results to the previous study of Lee et al. (2014). First, self-efficacy measured by a single indicator showed the same loading that accounted for up to 81.7 percent of the total variance in both researches, and the direct path from self-efficacy on learning outcome showed equally effect and the same loading on self-regulated learning, in which the highest factor loading was on reflecting. Moreover, both research models showed that the chi-square values were accompanied by model fit indexes. In another research, which used the three indicators measurement of goal orientation or achievement goal, it was showed that the consistency effect on learning outcome and effort which the effect of goal on effort is around 0.7, which is almost the same as current research (Elliot et al., 1999).

## **2. Direct and indirect effects in the model.**

The study of factors that affect learning outcome consists of four independent variables: self-efficacy, goal orientation, self-regulated learning and effort investment. First, self-efficacy directly affects self-regulated learning, goal orientation, and effort investment. Moreover, self-efficacy affects learning outcome directly and indirectly through self-regulated learning. Although self-efficacy directly affects learning outcome, it does not indirectly affect learning outcome through goal orientation. Second, goal orientation did not directly affect learning outcome but indirectly affected through self-regulated learning. Thus, all of these are the summary of the results of this research.

Self-efficacy or students' belief in their ability of academic study predicted students' performance on their English final examination, the results consistent with previous findings (Zimmerman, 2002). Moreover, the most interesting results of this study showed the role of self-efficacy emerged as a positively significant effect on all variables in the model. Moreover, self-efficacy predicts learning outcome both directly and indirectly through self-regulated learning. The non-significant path from goal orientation needs further explanation. In this study, self-regulated learning positively predicted learning outcome but goal orientation fail to predict learning outcome. This non-significant finding indicates that students' goal orientation with sub process such as mastery goal, performance goal, and avoidance goal did not necessarily help them achieve higher scores on English test unless students also applied their self-regulated learning strategies such as planning their activities, monitoring the lacking points and reflecting on their weaknesses.

Both self-efficacy and goal orientation directly predicted effort investment. However, these two constructs did not indirectly affect learning outcome through effort investment. The present study indicated that students' effort expenditure depends on both strong belief of their self-efficacy and goal orientation. However, effort investment did not show a significant effect on learning outcome. This non-significant path from effort investment to learning outcome needs further discussion. Few studies have examined the function of effort investment in learning outcome. There are different kinds of effort affecting on students' learning outcome, and this was measured in two ways, including the amount of effort and type of effort (Fisher &

Ford, 1998). The amount of effort focused on time that students spend on tasks. Paas and Van Merriënboer (1994) suggested that the measure of effort does not depend on self-report perceptions while the present study used the self-report perceptions to measure the effort investment. Paas and Van Merriënboer (1994) also suggested that time on task was unrelated to the self-report measure of mental workload. In addition, Fisher and Ford (1998) suggested that the measurement of effort investment needs to be done in multiple ways.

Goal orientation was not statistically significant effect on learning outcome. These results showed the consistency with a previous study (VandeWalle, Cron, & Slocum Jr, 2001). The previous results suggested that the study of goal orientation should be done by studying a setting where students possess multiple episodes.

### **3. Mediating roles of self-regulated learning, goal orientation and effort investment between self-efficacy and learning outcome**

The results showed that only self-regulated learning was a mediator between self-efficacy and learning outcome. This showed that self-efficacy of students was not enough, but they also needed to have learning strategies or self-regulated learning to gain a better learning outcome. So, the results were consistent with the idea of Bandura (1997) in which he stated that self-efficacy was known as the influence of people's thought and actions, in which students who have a high sense of self-efficacy will set challenging learning activities, which leads to achieving their desired learning outcome.

### **Recommendations**

The recommendation in this research was proposed in two parts: first recommendations of applying this research to practice, and the second recommendations for future research.

#### **1. Recommendation for applying research results into practices**

The results of learning outcome model indicate that self-efficacy, goal-orientation and self-regulated learning affect learning outcome of the student. So, the researcher would suggestion from the research results as below.

**Teachers or lecturers** should provide learning activities which let students plan their learning activities, monitor their own learning process and reflect on their lacking points. Those activities are homework, assignments and related tasks. To



promote self-efficacy, teachers should support them both physically and emotionally to think positively in their ability. For goal orientation, teachers may ask them to practice setting their goals such as what they want to learn from class and how to achieve that goal.

**Leaders** should provide any related training to teachers on how to set activities, such as project planning and evaluation, which could promote self-regulated learning, goal setting or project goals.

**Students:** The research results indicated that self-efficacy and self-regulated learning effect on learning outcome. Moreover, goal orientation also indirectly effect on learning outcome through self-regulated learning. So, in order to improve learning outcome students must always think positively about their abilities in learning, set more challenge goals and need to regulate activities which lead to achieve the set goal. For example, setting a goal of receiving the scholarship to study abroad, the student must then use the requirements for getting the scholarship to try to set activities toward that goal. So, then students try to set activities toward that goal.

## **2. Recommendation for future research**

The data was collected only in Phnom Penh, which is weak in generalization to the whole country. So, future research should collect from various sites in order to increase the power of generalization or external validity. Second, effort-investment construct should not be measure by self-reporting (Paas & Van Merriënboer, 1994). Third, this research focuses only on students' self-efficacy, goals, self-regulated learning and effort investment, internal aspects of the individual students. Improving learning outcome does not happen from only students themselves, but also via teachers' contributions to students' learning outcome. So, the next study should include variables related to teacher that are important to promotion of students' self-regulated learning, the variable that should receive more attention is teacher-regulated activities. Teacher-regulated activities, such as external regulation, shared regulation and internal regulation are important to promote self-regulated learning of students (van Beek, de Jong, Minnaert, & Wubbels, 2014). External regulation, teacher activities are oriented at regulating student learning activities. Second, shared regulation, which is about teachers' activities that stimulate student's learning activities. Finally, internal regulation which is about activities oriented at allowing

students to self-regulate learning by letting them discuss, correct and reflect themselves. Another interesting variable is teachers' support. Diseth, Danielsen, and Samdal (2012) proved that a teacher's support predicted self-efficacy, goal orientation and academic achievement. So, future research should integrate this construct into the model.

The results of both MANOVA and the Independent t-test indicated that there are significant differences in goal orientation between field of study: science and social science. So, based on these results, we can infer that the field of study can be the moderator between goal orientation and learning outcome. It means that the level of goal orientation effect on learning outcome depends on the field of study. So, future research should focus on field of study as the moderator between goal orientation and learning outcome.



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**Appendix A**

**Name of Experts for Checking Research Instruments**

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

## Name of Experts for Checking Research Instrument

### Experts in Research Methods

1. Prof.Suwimon Wongwanich, PhD  
Lecturer at department of Educational research and psychology, Faculty of Education, Chulalongkorn University
2. Assoc. Prof.Duangkamol Traiwichitkhun, PhD  
Lecturer at department of Educational research and psychology, Faculty of Education, Chulalongkorn University
3. Chayut Piromsombat, PhD  
Lecturer at department of Educational research and psychology, Faculty of Education, Chulalongkorn University
4. Saowaros Yingwanna, PhD  
Lecturer at department of Research and Evaluation, Faculty of Education, Thaksin University

### Experts in Content and Language

1. Sok Uttara, PhD  
Dean of Faculty of Education, Pannasastra University of Cambodia
2. He Mary, Master of Applied Linguistic  
Lecturer at Faculty of Education, Pannasastra University of Cambodia



**Appendix B**  
**Research Instruments**

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

## The Self-Assessment Questionnaire

### I. Demographic Information

**Explanation:** This questionnaire is divided into two steps such as step 1: general data, step 2: express your idea about yourself. This questionnaire is a series of statements about your personality attitudes and traits. Each statement represents a commonly held belief. Read each statement and decide to what extent it describes you. There are no wrong or right answers. You will probably agree with some of the statements and disagree with others. Please indicate your own personal feelings about each statement below by marking in the box that describes your attitude or feeling. Please be truthful and describe yourself as you really are, not as you would like to be (Tick in the box provided only). I guaranteed that your answers will be kept in secret. Thank you so much for your cooperation.

Questions	
1. Student's ID:	_____
2. Gender	<input type="checkbox"/> 1. Male <input type="checkbox"/> 2. Female
3. Age	_____
4. Study field	<input type="checkbox"/> 1. Social Science <input type="checkbox"/> 2. Pure Science
5. Subject	_____

## Part II Self-Assessment

**Indication:** Please indicate your personal feelings about each statement below by marking in the box that describes your attitude or feeling.

- 1. Strongly disagree** means do not match to you the most  
**2. Disagree** means do not match to you so much  
**3. Neutral** means match to you  
**4. Agree** means match to you so much  
**5. Strongly agree** means match to you the most

<b>SELF-EFFICACY</b>					
1) I am confident I can understand the basic concepts taught in this class.	1	2	3	4	5
2) I am sure that I understand the most difficult material presented in this class.	1	2	3	4	5
3) I am confident I can do well on assignments, tests and exams in this class.	1	2	3	4	5
4) Considering the difficulty of this course, I think I will do well in this class.	1	2	3	4	5
5) I believe I understand the most complex material presented by the teacher.	1	2	3	4	5
6) I believe I will receive an excellent grade in this class.	1	2	3	4	5
<b>GOAL ORIENTATION</b>					
7) It is important to me to understand the content of this course as thoroughly as possible	1	2	3	4	5
8) I just want to avoid doing poorly in this class	1	2	3	4	5
9) It is important for me to do better than other students in this class.	1	2	3	4	5
10) My goal in this class is to avoid performing poorly	1	2	3	4	5
11) I hope to have gained a broader and deeper knowledge of English when I am done with this class	1	2	3	4	5
12) It is important for me to do well compared to others in this class	1	2	3	4	5
13) In this class, understanding the work is more important than the grade that I get	1	2	3	4	5
14) My goal in this class is to get a better grade than most of the others students	1	2	3	4	5
15) My fear of performing poorly in this class is often what motivates me.	1	2	3	4	5

<b>SELF-REGULATED LEARNING</b>					
16) I think about what I will learn tomorrow and prepare the related learning materials	1	2	3	4	5
17) I try to reread if I do not understand material	1	2	3	4	5
18) I check my learning schedule for unfinished work or assignments then I rush to finish it before doing something else.	1	2	3	4	5
19) I set a learning schedule for all subjects (i.e. what time I read, what time I do homework, a time table for learning each subject, a schedule for learning, reading time)	1	2	3	4	5
20) When reading, I always make up questions to help me focus on reading.	1	2	3	4	5
21) After I study in this class, I try to check which concepts I do not understand	1	2	3	4	5
22) I read in advance about what I will learn tomorrow.	1	2	3	4	5
23) I regularly discuss with my teacher to make sure I understand the lesson.	1	2	3	4	5
24) After reading I always check how much I understand by summarizing it and answering questions	1	2	3	4	5
<b>EFFORT INVESTMENT</b>					
25) I spend much time to study at home and the library	1	2	3	4	5
26) I work hard on assignments and homework	1	2	3	4	5
27) I keep working, even when the work is difficult.	1	2	3	4	5
28) I spend as much time as I need to get the work done	1	2	3	4	5
29) In general, I am a hard worker	1	2	3	4	5

**កំរងសំនួរ**

សេចក្តីណែនាំ: កំរងសំនួរនេះត្រូវបានបែងចែកជាពីរផ្នែក គឺទី១ទាក់ទងនឹងព័ត៌មានទូទៅ ផ្នែកទី២ ទាក់ទងទៅនឹងការបង្ហាញអំពីការយល់ឃើញអំពីខ្លួនអ្នក។ កំរងសំនួរនេះគឺជាកំរងប្រយោគអំពី ឥរិយាបថរបស់អ្នក។ សូមអាននូវប្រយោគនីមួយៗហើយធ្វើការសំរេចចិត្តថាតើវាត្រូវនឹងឥរិយាបថ របស់អ្នកបានកំរិតណា។ មិនមានចំលើយខុស រឺ ត្រូវនោះទេក្នុងការឆ្លើយសំនួរទាំងអស់នេះ។ អ្នក អាចនឹងយល់ស្របជាមួយប្រយោគមួយចំនួន និង មិនយល់ស្របជាមួយប្រយោគមួយចំនួន។ សូម មេត្តាបង្ហាញអារម្មណ៍ផ្ទាល់ខ្លួនរបស់អ្នកតាមអ្វីដូចដែលអ្នកគិតថាខ្លួនអ្នកពិតជាបែបនឹងមែន។ ខ្ញុំ សូមធានាថាពាល់ចំលើយទាំងអស់នឹងទុកជាសំងាត់។ សូមអគុណសំរាប់ការសហការ។

**ផ្នែកទី១: ព័ត៌មានទូទៅ**

សំនួរ	
លេខសំគាល់	_____
ភេទ:	<input type="checkbox"/> 1. ប្រុស <input type="checkbox"/> 2. ស្រី
អាយុ:	_____
មហាវិទ្យាល័យ:	<input type="checkbox"/> 1. វិទ្យាសាស្ត្រសង្គម <input type="checkbox"/> 2. វិទ្យាសាស្ត្រពិត
មុខវិជ្ជា:	_____

**ផ្នែកទី២ សំនួរវាយតម្លៃអំពីខ្លួនឯង**

សូមមេត្តាចង្អុលបង្ហាញនូវអារម្មណ៍ផ្ទាល់ខ្លួនរបស់អ្នកចំពោះប្រយោគខាងក្រោមដោយគូសសញ្ញា

✓ ក្នុងប្រអប់ដែលអ្នកគិតថាវាត្រូវទៅនឹងឥរិយាបថ រឺអារម្មណ៍របស់អ្នក

- 1 មិនយល់ស្របយ៉ាងខ្លាំង                      មានន័យថាមិនត្រូវនឹងឥរិយាបថរបស់អ្នកច្រើនបំផុត
- 2 មិនយល់ស្រប                                      មានន័យថាមិនត្រូវនឹងឥរិយាបថរបស់អ្នកច្រើន
- 3 អព្យាក្រឹត    មានន័យថាត្រូវទៅនឹងឥរិយាបថរបស់អ្នកមធ្យម
- 4 យល់ស្រប    មានន័យថាត្រូវទៅនឹងឥរិយាបថរបស់អ្នកច្រើន
- 5 យល់ស្របយ៉ាងខ្លាំង                              មានន័យថាត្រូវទៅនឹងឥរិយាបថរបស់អ្នកច្រើនបំផុត

<b>ការជឿលើសម្បទានខ្លួនឯង</b>					
1) ខ្ញុំជឿជាក់ថាខ្ញុំអាចយល់ពីគោលគំនិតជាមូលដ្ឋានដែលបានបង្រៀននៅក្នុងថ្នាក់នេះ	1	2	3	4	5
2) ខ្ញុំជឿជាក់ថាខ្ញុំអាចយល់មេរៀន រឺ ឯកសារផ្សេងៗដែលលំបាកបំផុតដែលបានបង្ហាញ រឺ បង្រៀននៅក្នុងថ្នាក់នេះ	1	2	3	4	5
3) ខ្ញុំមានជំនឿចិត្តថាខ្ញុំអាចធ្វើបានយ៉ាងល្អនៅលើកិច្ចការដែលត្រូវដាក់អោយ ការធ្វើលំហាត់ និងការប្រឡងនៅក្នុងថ្នាក់នេះ	1	2	3	4	5
4) គិតដល់ភាពលំបាកនៃមុខវិជ្ជានេះ ខ្ញុំជឿជាក់ថាខ្ញុំនឹងធ្វើបានយ៉ាងល្អនៅក្នុងថ្នាក់នេះ។	1	2	3	4	5
5) ខ្ញុំជឿថាខ្ញុំយល់ពីមេរៀនដែលស្មុគស្មាញបំផុតដែលបង្រៀន រឺ បង្ហាញដោយលោកគ្រូ អ្នកគ្រូ។	1	2	3	4	5
6) ខ្ញុំជឿថាខ្ញុំនឹងទទួលបានពិន្ទុដ៏ល្អបំផុតនៅក្នុងថ្នាក់នេះ។	1	2	3	4	5



គោលបំណងនៃការរៀន					
7) វាជាការសំខាន់សំរាប់ខ្ញុំក្នុងការយល់ពីមាតិកាមេរៀននៃមុខវិជ្ជានេះ អោយបានយ៉ាងលំអិតតាមដែលអាចធ្វើទៅបាន	1	2	3	4	5
8) ខ្ញុំជៀសវាងការរៀនខ្សោយ នៅក្នុងថ្នាក់នេះ	1	2	3	4	5
9) វាជាការសំខាន់សម្រាប់ខ្ញុំក្នុងការធ្វើបានល្អប្រសើរជាងនិស្សិតដទៃ ទៀតនៅក្នុងថ្នាក់នេះ។	1	2	3	4	5
10) គោលដៅរបស់ខ្ញុំនៅក្នុងថ្នាក់នេះគឺដើម្បីជៀសវាងការរៀនមិនបាន ល្អ	1	2	3	4	5
11) ខ្ញុំចង់បានភាពស្ងាត់ជំនាញ និងទទួលបានចំនេះដឹងយ៉ាងច្បាស់នៅ ពេលរៀនចប់ថ្នាក់នេះ	1	2	3	4	5
12) វាសំខាន់សម្រាប់ខ្ញុំក្នុងការធ្វើឱ្យបានល្អប្រៀបធៀបទៅនឹងអ្នក ដទៃទៀតនៅក្នុងថ្នាក់នេះ។	1	2	3	4	5
13) នៅក្នុងថ្នាក់នេះ យល់ពីមេរៀន និងការងារគឺមានសារៈសំខាន់ជាង និទ្ទេសដែលខ្ញុំទទួលបាន	1	2	3	4	5
14) គោលបំណងរបស់ខ្ញុំនៅក្នុងថ្នាក់នេះគឺដើម្បីទទួលបានចំណាត់ថ្នាក់ ល្អប្រសើរជាង និស្សិតភាគច្រើនផ្សេងទៀតនៅក្នុងថ្នាក់នេះ។	1	2	3	4	5
15) ការភ័យខ្លាចរបស់ខ្ញុំក្នុងការរៀនមិនបានពូកែក្នុងថ្នាក់នេះគឺជាអ្វី ដែលជំរុញទឹកចិត្តរបស់ខ្ញុំ	1	2	3	4	5



<b>ការរៀនដោយខ្លួនឯង</b>					
16) ខ្ញុំតែងតែគិតអំពីអ្វីដែលខ្ញុំនឹងរៀនថ្ងៃស្អែកនិងរៀបចំសម្ភារៈសិក្សាពាក់ព័ន្ធទុកជាមុន។	1	2	3	4	5
17) ខ្ញុំព្យាយាមអានអត្ថបទឬសៀវភៅឡើងវិញប្រសិនបើខ្ញុំមិនយល់មេរៀន។	1	2	3	4	5
18) ខ្ញុំតែងតែពិនិត្យមើលកាលវិភាគរៀនសូត្ររបស់ខ្ញុំដើម្បីមើលការងារដែលមិនទាន់ធ្វើហើយ រឺមិនទាន់បញ្ចប់ បន្ទាប់មកខ្ញុំប្រញាប់ដើម្បីបញ្ចប់វាមុនពេលធ្វើអ្វីមួយផ្សេងទៀត។	1	2	3	4	5
19) ខ្ញុំតែងតែកំណត់កាលវិភាគសម្រាប់ការរៀនមុខវិជ្ជាទាំងអស់ (ឧទាហរណ៍ ម៉ោងបុន្នានខ្ញុំអាន ម៉ោងបុន្នានខ្ញុំធ្វើកិច្ចការសាលា រៀបចំពេលវេលារៀនមុខវិជ្ជានីមួយៗ កាលវិភាគសំរាប់រៀននិងអាន) ។	1	2	3	4	5
20) នៅពេលខ្ញុំអាន ខ្ញុំតែងតែដាក់ជាសំនួរ រឺបង្កើតសំនួរមុនអានដើម្បីជួយខ្ញុំផ្ដោតលើការអាន។	1	2	3	4	5
21) បន្ទាប់ពីខ្ញុំបានសិក្សានៅក្នុងថ្នាក់នេះខ្ញុំព្យាយាមកំណត់ថាតើអ្វីខ្ញុំមិនយល់	1	2	3	4	5
22) ខ្ញុំតែងតែអានជាមុនអំពីអ្វីដែលខ្ញុំនឹងរៀននៅថ្ងៃស្អែក។	1	2	3	4	5
23) ខ្ញុំតែងតែ ពិភាក្សាជាមួយគ្រូរបស់ខ្ញុំយ៉ាងទៀងទាត់ដើម្បីឱ្យប្រាកដថាខ្ញុំយល់ពីមេរៀននេះ។	1	2	3	4	5
24) បន្ទាប់ពីបានអានខ្ញុំតែងតែពិនិត្យមើលថាតើខ្ញុំយល់អត្ថបទនេះបានប៉ុណ្ណា ដោយខ្ញុំសង្ខេបអត្ថបទនោះហើយឆ្លើយទៅនឹងសំណួរ។	1	2	3	4	5

ការព្យាយាមក្នុងការរៀន					
25) ខ្ញុំបានចំណាយពេលវេលារបស់ខ្ញុំយ៉ាងច្រើនក្នុងការរៀននៅផ្ទះនិងនៅបណ្ណាល័យ	1	2	3	4	5
26) ខ្ញុំខិតខំធ្វើការងារដែលគ្រូដាក់អោយយ៉ាងខ្លាំងបំផុត	1	2	3	4	5
27) ខ្ញុំបន្តធ្វើការនោះទោះបីជាការងារនោះមានការលំបាកក៏ដោយ។	1	2	3	4	5
28) ខ្ញុំបានចំណាយពេលជាច្រើនតាមដែលខ្ញុំត្រូវការដើម្បីអោយសំរេចការងាររបស់ខ្ញុំ។	1	2	3	4	5
29) ជាទូទៅខ្ញុំមនុស្សម្នាក់ដែលឧស្សាហ៍ព្យាយាមក្នុងការរៀនសូត្រ។	1	2	3	4	5
30) ខ្ញុំបានចំណាយពេលវេលារបស់ខ្ញុំទៅលើមេរៀនអត្ថបទដែលខ្ញុំអានម្តងហើយម្តងទៀតរហូតដល់ខ្ញុំយល់	1	2	3	4	5



**Appendix C**

**Quality of Research Instrument**

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Results of Research Instrument Checking

No	Question	Comments from experts			IOC Score	Result
		Consistent (+1)	Not sure (0)	Not consistent (-1)		
Self-efficacy						
1	I believe that I can understand the basic concepts taught in this class	5	0	0	1	Ok
2	I believe that I can understand the most difficult material presented in this class	5	0	0	1	Ok
3	I believe that I can do well on assignments, tests and exams in this class	5	0	0	1	Ok
4	Considering the difficulty of this course, I think I will do well in this class	5	0	0	1	Ok
5	I believe I can understand the most complex material presented by the teacher	5	0	0	1	Ok
6	I am sure that I can learn all the skills taught in English class well.	5	0	0	1	Ok
Goal-orientation						
Mastery goal						
1.1	It is important for me to understand the content of this course as thoroughly as possible	3	0	-2	0.2	Revise
1.2	I hope to have gained a broader and deeper knowledge of English when I am done with this class	2	1	-1	0.2	Revise
1.3	In this class, understanding the work is more important to me than the grade that I get	4	1	0	0.8	Ok
Performance goal						
2.1	It is important for me to do better than other students in this class	2	3	0	0.4	Revise or delete
2.2	It is important for me to do well compared to others in this class	2	3	0	0.4	Revise or delete
2.3	My goal in this class is to get a better grade than most of the other students	2	3	0	0.4	Revise or delete

No	Questions	Comments from experts			IOC score	Result
		Consistent (+1)	Not sure (0)	Not consistent (-1)		
Avoidance goal						
3.1	I just want to avoid doing poorly in this class.	4	1	0	1	Ok
3.2	My goal in this class is to avoid performing poorly.	4	1	0	1	Ok
3.3	My fear of performing poorly in this class is often what motivates me.	2	3	0	0.4	Revise
Self-regulated learning						
Planning						
1.1	I think about what I will learn tomorrow and prepare the related learning materials.	5	0	0	1	Ok
1.2	I set a learning schedule for all subjects (i.e. what time I read, what time I do homework, a time table for learning each subject, a schedule for learning, reading time)	5	0	0	1	Ok
1.3	I read in advance about what I will learn tomorrow.	5	0	0	1	Ok
Monitoring						
2.1	I always check my learning schedule for unfinished work or assignments, then rush to finish it before doing something else.	5	0	0	1	Ok
2.2	When reading, I always make up questions to help me focus on reading.	4	1	0	0.8	Ok
2.3	I discuss with my teacher to make sure I understand the lesson.	5	0	0	1	Ok

No	Question	Comment form experts			IOC score	Result
		Consistent (+1)	Not sure (0)	Not consistent (-1)		
Reflecting						
3.1	I try to reread if I do not understand the material.	4	1	0	0.8	Ok
3.2	After I study in this class, I try to check which concepts I do not understand	5	0	0	1	Ok
3.3	After reading I always check how much I understand by summarizing it and answering questions	4	1	0	0.8	Ok
Effort investment						
Time commitment						
1.1	I spend much time to do school work.	5	0	0	1	Ok
1.2	I spend as much time as I need to get the work done	5	0	0	1	Ok
1.3	I spend my time over the materials again and again until I understand them.	5	0	0	1	Ok
Intensity						
2.1	In general, I am a hard worker	4	1	0	0.8	Ok
2.2	I keep working, even when the work is difficult.	5	0	0	1	Ok
2.3	I work hard on assignments and homework	5	0	0	1	Ok

### The Results of Items Reliability

Variable	Used with (n=30)			Research sample (n=700)		
	Corrected Item-Total Correction	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	Corrected Item-Total Correction	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Self-efficacy			.831			.689
1	.696	.786	.831	.337	.673	.689
2	.731	.776		.344	.671	
3	.612	.803		.513	.618	
4	.612	.805		.468	.631	
5	.579	.809		.391	.659	
6	.442	.844		.464	.633	
Goal orientation			.933			.789
Mastery goal						
7	.507	.800	.774	.387	.580	.620
8	.629	.685		.478	.460	
9	.719	.576		.429	.523	
Performance goal						
10	.771	.797	.869	.491	.597	.683
11	.745	.821		.573	.499	
12	.737	.829		.436	.673	
Avoidance						
13	.696	.744	.825	.438	.498	.616
14	.646	.793		.484	.436	
15	.703	.737		.361	.618	



Variable	Used with (n=30)			Research sample (n=700)			
	Corrected Item-Total Correction	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	Corrected Item-Total Correction	Cronbach's Alpha if Item Deleted	Cronbach's Alpha	
Self-regulated learning			.894				.869
Planning							
16	.531	.689	.737	.549	.653	.732	
17	.635	.559		.536	.671		
18	.525	.694		.582	.614		
Monitoring							
19	.703	.494	.740	.361	.612	.618	
20	.605	.609		.491	.423		
21	.414	.816		.433	.511		
Reflecting							
22	.612	.202	.615	.524	.546	.681	
23	.405	.548		.500	.579		
24	.288	.681		.460	.629		
Effort investment			.900				.818
Time commitment							
25	.470	.656	.696	.438	.527	.628	
26	.688	.349		.387	.597		
27	.400	.731		.488	.453		
Intensity							
28	.600	.200	.610	.573	.601	.724	
29	.490	.407		.595	.573		
30	.209	.769		.472	.719		



**Appendix D**

**Frequency and Percentages of Responses in Each Question**

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### 1. Level of self-efficacy

No	Item	Response					Total
		1	2	3	4	5	
Self-efficacy							
1	I am confident I can understand the basic concepts taught in this class.	2 (0.3)	23 (3.3)	306 (43.7)	334 (47.7)	35 (5)	700 (100)
2	I am certain that I can understand the most difficult material presented in this class.	6 (0.9)	81 (11.6)	396 (56.6)	205 (29.3)	12 (1.7)	700 (100)
3	I am confident I can do well on assignments, tests and exams in this class.	1 (0.1)	46 (6.6)	316 (45.1)	302 (43.1)	35 (5.0)	700 (100)
4	Considering the difficulty of this course, I think I will do well in this class.	5 (0.7)	82 (11.7)	326 (46.6)	257 (36.7)	30 (4.3)	700 (100)
5	I believe I understand the most complex material presented by the teacher.	13 (1.9)	131 (18.7)	358 (51.1)	175 (25.0)	23 (3.3)	700 (100)
6	I believe I will receive an excellent grade in this class.	12 (1.7)	74 (10.6)	360 (51.4)	230 (32.9)	24 (3.4)	700 (100)

## 2. Level of goal-orientation

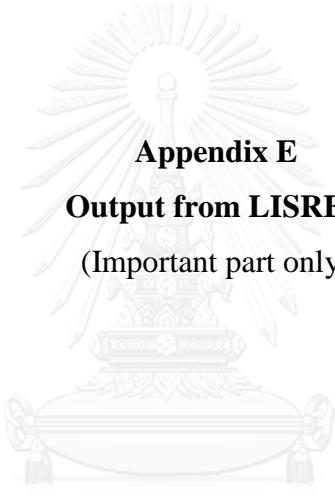
No	Item	Response					Total
		1	2	3	4	5	
Goal orientation							
Mastery goal							
1	It is important to me to understand the content of this course as thoroughly as possible	3 (0.4)	64 (9.1)	157 (22.4)	324 (46.3)	152 (21.7)	700 (100)
2	I hope to have gained a broader and deeper knowledge of English when I am done with this class	11 (1.6)	16 (2.3)	32 (4.6)	189 (27.0)	452 (64.6)	700 (100)
3	In this class, understanding the work is more important to me than the grade that I get	10 (1.4)	37 (5.3)	157 (22.4)	258 (36.9)	238 (34.0)	700 (100)
Performance goal							
1	It is important for me to do better than other students in this class	7 (1.0)	50 (7.1)	216 (30.9)	287 (41.0)	140 (20.0)	700 (100)
2	It is important for me to do well compared to others in this class	6 (0.9)	35 (5.0)	214 (30.6)	324 (46.3)	121 (17.3)	700 (100)
3	My goal in this class is to get a better grade than most of the other students	21 (3.0)	68 (9.7)	237 (33.9)	285 (40.7)	89 (12.7)	700 (100)
Avoidance goal							
1	I just want to avoid doing poorly in this class	12 (1.7)	22 (3.1)	119 (17.0)	328 (46.8)	219 (31.3)	700 (100)
2	My goal in this class is to avoid performing poorly	10 (1.4)	23 (3.3)	92 (13.1)	327 (46.7)	248 (35.4)	700 (100)
3	My fear of performing poorly in this class is often what motivates me.	16 (2.3)	55 (7.9)	179 (25.6)	287 (41.0)	163 (23.3)	700 (100)

### 3. Level of self-regulated learning

No	Item	Response					Total
		1	2	3	4	5	
Self-regulated learning							
Planning							
1	I think about what I will learn tomorrow and prepare the related learning materials	5 (0.7)	37 (5.3)	148 (21.1)	307 (43.8)	203 (29.0)	700 (100)
2	I set a learning schedule for all subjects	11 (1.6)	68 (9.7)	259 (37.0)	243 (34.7)	119 (17.0)	700 (100)
3	I read in advance about what I will learn tomorrow.	6 (0.9)	61 (8.7)	252 (36.0)	280 (40.0)	101 (14.4)	700 (100)
Monitoring							
1	I always check my learning schedule for unfinished work or assignments, then rush to finish it before doing something else.	5 (0.7)	42 (6.0)	147 (21.0)	316 (45.4)	188 (26.9)	700 (100)
2	When reading, I always make up questions to help me focus on reading.	6 (0.9)	83 (11.7)	297 (42.4)	232 (33.1)	83 (11.9)	700 (100)
3	I discuss with my teacher to make sure I understand the lesson.	23 (3.3)	138 (19.7)	351 (50.1)	158 (22.6)	30 (4.3)	700 (100)
Reflecting							
1	I try to reread if I do not understand	7 (1.0)	29 (4.1)	169 (24.1)	328 (46.9)	167 (23.9)	700 (100)
2	After I study in this class, I try to check which concepts I do not understand	5 (0.7)	51 (7.3)	230 (32.9)	328 (46.9)	86 (12.3)	700 (100)
3	After reading I always check how much I understand by summarizing it and answer to the questions	3 (0.4)	74 (10.6)	332 (47.1)	244 (34.9)	47 (6.7)	700 (100)

#### 4. Level of Effort Investment

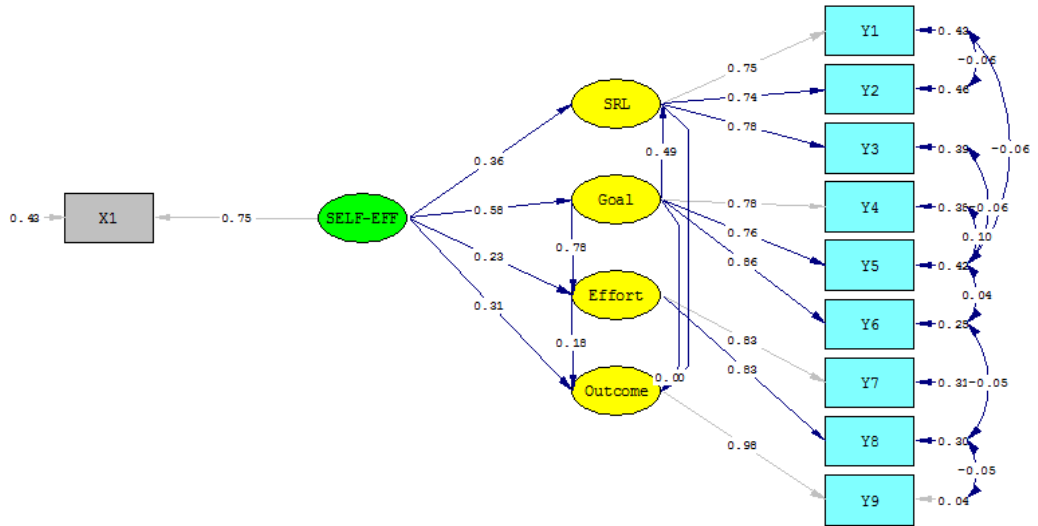
No	Item	Response					Total
		1	2	3	4	5	
Effort investment							
Time commitment							
1	I spend much time to do school work	2 (0.3)	67 (9.6)	298 (42.6)	273 (39.0)	60 (8.6)	700 (100)
2	I spend as much time as I need to get the work done	1 (0.1)	27 (3.9)	166 (23.7)	254 (50.6)	152 (21.7)	700 (100)
3	I spend my time over the materials again and again until I understand them.	3 (0.4)	51 (7.3)	237 (33.9)	307 (43.8)	102 (14.6)	700 (100)
Intensity							
1	In general, I am a hard worker	3 (0.4)	28 (4.0)	182 (26.0)	349 (49.9)	138 (19.7)	700 (100)
2	I keep working, even when the work is difficult.	6 (0.9)	30 (4.3)	151 (21.6)	364 (52.0)	149 (21.3)	700 (100)
3	I work hard on assignments and homework	5 (0.7)	51 (7.3)	303 (43.2)	298 (42.6)	43 (6.1)	700 (100)



**Appendix E**  
**Output from LISREL**  
(Important part only)

จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

## Causal Model of Learning Outcome of Cambodia Undergraduate Students



Chi-Square=27.79, df=21, P-value=0.14630, RMSEA=0.021

DATE: 6/23/2015

TIME: 22:53

L I S R E L 9.20 (STUDENT)

BY

Karl G. Jöreskog & Dag Sörbom

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The following lines were read from file D:\Desktop\Draft thesis\DATA ANALYSIS\PATH ANALYSIS OF LEARNING OUTCOME.spl:

PATH ANALYSIS OF LEARNING OUTCOME MODEL

DA NI=10 NO=700 MA=CM

LA

X1 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9

KM

1.00

.319 1.00

.373 .498 1.00

.390 .592 .578 1.00

.330 .423 .414 .445 1.00

.375 .345 .365 .354 .697 1.00



.374 .463 .420 .450 .682 .698 1.00  
 .405 .441 .406 .440 .603 .600 .666 1.00  
 .455 .466 .457 .475 .585 .567 .610 .692 1.00  
 .403 .362 .372 .381 .359 .357 .401 .416 .380 1.00  
 SD  
 .45551 .67064 .69296 .67562 .72057 .65099 .63477 .60564 .63029 .51542  
 ME  
 3.3103 4.0909 3.6596 3.9670 3.7006 3.4719 3.6290 3.6704 3.7328 3.6766  
 SE  
 2 3 4 5 6 7 8 9 10 1  
 MO NX=1 NY=9 NK=1 NE=4 LX=FU,FI LY=FU,FI BE=FU,FI GA=FU,FR PH=SY,FR PS=DI,FR TE=SY TD=FU,FR  
 FR LX 1 1 LY 2 1 LY 3 1 LY 5 2 LY 6 2 LY 8 3 LY 9 4  
 ST 1 LY(1,1) LY 4 2 LY 7 3  
 FR BE 1 2 BE 3 2 BE 4 2 BE 4 1 BE 4 3  
 FI TD 1 1 LX 1 1  
 VA 0.089 TD(1,1)  
 VA 0.911 LX 1 1  
 FI LY 9 4 TE 9 9  
 VA 1 LY 9 4  
 VA 0.01 TE 9 9  
 FR TE 5 4 TE 5 3 TE 5 1 TE 8 6 TE 2 1 TE 9 8 TE 6 5  
 LE  
 SRL Goal Effort Outcome  
 LK  
 SELF-EFFICACY  
 Path diagram  
 OU SE TV EF SS MI RS FS SC ND=3

#### PATH ANALYSIS OF LEARNING OUTCOME MODEL

Number of Input Variables 10  
 Number of Y - Variables 9  
 Number of X - Variables 1  
 Number of ETA - Variables 4  
 Number of KSI - Variables 1  
 Number of Observations 700

#### PATH ANALYSIS OF LEARNING OUTCOME MODEL

##### Covariance Matrix

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.450					

Y2	0.231	0.480				
Y3	0.268	0.271	0.456			
Y4	0.204	0.207	0.217	0.519		
Y5	0.151	0.165	0.156	0.327	0.424	
Y6	0.197	0.185	0.193	0.312	0.288	0.403
Y7	0.179	0.170	0.180	0.263	0.237	0.256
Y8	0.197	0.200	0.202	0.266	0.233	0.244
Y9	0.125	0.133	0.133	0.133	0.120	0.131
X1	0.097	0.118	0.120	0.108	0.111	0.108

## Covariance Matrix

	Y7	Y8	Y9	X1
Y7	0.367			
Y8	0.264	0.397		
Y9	0.130	0.123	0.266	
X1	0.112	0.131	0.095	0.207

Total Variance = 3.970 Generalized Variance = 0.467376D-06

Largest Eigenvalue = 2.142 Smallest Eigenvalue = 0.106

Condition Number = 4.498

## PATH ANALYSIS OF LEARNING OUTCOME MODEL

## Parameter Specifications

## LAMBDA-Y

	SRL	Goal	Effort	Outcome
Y1	0	0	0	0
Y2	1	0	0	0
Y3	2	0	0	0
Y4	0	0	0	0
Y5	0	3	0	0
Y6	0	4	0	0
Y7	0	0	0	0
Y8	0	0	5	0
Y9	0	0	0	0

## BETA

	SRL	Goal	Effort	Outcome
SRL	0	6	0	0
Goal	0	0	0	0
Effort	0	7	0	0

Outcome 8 9 10 0

GAMMA

SELF-EFF

-----

SRL 11  
 Goal 12  
 Effort 13  
 Outcome 14

PHI

SELF-EFF

-----

15

PSI

SRL Goal Effort Outcome

-----

16 17 18 19

THETA-EPS

Y1 Y2 Y3 Y4 Y5 Y6

-----

Y1	20					
Y2	21	22				
Y3	0	0	23			
Y4	0	0	0	24		
Y5	25	0	26	27	28	
Y6	0	0	0	0	29	30
Y7	0	0	0	0	0	0
Y8	0	0	0	0	0	32
Y9	0	0	0	0	0	0

THETA-EPS

Y7 Y8 Y9

-----

Y7	31		
Y8	0	33	
Y9	0	34	0

PATH ANALYSIS OF LEARNING OUTCOME MODEL

Number of Iterations = 8

LISREL Estimates (Maximum Likelihood)

## LAMBDA-Y

	SRL	Goal	Effort	Outcome
Y1	1.000	--	--	--
Y2	1.009	--	--	--
	(0.060)			
	16.746			
Y3	1.047	--	--	--
	(0.062)			
	17.000			
Y4	--	1.000	--	--
Y5	--	0.876	--	--
	(0.039)			
	22.415			
Y6	--	0.968	--	--
	(0.043)			
	22.388			
Y7	--	--	1.000	--
Y8	--	--	1.046	--
	(0.044)			
	23.756			
Y9	--	--	--	1.000

## LAMBDA-X

## SELF-EFF

X1	0.911			
BETA				
	SRL	Goal	Effort	Outcome
SRL	--	0.439	--	--
	(0.052)			
	8.402			
Goal	--	--	--	--
Effort	--	0.697	--	--
	(0.048)			
	14.411			

Outcome 0.177 0.002 0.178 --  
 (0.071) (0.190) (0.248)  
 2.494 0.008 0.720

GAMMA  
 SELF-EFF

-----  
 SRL 0.480  
 (0.087)  
 5.549

Goal 0.874  
 (0.087)  
 10.037

Effort 0.311  
 (0.070)  
 4.434

Outcome 0.420  
 (0.132)  
 3.192

Covariance Matrix of ETA and KSI

SRL Goal Effort Outcome SELF-EFF

-----  
 SRL 0.255  
 Goal 0.200 0.320  
 Effort 0.178 0.262 0.253  
 Outcome 0.129 0.135 0.132 0.256  
 SELF-EFF 0.123 0.124 0.131 0.105 0.142

PHI

SELF-EFF

-----  
 0.142  
 (0.013)  
 10.678

PSI

Note: This matrix is diagonal.

SRL Goal Effort Outcome  
 -----  
 0.109 0.211 0.030 0.166  
 (0.014) (0.023) (0.008) (0.011)  
 7.829 9.360 3.582 15.492



## Squared Multiple Correlations for Structural Equations

SRL	Goal	Effort	Outcome
0.575	0.339	0.882	0.354

NOTE: R<sup>2</sup> for Structural Equations are Hayduk's (2006) Blocked-Error R<sup>2</sup>

## Reduced Form

## SELF-EFF

SRL	0.864
	(0.080)
	10.863
Goal	0.874
	(0.087)
	10.030
Effort	0.920
	(0.077)
	11.984
Outcome	0.739
	(0.069)
	10.685

## Squared Multiple Correlations for Reduced Form

SRL	Goal	Effort	Outcome
0.415	0.339	0.476	0.303

## THETA-EPS

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.194					
	(0.016)					
	11.884					
Y2	-0.028	0.220				
	(0.013)	(0.018)				
	-2.170	12.447				
Y3	--	--	0.176			
			(0.015)			
			12.127			
Y4	--	--	--	0.199		
				(0.014)		
				13.997		

Y5	-0.028	--	-0.025	0.047	0.179
	(0.009)		(0.008)	(0.011)	(0.015)
	-3.169		-3.043	4.309	12.283
Y6	--	--	--	--	0.016 0.102
				(0.009)	(0.011)
				1.735	9.666
Y7	--	--	--	--	--
Y8	--	--	--	--	-0.019
				(0.007)	
				-2.572	
Y9	--	--	--	--	--

THETA-EPS

	Y7	Y8	Y9
-----	-----	-----	-----
Y7	0.114		
	(0.009)		
	12.284		
Y8	--	0.121	
		(0.010)	
		11.933	
Y9	--	-0.017	0.010
		(0.008)	
		-2.066	



Squared Multiple Correlations for Y - Variables

Y1	Y2	Y3	Y4	Y5	Y6
-----	-----	-----	-----	-----	-----
0.568	0.541	0.613	0.616	0.579	0.745

Squared Multiple Correlations for Y - Variables

Y7	Y8	Y9
-----	-----	-----
0.689	0.696	0.962

THETA-DELTA

X1
-----
0.089

Squared Multiple Correlations for X - Variables

X1
-----
0.570

## Log-likelihood Values

	Estimated Model	Saturated Model
Number of free parameters(t)	34	55
-2ln(L)	-3175.506	-3203.293
AIC (Akaike, 1974)*	-3107.506	-3093.293
BIC (Schwarz, 1978)*	-2952.769	-2842.983

\*LISREL uses  $AIC = 2t - 2\ln(L)$  and  $BIC = t\ln(N) - 2\ln(L)$

## Goodness-of-Fit Statistics

Degrees of Freedom for (C1)-(C2)	21
Maximum Likelihood Ratio Chi-Square (C1)	27.787 (P = 0.1463)
Browne's (1984) ADF Chi-Square (C2_NT)	27.412 (P = 0.1576)
Estimated Non-centrality Parameter (NCP)	6.787
90 Percent Confidence Interval for NCP	(0.0 ; 24.629)
Minimum Fit Function Value	0.0397
Population Discrepancy Function Value (F0)	0.00970
90 Percent Confidence Interval for F0	(0.0 ; 0.0352)
Root Mean Square Error of Approximation (RMSEA)	0.0215
90 Percent Confidence Interval for RMSEA	(0.0 ; 0.0409)
P-Value for Test of Close Fit (RMSEA < 0.05)	0.995
Expected Cross-Validation Index (ECVI)	0.137
90 Percent Confidence Interval for ECVI	(0.127 ; 0.162)
ECVI for Saturated Model	0.157
ECVI for Independence Model	5.041
Chi-Square for Independence Model (45 df)	3508.420
Normed Fit Index (NFI)	0.992
Non-Normed Fit Index (NNFI)	0.996
Parsimony Normed Fit Index (PNFI)	0.463
Comparative Fit Index (CFI)	0.998
Incremental Fit Index (IFI)	0.998
Relative Fit Index (RFI)	0.983
Critical N (CN)	980.367
Root Mean Square Residual (RMR)	0.00551
Standardized RMR	0.0148
Goodness of Fit Index (GFI)	0.992
Adjusted Goodness of Fit Index (AGFI)	0.978
Parsimony Goodness of Fit Index (PGFI)	0.379



## PATH ANALYSIS OF LEARNING OUTCOME MODEL

## Fitted Covariance Matrix

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.449					
Y2	0.230	0.480				
Y3	0.267	0.270	0.456			
Y4	0.200	0.202	0.209	0.519		
Y5	0.148	0.177	0.158	0.328	0.424	
Y6	0.194	0.195	0.203	0.310	0.287	0.402
Y7	0.178	0.179	0.186	0.262	0.229	0.253
Y8	0.186	0.187	0.194	0.274	0.240	0.246
Y9	0.129	0.130	0.135	0.135	0.118	0.131
X1	0.112	0.113	0.117	0.113	0.099	0.110

## Fitted Covariance Matrix

	Y7	Y8	Y9	X1
Y7	0.367			
Y8	0.264	0.397		
Y9	0.132	0.121	0.266	
X1	0.119	0.125	0.096	0.207

## Fitted Residuals

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.000					
Y2	0.002	0.000				
Y3	0.001	0.001	0.001			
Y4	0.004	0.005	0.007	0.000		
Y5	0.003	-0.012	-0.003	-0.001	-0.001	
Y6	0.003	-0.011	-0.010	0.002	0.001	0.001
Y7	0.002	-0.009	-0.006	0.002	0.007	0.003
Y8	0.011	0.012	0.008	-0.008	-0.007	-0.002
Y9	-0.004	0.003	-0.002	-0.001	0.002	0.001
X1	-0.014	0.005	0.003	-0.005	0.012	-0.001

## Fitted Residuals

	Y7	Y8	Y9	X1
Y7	0.000			
Y8	0.000	0.000		

Y9 -0.002 0.003 -0.001  
 X1 -0.007 0.006 -0.001 0.001

Summary Statistics for Fitted Residuals

Smallest Fitted Residual = -0.014

Median Fitted Residual = 0.001

Largest Fitted Residual = 0.012

Stemleaf Plot

- 1|4210

- 0|987765

- 0|43222111111000000

0|111111122223333334

0|556778

1|122

Standardized Residuals

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.012					
Y2	0.091	0.000				
Y3	0.050	0.049	0.027			
Y4	0.170	0.202	0.313	0.000		
Y5	0.188	-0.985	-0.135	-0.025	-0.030	
Y6	0.142	-0.646	-0.555	0.360	0.089	0.075
Y7	0.257	-0.526	--	0.091	0.410	0.229
Y8	0.443	0.768	0.452	-0.365	-0.571	-0.121
Y9	-0.262	--	-0.142	-0.096	0.169	0.055
X1	-0.933	0.376	0.166	-0.389	0.801	-0.090

Standardized Residuals

	Y7	Y8	Y9	X1
Y7	0.000			
Y8	-0.014	0.004		
Y9	-0.165	0.248	-0.097	
X1	-0.651	0.638	-0.105	0.146

Summary Statistics for Standardized Residuals

Smallest Standardized Residual = -0.985

Median Standardized Residual = 0.012

Largest Standardized Residual = 0.801

Stemleaf Plot

- 8|83  
 - 6|55  
 - 4|763  
 - 2|966  
 - 0|74320009331000000  
 0|135557999457779  
 2|0356168  
 4|145  
 6|47  
 8|0

PATH ANALYSIS OF LEARNING OUTCOME MODEL

Qplot of Standardized Residuals





## Expected Change for THETA-EPS

	Y7	Y8	Y9
Y7	--		
Y8	--	--	
Y9	--	--	--

## Completely Standardized Expected Change for THETA-EPS

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	--					
Y2	--	--				
Y3	0.006	-0.006	--			
Y4	-0.009	0.019	0.020	--		
Y5	--	-0.034	--	--	--	
Y6	0.015	-0.009	-0.023	0.043	--	--
Y7	0.008	-0.020	-0.005	0.001	0.024	0.011
Y8	0.011	0.028	0.001	-0.016	-0.030	--
Y9	-0.004	0.016	-0.010	-0.005	-0.006	0.011

## Completely Standardized Expected Change for THETA-EPS

	Y7	Y8	Y9
Y7	--		
Y8	--	--	
Y9	--	--	--

## Modification Indices for THETA-DELTA-EPS

	Y1	Y2	Y3	Y4	Y5	Y6
X1	5.513	0.346	1.635	1.916	5.251	0.135

## Modification Indices for THETA-DELTA-EPS

	Y7	Y8	Y9
X1	3.107	1.566	--

## Expected Change for THETA-DELTA-EPS

	Y1	Y2	Y3	Y4	Y5	Y6
X1	-0.019	0.005	0.010	-0.010	0.014	-0.002

## Expected Change for THETA-DELTA-EPS

	Y7	Y8	Y9

X1 -0.012 0.009 --

Completely Standardized Expected Change for THETA-DELTA-EPS

Y1 Y2 Y3 Y4 Y5 Y6

X1 -0.062 0.016 0.032 -0.029 0.048 -0.008

Completely Standardized Expected Change for THETA-DELTA-EPS

Y7 Y8 Y9

X1 -0.045 0.032 --

Modification Indices for THETA-DELTA

X1

0.845

Expected Change for THETA-DELTA

X1

0.034

Completely Standardized Expected Change for THETA-DELTA

X1

0.165

Maximum Modification Index is 9.31 for Element ( 8, 4) of LAMBDA-Y

PATH ANALYSIS OF LEARNING OUTCOME MODEL

Factor Scores Regressions

ETA

Y1 Y2 Y3 Y4 Y5 Y6

SRL	0.234	0.202	0.235	-0.003	0.085	0.026
Goal	0.037	0.021	0.036	0.145	0.110	0.338
Effort	0.020	0.013	0.020	0.060	0.044	0.175
Outcome	-0.001	0.000	-0.001	-0.011	-0.010	-0.006

ETA

Y7 Y8 Y9 X1

SRL	0.020	0.032	0.057	0.060
Goal	0.123	0.179	0.033	-0.010
Effort	0.230	0.265	0.072	0.074
Outcome	-0.033	0.101	0.949	-0.002

KSI	Y1	Y2	Y3	Y4	Y5	Y6
SELF-EFF	0.036	0.031	0.036	-0.007	0.007	0.004

KSI	Y7	Y8	Y9	X1
SELF-EFF	0.063	0.080	0.121	0.426

#### PATH ANALYSIS OF LEARNING OUTCOME MODEL

##### Standardized Solution

##### LAMBDA-Y

	SRL	Goal	Effort	Outcome
Y1	0.505	--	--	--
Y2	0.510	--	--	--
Y3	0.529	--	--	--
Y4	--	0.566	--	--
Y5	--	0.496	--	--
Y6	--	0.548	--	--
Y7	--	--	0.503	--
Y8	--	--	0.526	--
Y9	--	--	--	0.506

##### LAMBDA-X

##### SELF-EFF

X1	0.343
----	-------

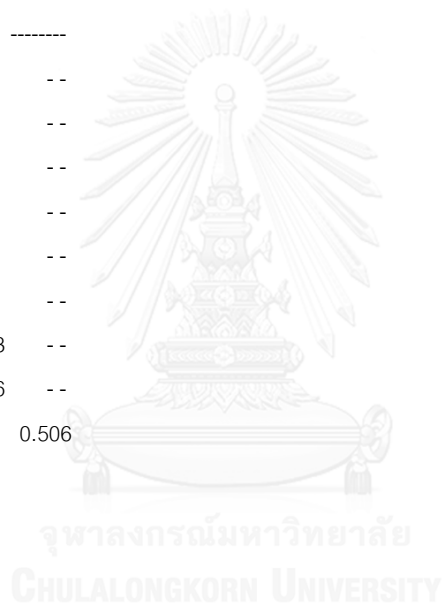
##### BETA

	SRL	Goal	Effort	Outcome
SRL	--	0.491	--	--
Goal	--	--	--	--
Effort	--	0.784	--	--
Outcome	0.177	0.002	0.177	--

##### GAMMA

##### SELF-EFF

SRL	0.358
Goal	0.582
Effort	0.233



Outcome 0.313

Correlation Matrix of ETA and KSI

	SRL	Goal	Effort	Outcome	SELF-EFF
SRL	1.000				
Goal	0.700	1.000			
Effort	0.699	0.920	1.000		
Outcome	0.504	0.471	0.518	1.000	
SELF-EFF	0.644	0.582	0.690	0.550	1.000

PSI

Note: This matrix is diagonal.

SRL	Goal	Effort	Outcome
-----	------	--------	---------

0.425	0.661	0.118	0.646
-------	-------	-------	-------

Regression Matrix ETA on KSI (Standardized)

SELF-EFF

SRL	0.644
Goal	0.582
Effort	0.690
Outcome	0.550

PATH ANALYSIS OF LEARNING OUTCOME MODEL

Completely Standardized Solution

LAMBDA-Y

	SRL	Goal	Effort	Outcome
Y1	0.754	--	--	--
Y2	0.736	--	--	--
Y3	0.783	--	--	--
Y4	--	0.785	--	--
Y5	--	0.761	--	--
Y6	--	0.863	--	--
Y7	--	--	0.830	--
Y8	--	--	0.834	--
Y9	--	--	--	0.981

LAMBDA-X

SELF-EFF

X1	0.755
----	-------



## BETA

	SRL	Goal	Effort	Outcome
SRL	--	0.491	--	--
Goal	--	--	--	--
Effort	--	0.784	--	--
Outcome	0.177	0.002	0.177	--

## GAMMA

## SELF-EFF

SRL	0.358
Goal	0.582
Effort	0.233
Outcome	0.313

## Correlation Matrix of ETA and KSI

	SRL	Goal	Effort	Outcome	SELF-EFF
SRL	1.000				
Goal	0.700	1.000			
Effort	0.699	0.920	1.000		
Outcome	0.504	0.471	0.518	1.000	
SELF-EFF	0.644	0.582	0.690	0.550	1.000

## PSI

Note: This matrix is diagonal.

	SRL	Goal	Effort	Outcome
	0.425	0.661	0.118	0.646

## THETA-EPS

	Y1	Y2	Y3	Y4	Y5	Y6
Y1	0.432					
Y2	-0.060	0.459				
Y3	--	--	0.387			
Y4	--	--	--	0.384		
Y5	-0.063	--	-0.057	0.101	0.421	
Y6	--	--	--	--	0.038	0.255
Y7	--	--	--	--	--	--
Y8	--	--	--	--	--	-0.047
Y9	--	--	--	--	--	--

## THETA-EPS

	Y7	Y8	Y9
Y7	0.311		
Y8	--	0.304	
Y9	--	-0.053	0.038

-----

Y7 0.311

Y8 -- 0.304

Y9 -- -0.053 0.038

## THETA-DELTA

X1

-----

0.430

## Regression Matrix ETA on KSI (Standardized)

SELF-EFF

-----

SRL 0.644

Goal 0.582

Effort 0.690

Outcome 0.550

## PATH ANALYSIS OF LEARNING OUTCOME MODEL

## Total and Indirect Effects

## Total Effects of KSI on ETA

SELF-EFF

-----

SRL 0.864

(0.079)

10.871

Goal 0.874

(0.087)

10.037

Effort 0.920

(0.077)

11.993

Outcome 0.739

(0.069)

10.693

## Indirect Effects of KSI on ETA

SELF-EFF

-----

SRL 0.383

(0.051)



7.461  
 Goal --  
 Effort 0.609  
 (0.066)  
 9.195  
 Outcome 0.319  
 (0.096)  
 3.311

Total Effects of ETA on ETA

	SRL	Goal	Effort	Outcome
SRL	--	0.439	--	--
		(0.052)		
		8.402		
Goal	--	--	--	--
Effort	--	0.697	--	--
		(0.048)		
		14.411		
Outcome	0.177	0.204	0.178	--
	(0.071)	(0.051)	(0.248)	
	2.494	4.030	0.720	

Largest Eigenvalue of B\*B' (Stability Index) is 0.678

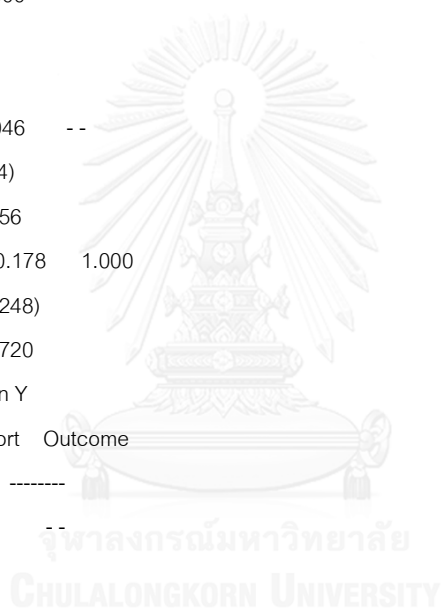
Indirect Effects of ETA on ETA

	SRL	Goal	Effort	Outcome
SRL	--	--	--	--
Goal	--	--	--	--
Effort	--	--	--	--
Outcome	--	0.202	--	--
		(0.183)		
		1.103		

Total Effects of ETA on Y

	SRL	Goal	Effort	Outcome
Y1	1.000	0.439	--	--
		(0.052)		
		8.402		
Y2	1.009	0.443	--	--
	(0.060)	(0.053)		

	16.746	8.365		
Y3	1.047	0.459	--	--
	(0.062)	(0.055)		
	17.000	8.415		
Y4	--	1.000	--	--
Y5	--	0.876	--	--
	(0.039)			
	22.415			
Y6	--	0.968	--	--
	(0.043)			
	22.388			
Y7	--	0.697	1.000	--
	(0.048)			
	14.411			
Y8	--	0.729	1.046	--
	(0.053)	(0.044)		
	13.849	23.756		
Y9	0.177	0.204	0.178	1.000
	(0.071)	(0.051)	(0.248)	
	2.494	4.030	0.720	
Indirect Effects of ETA on Y				
	SRL	Goal	Effort	Outcome
	-----	-----	-----	-----
Y1	--	0.439	--	--
	(0.052)			
	8.402			
Y2	--	0.443	--	--
	(0.053)			
	8.365			
Y3	--	0.459	--	--
	(0.055)			
	8.415			
Y4	--	--	--	--
Y5	--	--	--	--
Y6	--	--	--	--
Y7	--	0.697	--	--
	(0.048)			
	14.411			



Y8	--	0.729	--	--
		(0.053)		
		13.849		
Y9	0.177	0.204	0.178	--
	(0.071)	(0.051)	(0.248)	
	2.494	4.030	0.720	

Total Effects of KSI on Y

SELF-EFF

-----

Y1	0.864
	(0.079)
	10.871
Y2	0.872
	(0.081)
	10.752
Y3	0.904
	(0.083)
	10.897
Y4	0.874
	(0.087)
	10.037
Y5	0.766
	(0.077)
	9.929
Y6	0.846
	(0.082)
	10.339
Y7	0.920
	(0.077)
	11.993
Y8	0.962
	(0.080)
	12.067
Y9	0.739
	(0.069)
	10.693



## PATH ANALYSIS OF LEARNING OUTCOME MODEL

## Standardized Total and Indirect Effects

## Standardized Total Effects of KSI on ETA

SELF-EFF

-----

SRL 0.644

Goal 0.582

Effort 0.690

Outcome 0.550

## Standardized Indirect Effects of KSI on ETA

SELF-EFF

-----

SRL 0.286

Goal --

Effort 0.457

Outcome 0.237

## Standardized Total Effects of ETA on ETA

SRL Goal Effort Outcome

-----

SRL -- 0.491 -- --

Goal -- -- -- --

Effort -- 0.784 -- --

Outcome 0.177 0.228 0.177 --

## Standardized Indirect Effects of ETA on ETA

SRL Goal Effort Outcome

-----

SRL -- -- -- --

Goal -- -- -- --

Effort -- -- -- --

Outcome -- 0.226 -- --

## Standardized Total Effects of ETA on Y

SRL Goal Effort Outcome

-----

Y1 0.505 0.248 -- --

Y2 0.510 0.250 -- --

Y3 0.529 0.260 -- --

Y4 -- 0.566 -- --

Y5 -- 0.496 -- --

Y6 -- 0.548 -- --

Y7	--	0.394	0.503	--
Y8	--	0.412	0.526	--
Y9	0.090	0.115	0.090	0.506

## Completely Standardized Total Effects of ETA on Y

	SRL	Goal	Effort	Outcome
Y1	0.754	0.370	--	--
Y2	0.736	0.361	--	--
Y3	0.783	0.385	--	--
Y4	--	0.785	--	--
Y5	--	0.761	--	--
Y6	--	0.863	--	--
Y7	--	0.651	0.830	--
Y8	--	0.654	0.834	--
Y9	0.174	0.223	0.174	0.981

## Standardized Indirect Effects of ETA on Y

	SRL	Goal	Effort	Outcome
Y1	--	0.248	--	--
Y2	--	0.250	--	--
Y3	--	0.260	--	--
Y4	--	--	--	--
Y5	--	--	--	--
Y6	--	--	--	--
Y7	--	0.394	--	--
Y8	--	0.412	--	--
Y9	0.090	0.115	0.090	--

## Completely Standardized Indirect Effects of ETA on Y

	SRL	Goal	Effort	Outcome
Y1	--	0.370	--	--
Y2	--	0.361	--	--
Y3	--	0.385	--	--
Y4	--	--	--	--
Y5	--	--	--	--
Y6	--	--	--	--
Y7	--	0.651	--	--
Y8	--	0.654	--	--
Y9	0.174	0.223	0.174	--

## Standardized Total Effects of KSI on Y

SELF-EFF

-----

Y1	0.326
Y2	0.329
Y3	0.341
Y4	0.329
Y5	0.289
Y6	0.319
Y7	0.347
Y8	0.363
Y9	0.279

## Completely Standardized Total Effects of KSI on Y

SELF-EFF

-----

Y1	0.486
Y2	0.474
Y3	0.505
Y4	0.457
Y5	0.443
Y6	0.503
Y7	0.572
Y8	0.576
Y9	0.540



จุฬาลงกรณ์มหาวิทยาลัย  
CHULALONGKORN UNIVERSITY

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## VITA

Mr. Bunheang Chhar was born on 09 October, 1987 in Kompong Thom province where he spent his high school life there. After graduation in 2005, Mr. Bunheang Chhar has received a scholarship from Royal Government of Cambodia to study at Royal University of Phnom Penh majoring in Sociology and at the same time he also pursued a Bachelor of Education in Teaching English as The Second Language (TESOL). Bunheang Chhar is a college student who is working towards becoming a social researcher and will be graduating with a master degree in Educational Research Methodology, at Chulalongkorn University.

