Metacognitive awareness, procrastination and academic performance of university students in Hong Kong

Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

at the University of Leicester

by

Brian Shing-chi Wong

ABSTRACT

Metacognitive awareness, procrastination and academic performance of university students in Hong Kong.

by Brian Shing-Chi Wong

Academic performance has long been the focus of educational research. There are so many factors that can affect the results of the academic performance of a student. This study focuses on how university students in Hong Kong self-regulate their academic learning. Two factors were investigated for their self-regulation: the use of metacognitive skills and the punctuality for learning. Three hundred and fourteen students from two universities participated in this study by filling out a self-administered questionnaire, which consists of three instruments measuring metacognitive awareness, procrastination, and academic performance. The results show that 'high metacognitive awareness' and 'low procrastination tendency' are two positive elements for academic learning. For analysis purposes, the data were divided into four categories by using the mean scores of each variable: students with high level of metacognitive awareness and high level of procrastination; students with low level of metacognitive awareness and low level of procrastination; students with high level of metacognitive awareness but low level of procrastination; students with low level of metacognitive awareness but high level of procrastination. The results show that the students without any of these positive elements are significantly lower in G.P.A. than students from the other three groups; however, it is surprising to find that the students who have two positive elements do not get a higher G.P.A. than those who have only one of these positive elements.

ACKNOWLEDGEMENTS

I would like to express my gratitude to my supervisor, Professor Paul Cooper of the University of Leicester, who has inspired me in research and given me very useful advice for this study. I would also like to thank my wife, Ivy, and one of my best friends, Roger To, for their help in the questionnaire distribution and collection. Roger also spent his valuable time on proofreading for me. For the use of MAI, I want to express my gratitude to Dr. Gregory Schraw of University of Nebraska-Lincoln, who responded my email promptly upon my request for the instrument and its scoring method. Without his help, the analysis part would not be possible. Last but not least, I would also like to thank The Hong Kong Polytechnic University and The University of Hong Kong for allowing me to collect my data on their campuses.

Key Words: Learning, Academic Performance, Self-regulated Learning, Metacognition, Metacognitive Awareness, Academic Procrastination.

Thesis Title: Metacognitive awareness, procrastination and academic performance of university students in Hong Kong.

List of Contents

List of tables and diagrams

Abbreviations

G.P.A.	**Grade Point Average**
API	**Aitken Procrastination Inventory**
MAI	**Metacognitive Awareness Inventory**
K of Cog	**Knowledge of Cognition**
R of Cog	**Regulation of Cognition**
DK	**Declarative Knowledge**
PK	**Procedural Knowledge**
CK	**Conditional Knowledge**
P	**Planning**
IMS	**Information Management Strategies**
CM	**Comprehension Monitoring**
DS	**Debugging Strategies**
E	**Evaluation**

Glossary

The conceptual definitions are given as follows, while operational definitions of some variables will be given in chapter 3.

Academic Learning

Permanent change of mental state as a result of the personal, vicarious, and social experiences with a learning structure and culture.

Academic performance

The final results of a student's academic learning.

Self-regulated learning

The learning process, in which the learners can manage its learning metacognitively and behaviourally.

Autonomous learner

A learner who can takes control of his/her learning, including the selection of learning materials and self-regulating his/ her own learning.

Metacognition:

A learner's awareness of his/her own cognition: the ability to reflect upon, understand and control one's own thinking.

Metacognitive Awareness:

Metacognitive awareness is the measurement of one's metacognition. Metacognitive awareness consists of two components: Knowledge of Cognition and Regulation of Cognition. Knowledge of cognition includes three sub-scales: declarative knowledge, procedural knowledge, and conditional knowledge. Regulation of cognition includes five sub-scales: planning, information management strategies, comprehension monitoring, debugging strategies and evaluation. It is used interchangeably with metacognition in this study.

Procrastination

The delay of a task until it has passed the optimal time.

Procrastination tendency

A tendency to delay tasks until they have passed the optimal time. In this study, it is also used as the measurement of trait procrastination, and used interchangeably with procrastination.

Academic Procrastination

The delay of academic responsibilities: such as the delay of submission of schoolwork or a delay of preparation for tests or examinations.

CHAPTER 1: INTRODUCTION

BACKGROUND OF THE STUDY

In 19th Century, students who failed in school were considered to be unintelligent or lazy, which implied that there was a lack of personal ability or diligence (Zimmerman, 2002). They were expected to overcome these two shortcomings in order to succeed in school. From the time when the disciplines of educational psychology and cognitive science came into being, a lot of research on learning behaviour has been conducted, trying to find out factors that affect the success of learning. In 1970's, the research on metacognition and self-regulated learning began, and people started to believe that learner's metacognition and social cognition instead of intelligence are the factors that lead to learning differences (Zimmerman, 2002). Metacognition is different from intelligence, and research (Veenman et al, 2006) shows that metacognition accounts for a higher percentage of variance in learning than intelligence does. Metacognition is a term coined by Flavell (1976; 1979) to refer to the learner's awareness of their own thinking and learning processes, which is a higher order of cognition to oversee one's own thinking. Many studies (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008) show that metacognition is significantly correlated to academic success.

However, being metacognitively aware of one's own cognition does not necessarily lead to action. Some students with high level of metacognitive awareness may not be able to take action to complete their academic responsibilities on time. If they cannot complete their studies before examinations, it is reasonable to believe that their academic

performance will be affected. Being to motivate oneself to work on time is an important part of self-regulated behaviour. For higher education, such as the ones in universities, students need to set plans for themselves and achieve their academic goals before the deadlines if they want to succeed. As a result, academic procrastination has also become an interesting topic among psychologists and educators. Researchers have begun to investigate what factors lead to procrastination and how students can become an autonomous learner, who can achieve his/her academic goals without being urged by others. Starting from 1990's, more and more researchers have recognized that metacognitive strategy acquisition alone cannot guarantee improvement in learning, as how to motivate the learners to use the strategies they learnt is even more important (Lau and Chan, 2003). How learners motivate themselves to take action for learning without delay involves self-regulated learning activities.

Self-regulated learning behaviour is considered to be a very important factor related to the success of academic learning (Zimmerman, 1986), especially in a learning environment where self-reliance is essential, such as college education. Self-regulated learning or autonomous learning activities involve at least two factors, cognition and action. Cognitive activities entail processes of thinking; while action entails activities of learning. If a learner thinks but never takes action to accomplish the learning activities, there will not be any successful academic learning. This paper focuses on two factors: metacognition, a higher order of cognitive activities, and procrastination, a behaviour that is related to action taken by learners.

Most of the studies of metacognition and procrastination in the past were conducted in western countries. A question has arisen on whether these two variables are universal or culture-bound. Some researchers (Chan, 1996) posit that traditional Chinese culture

makes teaching and learning in Hong Kong exam-oriented, and therefore rote learning dominates the learning strategies among Hong Kong students. Furthermore, some other investigators (Thomas, 2006) contend that learning environment in local schools in Hong Kong reflects the Confucian-Heritage Culture. Thomas (2006) posits that Confucian-Heritage Culture emphasises memorization, and the concept of filial piety deters students from challenging the authorities. Although the above investigators contend that Confucian-Heritage Culture put emphasis on memorisation, some others (Kim, 2003) contend that Confucius' learning theories put emphasis on thinking and higher levels of thinking. Successful learners from Confucian-Heritage Culture will increase the use of different metacognitive strategies when facing difficult materials (Kim, 2003). Using Confucian-Heritage Culture and non-Confucian-Heritage Culture dichotomy may not be appropriate for Hong Kong culture, as Hong Kong has been a British colony for one hundred years and it has been westernised. Some researchers (Lee, 2003) postulate that cultures are not static, as they change and move forward. Some investigators (Lau and Chan, 2003) posit that metacognition is universal and it applies to learners from all cultures. No matter whether Hong Kong's culture is a unique one, the present study will help to add pieces to the jigsaw of this branch of learning, and it will be helpful for the practice of teaching in Hong Kong.

Now more and more studies on metacognition can be seen in Hong Kong. In 1999, Jegede et al (1999) did a study on metacognition of students studying in the Open University in Hong Kong. In 2005, Thomas and Mee (2005) did a study on metacognition in primary schools in Hong Kong. In 2007, Mok et al (2007) did a study on 8,948 students from 12 primary and 12 secondary government-aided schools in Hong Kong for metacognition research. Downing et al (2008) did a study on the use of metacognition

among the university students in the City University of Hong Kong. More studies have been done about Hong Kong students' use of metacognition since then (Downing, 2009; Downing et al, 2009; Downing, 2010). The details of the literature will be discussed in Chapter 2. As for the issue of academic procrastination, not many studies have been found to investigate procrastination tendency or habits of the university students in Hong Kong, and very few studies have been done on the relationships among metacognition, procrastination and academic performance of Hong Kong students. The present study focuses on the academic performance of the university students in Hong Kong, and how these two factors of self-regulation: metacognition and procrastination affect the performance of the university students.

THE RESEARCH PROBLEM

Many studies (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008) indicate that metacognition is positively related to academic performance, and plenty of studies (Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001) show that procrastination is negatively correlated to academic performance. Since metacognition is positively related to academic success, it is reasonable to believe that students who can be admitted to university are higher in metacognitive skills than those who cannot go to university. However, studies (Solomon and Rothblum, 1984; Orellana-Damacela et al, 2000; Knaus, 2000) show that the many university students consider themselves as procrastinators. Even among PhD students, procrastination is a serious problem (Kearns et al, 2008). In contrast to metacognition, procrastination is negatively correlated to academic success. We would then ask a question: 'What happens to the academic

performance of these procrastinators who are supposed to have high levels of metacognition?' There is a discrepancy that we need to address. Can there be successful academic learners who have low level of metacognition? What makes learners who have a high level of metacognition procrastinate? Is there a relationship between academic performance and the level of metacognition and the level of procrastination tendency? Plenty of studies have been done on these two variables respectively; however, research done on these two variables simultaneously is scanty (Wolters, 2003). The present study is intended to help understand more about the relationship of these two variables: metacognition and procrastination, and how they affect the academic performance of students when working together.

SIGNIFICANCE OF THE STUDY

The main purpose of all educational research, either implicitly or explicitly, is to improve learning. To be a successful learner, one should be able to acquire knowledge, transfer and make use of the acquired knowledge. To achieve these goals, learners need to be able to think and be able to understand their own thinking. For academic learning, learners have to acquire the required knowledge before their examinations, and acquire knowledge in order to complete their assignments before a deadline; therefore, timing is another essential factor for academic success in university. While the use of metacognitive strategies can help learners to be aware of their own learning processes, academic procrastination will lead to incomplete academic work or unprepared examinations. Hence, These two factors are vital for academic success, especially in university education, where higher levels of cognition is necessary and the deadlines are

not as evident as those in secondary schools. Since not many studies have been done on the combination of these two variables, this study will make some contribution to the literature on the two self-regulated factors. On the other hand, the samples used here are some university students in Hong Kong, and it will help gain an insight into the impact of metacognition and procrastination on academic performance of university students in Hong Kong.

If my hypothesis is true that learners with a combination of low level of metacognitive awareness and high of procrastination can lead to poor academic performance; then, more research should be done on helping learners eliminate their habit of procrastination and raise their metacognitive awareness at the same time.

AIMS, OBJECTIVES AND HYPOTHESES

Aims

To find out the relationships among metacognitive awareness, procrastination and academic performance of the university students in Hong Kong.

Objectives

(1) Find out the relation between academic performance and procrastination of university students.

(2) Find out the relation between academic performance and metacognitive awareness of university students.

(3) Find out the relation between metacognitive awareness and

procrastination of university students.

(4) Find out how the combination of different levels of metacognitive awareness and procrastination affect the academic performance of university students.

Hypotheses

Based on my objectives, the following hypotheses have been developed. The details of the hypotheses and the operational definitions of all variables will be discussed in Chapter 3.

Null Hypothesis:

There are no relationships among these three variables: metacognitive awareness, procrastination, and academic performance.

Alternative Hypotheses:

1) Academic performance of a learner is negatively related to his/her level of procrastination.
2) Academic performance of a learner is positively related to his/her metacognitive awareness.
3) Metacognitive awareness of a learner is negatively related to his/her level of procrastination.
4) Learners with a high level of metacognitive awareness and a high level of procrastination will have a higher-than-average academic performance.
5) Learners with low a level of metacognitive awareness and a low level of procrastination will have a higher-than-average academic

performance.

6) Learners with a high level of metacognitive awareness but a low level of procrastination will have a higher-than-average academic performance.
7) Learners with a low level of metacognitive awareness but a high level of procrastination will a have lower-than-average academic performance.

OVERVIEW OF THE THESIS

The thesis is divided into 5 chapters. This chapter is an overview of the thesis, and the aims for the present study. Chapter 2 is the literature review and the conceptual framework for this study. It is divided into three parts. Part A is about learning and academic performance; then followed by the discussion of the relationships among university study, autonomous learning and self-regulated learning. Part B is about metacognition and academic performance. Part C is about procrastination and academic performance. The conceptual framework of the present study will be presented at the end of this chapter. Chapter 3 is about paradigm, research design, aims, objectives, hypotheses, and operational definitions of all variables concerned. It then tells the procedures for data collection and methods of analysis. Ethical issues will then be discussed and followed by a statement of limitations of the methodology. Chapter 4 is about the findings and analysis. It displays the data found in the study in the forms of tables and texts. Cronbach's Alpha of all instruments and their sub-components are shown in this chapter. In the analysis part, it explains the results of the findings and

connects them to the hypotheses. Chapter 5 is the discussion and conclusion part of the thesis. The relations between the findings and the hypotheses and objectives will be discussed here. The findings will also be discussed in relation to the literature. It also gives recommendations for further research on the related topics.

DELIMITATIONS OF THE STUDY

Although data collection processes were arranged near the main entrances of both universities to enhance the chance of students being chosen equally for the study, the samples for the present study cannot be considered as random samples. The data were collected only from two universities in Hong Kong. Furthermore, the samples did not include year-1 students because year-one students did not have their G.P.A. in the first school term. Therefore, this study may not be able to reflect the whole picture of the population of all university students in Hong Kong. On the other hand, all instruments were self-administered questionnaires, and there was no triangulation to check the demographic data and G.P.A.

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

INTRODUCTION

The focus of this study is the academic performance of the university students in Hong Kong. The dependent variable is the academic performance, and the independent variables are metacognition and procrastination. In this Chapter, literature on these three variables will be explored. Part A of this chapter focuses on the literature about the nature of academic learning and academic performance in university, the importance of autonomy, and self-regulated learning skills. Part B focuses on the literature of metacognition, the relation between metacognition and academic performance in university, and the literature about metacognition training in order to improve academic performance. Part C focuses on the literature of the relationship between procrastination and academic performance in university, followed by the literature of the treatments for academic procrastination. The conceptual framework for the present study will be presented here at the end of this chapter.

PART A SELF-REGULATED LEARNING AND ACADEMIC PERFORMANCE

Academic learning in university is different from that in secondary schools because it needs more autonomy in the learning processes. Students need to choose their own classes to attend, plan their schedules, and pace themselves for their own learning. Academic performance is the result of their academic learning. Academic learning is a special kind of learning with formal educational context. Before talking about academic learning, learning and successful learning will first be defined.

Learning and successful learning

Definition of learning

Learning takes place every day, but it is not easy to give a definition to learning, as researchers have tried to explain it from different perspectives, and traditionally it was dominated by behavioural framework and it focused on animals and simple learning (Shuell, 1986). Hergenhahn and Olson (2005) suggest that the definition from Kimble (1961) is the most popular definition. It states that learning is a relatively permanent change in behavioural potentiality, as a result of reinforced practice.

However, there are still different opinions from different theorists. As a result, there are different definitions for the construct of learning. According to Schunk (2009), there are four major theories of learning and therefore there are four most common definitions of learning: Conditioning theories, Social cognitive theories, Cognitive information processing theories, and Constructivist theories. Conditioning theorists

posit that learning is an enduring change in behaviour because of re-enforcement, either self-re-enforcement or external re-enforcement. This change of behaviour is not the result of biological maturity, but the result of the interaction between the learners and their environments (Schunk, 2009). Social Cognitive theorists contend that learning is an enduring change in behaviour or the capacity in behaviour. This change of behaviour is the result of doing something by oneself or by observing the others who do it. From the Social Cognitivist point of view, re-enforcement is not essential for the change of behaviour but it is an important incentive for learning (Schunk, 2009). Cognitive Information Processing theorists posit that learning is the formation of information networks in memory. The processes of learning involve organisation, elaboration, rehearsal etc. (Schunk, 2009). Constructivist theories seem to be the combination of Social Cognitive theories and Cognitive Information Process theories, and this school of theories contends that learning is a process in which learners take in information from the environment and interpret it by the learners themselves, which is affected by the personal and social experiences of the learners (Schunk, 2009). By comparing these four categories, I would contend that there are two approaches for the definition of learning. One is behaviourist approach, and another is cognitivist approach. Behaviourists put emphasis on the change of observable behaviour while Cognitivists consider the change of the mental state, and the potential of the change of behaviour. From the Behaviourists' point of view, learning should be a relatively permanent change of behaviour as a result of one's own experience (Terry, 2000). Cognitivists think that some learning behaviour cannot be observed and therefore do not show a change of behaviour when the learning processes take place, although the change of behaviour may be observed in the later days. Hence, the Cognitivists define learning as a relatively permanent change of mental

association, either by self-experiences or vicarious experiences (Ormrod, 1995). When a learner reads a book, there is a permanent change of mental association, even though there may not be an immediate observable change of behaviour. Schunk (2009) defines learning as an enduring change of behaviour or a change in the capacity that will enable the learner to behave in a particular way in the future, as a result of practice or other forms of behaviour. This definition is very similar to the definition from Kimble (1961).

According to Schunk (2008), learning theories shifted from the traditional conditional theories to cognition theories in 1960s. Since then, the focus of the research on learning theories has been changed from environmental factors to humans themselves, and human as a learner becomes the focus of learning (Schunk, 2008).

By these definitions, we can see that there are some elements included. Firstly, there is a change of behaviour or a change of mental association, which will enable the learners to change their behaviour in the future. Secondly, the change is an enduring or a relatively permanent change, so that we can exclude all temporary change of behaviour as learning, such as the abnormal behaviour after taking drugs or uncontrollable behaviour when one is too tired. Thirdly, this change of behaviour or capacity is the result of practice, personal experiences, or vicarious experiences, not because of biological reasons, such as maturity. In this study, the cognitivist definition is adopted: Learning is the permanent change of mental state as a result of personal experiences, social experiences or vicarious experiences (Ormrod, 1995; Schunk, 2009).

Successful learning

According to this definition, if a learner reads a number and can remember it only for a few seconds and then forget it and cannot recall it at all, it is not considered as a successful learning process, because the information has not been put into the permanent memory of the learners and does not cause a permanent mental change. However, in a case that a learner reads a book and remembers it for one week, passes an examination, and then forgets everything, it is still considered as a successful learning process from the cognitivist point of view, even though many people may not agree that this learner is a successful learner. The learning process has changed the mental state of that learner permanently; otherwise, he/she would not be able to pass! Although he/she has no strategies to retrieve it after the exam, it cannot be denied that learning processes had happened before the exam.

Academic learning and academic performance

Academic learning

Academic learning is different from learning in general in the way that academic learning is not just the permanent change of mental state, it needs successful retrieval, transfer of knowledge and problem solving, and it is context-related. In the literature about 'learning', academic learning has been the focus of research in many studies, but not many investigators have given a definition to the term 'academic learning'. Some investigators (Thomas and Rohwer, 1986) use the term 'academic studying'. Thomas and Rohwer (1986) contend that there are some characteristics of academic studying. Firstly, it is a form of effortful academic cognition. Learning process itself can be painful, and

learners need to give up some tempting activities. Secondly, it is an individual activity. Some learning activities may seem to happen in the classroom, but learners need to encode the relevant materials into their mind in order to learn. These activities are basically individual learning. Thirdly, it needs both skills and will power to master the knowledge acquired. Fourthly, it is context dependent.

Some other investigators (Winne and Hadwin, 1998) use the term 'studying'. Winne and Hadwin (1998) contend that the topic of 'studying' has been the focus of research for a century. Studying is different from learning in general, Winne and Hadwin (1998) postulate that studying has the following features and they call these six features as metacognitively powered self-regulated learning:

1) Rarely involve teachers' intervention.
2) Mainly individual activities, although peer support may occasionally take place.
3) Goals set by teachers and
4) Involving searching and synthesising information.
5) Students choose their own learning environment.
6) Produce observable evidence of cognitive processes, such as notes, highlighted text etc.

Although these investigators contend that academic learning is mainly an individual activity, academic learning actually is not an isolated activity. Academic learning occurs in the interaction between the readers and the writers. Schunk (2009) contends that such independent learning is socially mediated. The learners need to encode materials written by others, which is a social interaction. This individual learning does not contradict the contemporary social learning theories. Vygotsky (1978) postulates that language is the main tool for learning, and reading can be considered as a social interaction between the

readers and the writers. Learning by reading is also consistent with Bruner's theory (1964) about Symbolic Representation, as language is a set of symbols for communication and learning. Since academic learning in university involves more difficult concepts and needs higher levels of cognitive activities, and it should be in the stage of Formal Operation of Piaget's theory (1964) of learning.

Since academic learning has its own characteristics, it needs to be defined for the present study. By reading the literature about academic learning (e.g. Thomas and Rohwer, 1986; Winne and Hadwin, 1998; Schunk, 2009) and observing the experiences of primary schools, secondary schools, and universities in learning, I would contend that academic learning involves the following:

1) Vicarious experiences, such as reading, listening to lectures.
2) Personal experiences, such as doing experiments, doing homework
3) Social experiences, such as discussing with peers, taking part in extra-curricular activities.
4) Some constraints on learning structures – such as curriculum or syllabus etc., the requirements set by the teachers, or deadlines for assignments and examinations.
5) School cultures and environments – such as active learning or passive learning etc.

Academic learning is different from 'learning in general' in the way that most of the academic learning activities take place in the form of vicarious learning, i.e. it is through the experiences or knowledge of others that printed on the books (or electronic resources). These indirect learning processes are unlikely to be explained by the traditional conditioning theories. Vicarious learning, such as reading and attending classes, accounts for most of the academic learning activities in university, although knowledge from

personal experiences, such as doing experiments, is also an important source. Since most academic learning activities in university involve vicarious experiences, being successful in vicarious learning is very important.

Other than vicarious learning, personal experiences and social experiences are also important parts in learning. Learners use language to communicate and learn; they use self-talk and personal experiences to help themselves understand their own learning processes (Vygotsky, 1978). On the other hand, social experiences help them scaffold their learning (Vygotsky, 1978). Learning structures, such as curriculum, also decide what students should learn (Glatthorn et al, 2009), whereas school cultures decide how students learn (Hollins, 2008). Although this definition may not be exhaustive and precise, it is helpful for the present study. Therefore, in this study, academic learning is defined as 'the enduring or permanent change of mental state as a result of the personal, vicarious, and social experiences with a learning structure and culture'.

Academic performance

Academic performance is the results of academic learning activities. It is also one of the main motivations that make students learn. However, some learners spend long hours studying, but their academic performance does not seem to be as good as some other learners who spend less time on their academic work, because their learning is not effective.

Three factors have to be considered if academic learning is to be successful:

1) Do the students want to learn?
2) Do the students know how to learn?
3) Do the students take action to learn?

In order to optimise their academic performance, learners need to be proactive rather than simply reactive in the learning processes (Lindner and Harris, 1992). Proactive means the learners want to learn and take action to learn, whereas reactive is to receive information passively and do not take action for learning activities unless they are prompted or urged to do so. Nevertheless, if a learner has the capability of acquiring new information but does not want to do it, learning processes still do not happen. Thus, learning is a result of many factors, not just the cognitive elements. It entails 'affect' elements, such as motivation (Ames, 1992). If one learner starts learning after being urged, and another learner is willing to learn without being prompted, it is reasonable to believe that the latter will spend more time on learning than the former if other variables are the same.

If the learners are motivated, they will use different mental strategies to achieve these learning goals if they know these strategies. These mental strategies are called cognitive strategies and metacognitive strategies. Cognitive strategies and metacognitive strategies will be discussed in part B of this chapter.

Once the learners acquired these strategies, they have to make a decision whether to take action. If they do not take action to learn, academic learning will not happen, and academic performance will be poor. Therefore, not to procrastinate in learning is an important factor for academic success. Academic procrastination will be discussed in part C of this chapter.

Willing to learn and knowing how to learn are two factors for successful academic learning. Some investigators (Zimmerman and Martinez-Pons, 1990) call it self-regulated learning. Zimmerman (1986) posits that self-regulated learners are those who learn metacognitively, motivationally, and behaviourally.

In order to be successful for academic learning, the learners need to acquire some self-regulated skills, which in fact are the basic skills for learning (Resnick and Klopfer, 1989). These skills will be discussed in the following sections of this Chapter. Veenman et al (2004) posit that good learners should possess general metacognitive skills. They can motivate themselves for learning activities, such as planning, analysing, checking their results. Therefore, a good learner should be one who is capable in using cognitive and metacognitive skills and who is willing to do it without being urged by other people. In other words, a good learner is one who is an autonomous and self-regulated learner, and, as a result, he/she will have good academic performance. In order to be a self-regulated learner, one should take control of his/her own learning. This is the construct of autonomy in learning (Boud, 1988). The following section will discuss autonomy in learning.

Learning Autonomy in university

Learning in university is different from that in secondary schools. Students need to choose their own courses and majors. They need to plan their own schedules for learning, seeing their tutors, and meeting deadlines for term papers. In some large courses, their teachers may not even recognise them. Under this new learning environment, making decision for learning becomes very important. Active engagement in the learning processes becomes necessary if they want to have good academic performance. Research (Ames, 1984) shows that active engagement in the learning processes helps improve academic performance of the learners. If learners only passively receive information the teachers impart, they will never learn more than what the teachers teach. If the learners

do not plan their learning, they are unlikely to achieve their goals in good quality and on time. If they do not check whether they understand, they may mistakenly over-estimate their learning. If they do not actively seek help when needed, they will not be able to solve some problems when resources are not available. This active engagement should include how to motivate oneself to learn, how to use different strategies to learn different materials, and how to seek help when necessary. In short, active learning requires learners to engage in meaningful learning activities and reflect what they are doing (Prince, 2004). This active engagement entails autonomy in learning. Although there's plenty of literature on learner autonomy, there is no general consensus on what it implies (Raya and Fernandez, 2002). For the construct of autonomy, researchers give different definitions. Holec (1981) defines autonomy in learning as 'the ability to take charge of one's own learning'. 'To take charge of' here means to determine learning goals or objectives, select methods for learning, monitor the learning processes, and evaluate the results or performance. Boud (1988) sees 'autonomy in learning' from three perspectives. Firstly, it refers to the behaviour in which the learners make their own decision about what they want to learn and how they learn. Secondly, instead of the behaviour, it refers to the learners' decisions on what they should learn and how they should do it. Thirdly, it is an educational approach in which the learners are trained to develop their own ability and attitude in learning, so that they can learn independently (Boud, 1988). Raya and Fernandez (2002) suggest that autonomy should be a continual transition from teacher-controlled learning to learner-controlled learning. Autonomous learners should be able to identify learning needs, choose strategies, monitor the learning processes and self-assess their own performance. Remmert (1997) believes that autonomy in learning should be perceived as a process, not as a state that can be completed once and for all.

When we talk about learning independently, which means the learners know how to plan and accomplish their learning by themselves. Autonomy should not be interpreted as being an isolated activity. Little (1995) posits that autonomous learners should be interdependent and not autism. Cotterall (1995) defines autonomy in learning as 'the extent to which learners demonstrate the ability to use a set of tactics for taking control of their learning'. Benson (2001) suggests three hypotheses about autonomous learning: Firstly, all people have a tendency and ability in some degree to take control of their own learning. Secondly, this ability of autonomous learning can be trained or fostered. Thirdly, autonomous learning is more effective than traditional classroom learning (Benson, 2001).

From all these opinions, we can get a better picture of autonomous learning. I would contend that it has the following attributes:

1) A learner's capacity to take control of his/her learning. It includes setting objectives, monitoring the learning processes, and evaluating the performance or outcomes.
2) It is a continuous process, not a state.
3) It is an independent activity, but not an isolated activity.
4) It is a capacity or a set of tactics that can be fostered and learnt.

In order to take control of one's own learning, one should know what to learn, how to learn, and be able to evaluate his/her own performance (Holec, 1981; Crabbe, 1993). Studies (Boud, 1988; Holec, 1981; Eccles et al, 1993; Pintrich and Schunk, 2002;) show that promoting academic autonomy can encourage the use of various strategies, which will help learners take charge of their own learning. In order to take charge of one's own learning and become a successful learner, one should learn self-regulating skills.

Self-regulated learning in university

The construct of self-regulated learning seems similar to autonomy in learning, but has been conceptualised clearly by some investigators (Zimmerman, 1986; Zimmerman, 1989; Zimmerman and Martinez-Pons, 1990).

Definition of self-regulated learning

Schraw et al (2006) posit that self-regulated learning is the ability of learners to understand and control learning environment. However, Zimmerman (2002) contends that self-regulation is not a kind of mental ability but a self-directive process by which they will acquire their academic skills. Self-regulated learning is believed to be a proactive process instead of an interactive process (Zimmerman, 2002). Self-regulated learning skills are the skills that help the learners motivate themselves to encounter difficulty, and know how to use suitable strategies to achieve their goals, and therefore sustain their academic autonomy. According to Zimmerman (1989), a self-regulated learner should be metacognitively, motivationally, and behaviourally participating in learning activities. Since the purpose of motivation is to lead to learning behaviour, I would contend that self-regulated learning involves metacognition and action. The self-regulated learners not only learn different metacognitive strategies, but also take action to learn.

Self-regulated learning involves the relationships among a person as a learner, the learning behaviour and the learning environment, and these factors acting together will lead to the result of self-regulation (Zimmerman, 1989; Bandura, 1997). Personal

factors include the learners' belief about learning (Schraw et al, 2006), and how the mind makes sense when interacting with the environment (Lajoie, 2008). Environmental factors includes the quality of teaching and feedback, access of information and social support, while behavioural factors includes the effects of past experience and performance (Schraw et al, 2006). These three factors interact with each other. The use of metacognitive skills and self-regulated strategies leads to an action that affects the learning environment. On the other hand, the learner's behaviour is also affected by environment as well. Bandura (1982;1986) contends that self-regulation can only happen when there is interaction between learners and environment. The continuous interactions lead to the change of one's beliefs about learning and his/her own ability, and finally lead to successful learning or failure. According to Zimmerman and Schunk (2001), self-regulated learning refers to the learning processes in which the learners monitor their thought, feelings and actions in order to achieve their goals. In other words, self-regulated learning is a process of learning in which a learner controls his/her own cognition, affection and behaviour so as to achieve the goals of learning (Zimmerman and Schunk, 2001). To control his/her own cognition is to continuously revaluate whether she/he understands what just learned. To control one's own affection is to keep on motivating himself/herself to learn or to work. To control one's own behaviour is to accomplish the targeted job on time, and time management is an important part of self-regulated learning activities, such as goal setting and planning (Weistein and Mayer, 1986). Without considering punctuality, work will never begin and goal will never be achieved.

For the components of self-regulation, researchers give different opinions. Lindner and Harris (1992) contend that self-regulated learning should entail the use of cognition, metacognition, motivation, and the control of environment in order to achieve learning

goals. Kanfer and Kanfer (1991) contend that self-regulation should entail goal setting and self-motivation, and they work together to achieve the learning goals. Schraw et al (2006) posit that self-regulated learning consists of three components: cognition, metacognition, and motivation and these three factors have to work together in order to achieve self-regulation. In fact, this definition does not contradict the Zimmerman's definition (1986), because metacognition is to understand one's cognition, and of course, is a higher level of cognition and should include cognition itself. According to Sperling et al (2004), there is a consensus regarding what constitutes self-regulated learning; it involves metacognition, motivation, and taking action to use learning strategies (Sperling et al, 2004). Vrugt and Oort (2008) also contend that there is a consensus that self-regulated learning should involve goal settings, metacognition, and the use of cognitive strategies for learning.

By reviewing all these opinions, I would contend that self-regulated learning involves two factors: mind and action. Self-regulated learners should be those who know how to learn and take action to learn without being urged by others.

Self-regulated learners and self-regulated skills

According to Schraw et al (2006), there are very few students who are fully self-regulated. Some investigators (Senecal et al, 1995) postulate that there are five levels of self-regulation: 'amotivation', external regulation, introjected regulation, identified regulation, and intrinsic regulation. 'Amotivation' is the least self-regulation, in which the learners do not know their purposes and have no goals. Compared to Amotivation, External regulation is in a higher autonomy, in which learners do a job because they are forced or awarded by and external control. 'Introjected' regulation is higher than external

regulation in terms of autonomy as the behaviour has been internalised, in which the learners will have a sense of guilt if they do not follow their internalised behaviour. Identified regulation occurs when learners have their goals and pursue their own values. Intrinsic motivation is the highest level of self-regulation, in which learners not only value an activity or behaviour but also find it interesting doing it. The higher level of self-regulation, the more motivated the learners are, and the lesser the learners will procrastinate. Research (Senecal et al, 1995) shows that Amotivation, External regulation and Introjected regulation are positively related to academic procrastination while Intrinsic motivation is negatively related to procrastination. However, there are contradicted conclusions for the 'Identified motivation', which is not correlated to procrastination in correlational analyses but positively correlated to procrastination in regression analysis. This shows that even though learners consider that some tasks are important to them, they still procrastinate, and only intrinsic motivation can make learners finish their tasks without delay (Senecal et al, 1995).

In order to survive in college and university, students need to be an intrinsic self-regulated learner. Lindner and Harris (1992) also suggest that self-regulated learners should exhibit flexibility in learning processes so as to be able to adapt to difficult situation in school, especially in college levels. Boekaerts (1997) contends that there is a consensus that self-regulators know how to use their internal resources to monitor their own learning, know how to set their own goals, and know how to motivate themselves. Research (Ablard and Lipschultz,1998) shows that some high achieving students use a full spectrum of self-regulated learning strategies instead of a particular strategy, but some achievers are not aware of using self-regulated strategies, as they may be automated (Ablard and Lipschultz, 1998). Knowing how to self-regulate one's own

learning can have powerful effects on academic performance, and this entails how learners use internal and external clues for initiating, maintaining, and terminating their learning activities (Senecal et al, 1995).

Research (Lindner and Harris, 1992; Dembo and Eaton, 2000; Zimmerman and Schunk, 2001) shows that self-regulated learners are typically academic high achievers, who use various cognitive and metacognitive strategies. Students will improve if they use self-regulated skills and their interest will also increase if they find they are improving (Schunk, 1983). Hence, university students need to acquire self-regulated skills in order to succeed in university.

From the social-cognitivist perspectives, learners need to go through four levels when they develop self-regulated skills (Schraw et al, 2006). At the first level, learners observe the models. At the second level, the learners imitate and get feedback. At the third level, the learners develop self-controlling skills, in which they construct their own internal standards and they try to self-motivate themselves via self-talk. At the highest level, learners self-regulate themselves by using a lot of learning strategies, while keeping a very high self-efficacy (Schraw et al, 2006).

According to Mace et al (2001) there are four key self-regulated processes: self-monitoring, self-instruction, self-evaluation and self-reinforcement. Self-monitoring is to be aware of one's own mental state during learning, such as whether one understand the learning materials or not; self-instruction is to tell oneself mentally what should be done and what should not be done during learning; self-evaluation is to find out whether the job has been successfully done and do the correction if necessary; self-reinforcement is to reward oneself for having successfully implemented the learning activities. This reward is to motivate the learners themselves to continue the learning activities in the

future (Mace et al, 2001). In self-regulated learning, learners must have their own choices and their own decision of learning behaviour, and the choices are not imposed by others; otherwise, this learning process cannot be called self-regulated (Schunk, 2009).

Self-regulated learning and Metacognition

The concept of metacognition is not new, but the terms 'metamemmory' and 'metacognition' were first used by Flavell (1971; 1976) to mean how a learner thinks about his/her own thinking or to be aware of his/her own mind. The term self-regulated learning emerged in 1980's (Zimmerman, 1986; Zimmerman, 1989) to mean when a learner get involved in learning activities metacognitively, motivationally and behaviourally. Self-regulated learning has a broader sense than metacognition because it includes action as well. In this sense, being a self-regulated learner, one should know the metacognitive skills first, and know how to motivate himself/herself to take action in learning activities. Some investigators (Yilmaz-Tuzun and Topcu, 2010) contend that metacognition is the sub-part of self-regulated learning.

According to Dinsmore et al (2008), many researchers use these three terms, metacognition, self-regulation, and self-regulated learning interchangeably, while some researchers (Schunk, 2008) consider metacognition, self-regulation, and self-regulated learning are highly related concepts but should be given clearer definitions. Self-regulation focuses on the impact of environment on learners, while metacognition focuses on how learners themselves take initiative to control their learning (Lajoie, 2008).

Some investigators (Kaplan, 2008; Schunk, 2008) consider metacognition, self-regulation, and self-regulated learning entail two same core elements: self awareness

and regulatory action. Although they are different from each other, they are under one 'conceptual abstract umbrella', as mentioned by Kaplan (2008). They are the sub-types of self-regulated action. Kaplan (2008) posits that any boundary among these three constructs is bound to be 'fuzzy and permeable'. Self-awareness is to know one's own cognition, to understand himself or herself as a learner. Regulatory action is the behaviour that directs one's cognition to learn successfully. In this sense, they are very related concepts. Although they seem very similar, metacognition and self-regulation can occur in different contexts whereas self-regulated learning happens only in academic context (Kaplan, 2008).

Metacognition alone will not help improve academic performance unless there is action. Nevertheless, some learners have high level of metacognitive awareness but they delay taking action, and therefore affect their academic performance. Students who have a high level of metacognition and do not delay their study are self-regulated learners. As Zimmerman (1986) states, self-regulated learners should be involved in learning activities metacognitively, motivationally, and behaviourally. Metacognition is an important part of self-regulated learning, and self-regulated learning proves to be a good way to achieve good academic performance. According to Kaplan (2008), the concepts of metacognition, self-regulated learning, and self-regulation have become dominating in educational theories, research, and practice.

Some researchers (Manning and Glasner, 1996) call the following process as self-regulatory metacognition or metacognitive/self-regulated skills: defining, focusing, persisting, guiding, coping, correcting, reinforcing and problem-solving. In this case, they seem to use these two terms, metacognition and self-regulation, interchangeably. According to Zimmerman and Schunk (2001), self-regulated learning is a process of

learning in which a learner controls his/her own cognition, affection and behaviour in order to achieve their learning goals, which means they should have high level of metacognitive awareness and action. To control his/her own cognition is to continuously revaluate whether he/she understands what just learned. To control one's own affection is to keep on motivating himself/herself to learn or to work. To control one's own behaviour is to accomplish the targeted job in order to achieve the goal.

Some strategies are both metacognitive skills and self-regulated skills. For instance, time management skill, such as goal setting and planning, is an important part of self-regulated learning activities (Weistein and Mayer, 1986). Plenty of studies (King, 1988; Scardamalia and Bereiter, 1991) show that planning is beneficial for learning. Planning is an important metacognitive strategy. On the other hand, self-monitoring skills, such as self-questioning and self-explaining, are also effective metacognitive strategies. Self-questioning is beneficial for learning (King, 1992) and self-explaining can help improve academic performance (Chi et al 1989). Research (Audet et al, 1996; Davis, 1998) shows that the ability to reflect is important for learning. These self-regulated learning activities seem to be part of the Regulation of Cognition in Schraw and Dennison's (1994) model of metacognition. On the other hand, self-regulation also involves self-motivation (Kanfer and Kanfer, 1991). Self-motivation is also part of metacognitive monitoring of Schraw and Dennison's model (1994). Therefore, we can see that metacognition and self-regulation share some similar skills.

According to Gavelek and Raphael (1985), there are at least two reasons why we need to investigate metacognition: Firstly, metacognition is to help learners control their own learning processes, so as to help them become autonomous learners. Secondly, metacognition will help learners apply what they have learned to different situations.

Research (Swanson, 1990) shows that learners with high metacognitive ability outperform learners with low metacognitive ability and there is a significant relationship between intellectual growth and metacognition skills (Veenman et al, 2004).

Since metacognition is essential for self-regulated learning, Part B of this chapter will focus on metacognition.

Part B METACOGTNION AND ACADEMIC PERFORMANCE

In order to be a self-regulated learner, one must engage in academic tasks metacognitively; otherwise, they won't be able to know whether they have learnt, let alone regulating the learning processes. The function of metacognition needs the help of cognition itself. One cannot carry out planning without cognitive activities, and one cannot evaluate the outcomes of a calculation without doing calculation itself (Veenman et al, 2006). Since metacognition is the process of being aware of one's own cognition, it is necessary to talk about cognition first before going on to metacognition.

Cognition and learning

Cognition is the processes by which knowledge and understanding developed in one's mind, which involves the mental activities such as thinking, remembering, perceiving, recognizing and classifying (Richards et al, 1992). Cognition is the essential part of learning processes. It is not difficult to imagine that there is no learning without thinking and remembering. The basic element of learning is to remember what we want to learn. If we cannot remember, there is no learning at all.

Learning can happen either intentionally or incidentally. Intentional learning happens when it is done on purpose, whereas incidental learning takes place unplanned or even unaware (Dodge, 1998). Academic learning is mainly intentional, which is not automatic. Learners need to put into efforts in order to store information in long-term memory (McCormick and Pressley, 1997). When learners try to put information into their long-term memory, they will use different mental strategies; for instance, they may

relate the newly learned information to the existing information in their minds (Bjork, 1995). The connection between old information and the new information may create some information that goes beyond the existing information (Ormrod, 1995). Effective learning needs the learners to monitor his/her own cognition (Baker and Brown, 1984). Unless learners know how to monitor their learning processes and put the information in the long-term memory properly, they would not be able to retrieve it when they want to use it.

In order to remember better, we need some learning strategies. Lau and Chan's study (2003) shows that reading performance and the use of learning strategies are positively correlated. It also shows that teaching the strategies to the poor learners can help improve their learning.

There are some cognitive and metacognitive strategies that can make learning easier. Strategies are what we intend to do in order to achieve a goal, and when they work automatically, they become our skills (Veenman et al, 2006). Some strategies are more effective than the others; however, learners may not be aware of this until their retrieval fail (Bahrick and Hall, 2005).

Schraw et al (2006) posit that cognitive strategies include simple learning strategies, problem-solving strategies, and critical thinking strategies. Simple learning strategies involve comprehending and memorising by using proper methods to put information into long-term memory, so that it can be retrieved for future use more easily. Problem-solving strategies usually involve breaking down a solution into different steps. Critical thinking skills involve identifying information, analysing credibility, giving conclusion etc. (Schraw et al, 2006). However, I would contend that only the simple learning strategies are cognitive strategies, problem-solving strategies and critical thinking skills are

metacognitive activities, because these strategies and skills entails monitoring and evaluating our cognitive activities. Metacognitive activities will be discussed later in this chapter.

The following are the most common simple cognitive strategies, although they are not exhaustive.

Rehearsal Rehearsal is a learning process in which a learner reads again and again the materials that he/she wants to learn until he/she can remember them. It is a conventional and useful way to encode the information in our long-term memory although it is not an efficient way (O'Malley and Chamot, 1989). Research (Terry, 2000) shows that rehearsal facilitates retention. Some people may think that learning by rote is a bad strategy, but for some materials, such as poems, reading the learning materials again and again is a way to encode the information into the long-term memory.

Visualisation When the materials are too long or too difficult to remember by rehearsal, creating a mental image when reading the materials can give learners a visual association, which can also help learners to retrieve the information more easily in the future (O'Malley and Chamot, 1989). The pictures or representations may not be exactly correct as it can be distorted by imagination and the interpretation of the learners, but it is a good strategy for the learners to remember some materials. A mental image can also make reading more interesting.

Summarising To summarise a reading material is to get the gist of it, and present it by using one's own words (King, 1992). This process not only prompts a learner to

think, but also helps the learner to remember the gist; when learners use their own words to summarise the reading materials, they are structuring the materials in a way that they can retrieve more easily in the future.

Organising In order to help us memorise more complicated materials, it is good to put similar items into the same category. By using categories, we can memorise things in a more effective way, and this strategy is called organising (McDaniel and Einstein, 1989). Organising is a way of analysis. Without analysis, it is impossible to put things into different categories.

Elaboration Elaboration is considered as one of the best learning strategies. The learners use their own words to retell themselves about the learned contents, and create some examples for themselves (Van Rossum and Schenk, 1984). Elaboration is not only a full comprehension of the learnt materials, but also goes beyond. When learners can give themselves new examples, they are applying their knowledge to the new situations.

The storage of information is the foundation of learning; however, not being able to retrieve the information is not a successful learning. These strategies not only help the learners store their information in the long-term memories, but also facilitate the retrieval processes. According to Bransford et al, (2000) experts are not only able to acquire knowledge, but also good at retrieving the knowledge that is relevant to a particular task.

In order to help learners to remember what they have learnt, they can test themselves by recalling. They can also ask others to test them. In this case, learners should be tested for what they have learnt before they forget; otherwise, the test will not help improve

learning (Bahrick and Hall, 2005).

Although all these strategies are useful for learning, learning how to shift from one strategy to another is even more important, especially when comprehension fails. According to Baker and Brown (1984), there are three types of comprehension failure. In the first type, the learner does not possess enough related schemata (knowledge) about the reading material. In the second type, the learners, although, possess these related schemata, but the author is at fault and does not convey the ideas clearly. In the third type, the learners although possess these related schemata and interpret in his/her own way, but misunderstand what the author wants to convey. In all these three types of comprehension failures, only Type two does not involve cognitive strategies, both Type one and Type three can be rectified through cognitive and metacognitive activities.

The flexibility in the use of strategies and the understanding of those strategies are important for learning. However, just learning these strategies cannot guarantee the success of learning, they have to be implemented. Research (Eagle, 1967) shows that the ability to recall the learnt materials is not related to the teaching of a strategy but related to the real use of a particular strategy. Therefore, if the students have learnt all these strategies but are not motivated to use them, successful learning will not happen. For instance, in order to put information into the long-term memory, reviewing should be done before the learnt materials are forgotten (Bahrick and Hall, 2005). Hence, the emphasis of the use of strategies should be the culture of all classrooms (Graham, 2003).

The construct of metacognition

Definition of metacognition

Knowing how and when to use the cognitive strategies engages metacognition (Flavell, 1976). According to Georghiades (2004), the concept of metacognition was first used in an empirical study done by Flavell. Flavell first used the term 'metamemmory' (Flavell, 1971; Brown, 1978). Then in 1976, he coined the word 'metacognition' (Flavell, 1976). There are some differences between cognitive skills and metacognitive skills, which have been mentioned by some researchers. For instance, Ku and Ho (2010) state that the difference between cognitive activities and metacognitive activities depends on their goals. Cognitive activities entail acquiring, retaining, and transferring knowledge for task execution, while metacognitive activities monitor and regulate the execution of the task (Ku and Ho, 2010). While 'cognition' refers to a variety of mental activities, such as perceiving, recognising, classifying, remembering and thinking (Richards et al, 1992), 'metacognition' refers to thinking about the processes of thinking (White, 1999). According to Blatner (2004), metacognition is one's awareness of his /her way of thinking and the effectiveness of his/her mental processes. Flavell (1976) states that metacognition is one's knowledge of his or her own cognitive process and products. Some researchers (Schraw and Moshman, 1995) contend that metacognition not only involves awareness, it should also involve the processes of control. Metacognition is the knowledge and awareness of one's own thinking, including the knowledge of when, where and how to use different strategies in order to learn successfully (McCormick and Pressley, 1997). Nevertheless, metacognition is different from intelligence, as metacognitive strategies can be learned. Although

intelligence can give learners an advantage at the beginning of the learning processes, the development of metacognition is not based on learners' intelligence (Veenman et al, 2006).

Usefulness of metacognition

Metacognition is very useful for learning activities. For example, if learners fail to understand a text but not aware of this failure, they will not take action to remedy it because they are not aware that they do not understand (Baker and Brown, 1984). Teaching and encouraging students to use cognitive and metacognitive strategies can help them improve their learning (Palinscar and Brown, 1987).

The use of metacognition makes experts different from novices in self-regulating learning activities and the application of their knowledge (Zimmerman, 2002). Experts know how to use their expertise in their domain to solve problems, especially, they can remember details in their domain and see things from the abstract principles or laws while novices see things in a superficial way, and therefore apply with wrong principles or rules (Donovan and Bransford, 2005). Novices self-regulate their learning reactively while experts regulate their learning proactively. Novices fail to set goals beforehand. They rely on the comparison with others in order to judge their own effectiveness, and tend to attribute causation to ability deficiencies, and produce lower personal satisfaction. On the other hand, experts set goals and divide jobs into manageable parts and use powerful strategies learnt before. They evaluate their performance with their own goals instead of the performance of other people and they attribute their performance to effort instead of ability (Donovan and Bransford, 2005). And the success reinforces the motivation of the experts (Zimmerman, 2002). Research (Ericsson and Charness, 1994)

shows that experts can motivate themselves, and they spend hours per day doing self-study and practice. Successful experiences improve their expertise, and their expertise motivates them to acquire further experiences. Research (Donovan and Bransford, 2005) shows that expertise in a particular domain will improve the general metacognitive skills of the learners.

Although the present study focuses on the metacognition related to academic learning, metacognition itself has been used in different areas. For instance, it not only helps improve their academic performance but also helps improve their social behaviour, such as violence reduction and conflict resolution (Heydenberk and Heydenberk, 2005). This is an interesting topic to explore for further studies besides academic learning. Nevertheless, Hacker and Dunlosky (2003) posit that metacognition is not a 'panacea' for problem solving, and not all kinds of metacognitive strategies benefit the learners all the time. Therefore, knowing when to use a particular strategy is also important.

Metacognitive instruction has also been used to help students with the learning disability. Research (Palincsar and Brown, 1987) shows that learning-disabled students can improve their level of memory after learning metacognitive strategies. According to Palincsar and Brown (1987), without explicit teaching of metacognitive skills, students with learning disability have a lower metacognition level than their peers, even they have the same IQ level. However, after learning the strategies, they can improve their ability in recalling the learnt material.

Research (Carr et al, 1996) shows that gifted children do not consistently have better use of metacognition than average children, which means that the use of metacognition is not directly related 'intelligence'. Average children can better use of metacognition after training, while the gifted students show better use of declarative knowledge, but not in

procedural knowledge (Carr et al, 1996). Declarative knowledge and procedural knowledge will be discussed later in this Chapter.

Hammann and Stevens (1998) contend that a high level of metacognitive awareness implies that learners can describe their own understanding and they are able to use the information they acquired. Knowing how to use the acquired information in academic learning is even more important than just remember the information.

Development of metacognition

Although Flavell (1976) coined the term 'metacognition', another researcher, Piaget (1964) had mentioned the concept of 'being aware of one's mind'. Research (Ruan, 2004) shows that that children develop their awareness of their own thinking at very young age. According to Kuhn and Dean (2004), humans develop metacognitive skills when they are growing, but not all of them develop the skills up to maximum level. Kuhn and Dean (2004) contend that there are different stages in the development of human's thinking. At the earliest learning experience, children are realists, i.e. they absorb what they see, or they just 'copy' the 'external reality'; when the metacognitive skills become more developed, they become absolutists, i.e. they believe that there is an absolute reality, and knowledge, at this stage, is considered as the reflection of objective reality; growing further, they believe that knowledge is generated by human minds instead of an objective reality, and knowledge, therefore, is uncertain, i.e. knowledge, at this stage, is considered as the constructed perception of the objective reality instead of the reality itself. When metacognitive skills become mature, they become evaluativists. Adults are at this stage, and they have the ability to develop their own metacognitive skills (Kuhn and Dean, 2004). At this stage, knowledge is considered as generated by human minds, but it is

susceptible to evaluation, as there are objective criteria (Kuhn and Dean, 2004), and under careful scrutiny, knowledge will reflect and become closer to the reality.

Primary and secondary school students usually rely on their parents, and their studies are usually regulated by their teachers. This study habit becomes an obstacle for them to develop a habit of using metacognitive strategies and have difficulty in self-regulating their learning in university (Hofer et al, 1998). Thomas (2006) uses 'metacognitive orientation' to refer to the tendency of using metacognitive strategies. He contends that it is important to find out how socio-cultural differences affect the metacognitive orientation (Thomas, 2002).

Some investigators (Veenman et al, 2006) contend that metacognition develops first in different domains, and later crosses domains and become a generalized skill. However, some other investigators (Schraw et al, 2006) contend that many adults cannot transfer their domain-specific knowledge in new areas and environment. Although there are a plenty of research done to find out how metacognition operates in specific tasks or domains, scanty studies have been done on the transfer between domains (Veenman et al, 2006). The issue of transferability needs more research.

Calibration of metacognition

Definition of Calibration of Metacognition

Imagine a student who has studied all materials for an examination and believes that she is well prepared for the exam, but then finds that she knows nothing in the exam centre. This is the focus of metacognitive calibration. Plenty of studies have been done on how learners perceive their own thinking, i.e. about metacognitive judgement. According

to Schraw (2009), metacognitive judgement is how a learner judges his or her own learning processes. For instance, if the learners could correctly answer all questions in a test, and they believe that they have done well; then, their metacognitive judgement is considered high; on the other hand, if they could answer all questions correctly, but they are not sure whether their performance is good; then, their metacognitive judgment cannot be considered good (Schraw, 2009). How to measure the accuracy of metacognitive judgement is called calibration. Calibration is the comparison between one's assessment of his/her own ability and the actual performance.

After a mega-analysis of 55 calibration studies, Mabe and West (1982) reported an overall correlation of 0.29 between the assessment of the performance and the real results of the performance.

Methods of Calibration of Metacognition

There are different kinds of calibration, such as relative calibration, and absolute calibration (Pieschl, 2009). Mabe and West (1982) contend that people are better in assessing their performance in relative scale rather than absolute scale. People can usually assess better when comparing their performance with the performance of other people; when asked to compare their performance with a scale, they would find it more difficult.

For assessing one's own calibration, there are two common ways. The first one is to predict our ability to complete a task before we do the task, and the second one is to assess our performance after we have completed a task. Prediction is to do the assessment before performing a task while post-diction is to do the self-assessment after finishing a task, and post-diction is more likely to be more accurate than prediction (Mabe and West,

1982; Lin and Zabrucky, 1998), as there are some cues for the learners to compare after they have finished the tasks. Some studies (Tenenberg and Murphy, 2005) have been done on the calibration of self-knowledge or self-assessment. Tenenberg and Murphy (2005) conducted survey on undergraduate students from two universities. The students were tested on their knowledge about data structures in a computer course; then, their prediction and post-diction of their calibration ability were analysed with their actual performance. The results show that both prediction and post-diction scores are positively correlated to their actual performance, although post-dictions are more accurate than the predictions, which means direct experiences bring more accurate calibration. The use of metacognition enhances calibration in post-test but there is no evidence for the calibration for the pre-test (Lin and Zabrucky, 1998).

Most of the studies about calibration were conducted before or after the learning, not many were conducted during the learning process, Ku and Ho (2010) prefer to use the method of 'think aloud' to keep track of the learners' use of metacognitive strategies, which shows that good critical thinkers are stronger in planning and evaluation than weaker thinkers.

Factors that affect the accuracy of Calibration of Metacognition

There is a big diversity of accuracy of assessments (Mabe and West, 1982). Tenenberg and Murphy (2005) suggest that there are many factors that cause the variation of calibration ability, such as the population's characteristics, discipline domain, test item difficulty, students' attitudes toward the learned subjects, and the students' beliefs about the assessment itself.

After reviewing the literature, I would contend that the following factors can affect

the accuracy of calibration of learners:

Social factors Exposure to social factors will influence one's calibration of metacognition experience (DeCarvalho Filho and Yuzawa, 2001). In some cultures where rote-learning is emphasized and metacognitive skills are seldom practiced; as a result, self-perception of metacognitive competency is affected. Mok et al (2007) did a study on 8,948 students and found that most secondary school students in Hong Kong under-estimated their own metacognitive ability; this may be related to the culture where humility is valued.

Domain-specific knowledge Accurate calibration needs domain-specific knowledge and expertise. It is difficult to judge whether oneself is competent in a particular domain unless she/he has adequate knowledge of that domain (Veenman et al, 2006). Research (Fitzgerald et al, 1997; Efklides, 2006) suggests that increase in knowledge and expertises in a domain will help improve the calibration of one's metacognition experience. According to Schraw et al (1995), metacognitive monitoring is first domain-specific. Learners then use this knowledge to construct conditional knowledge of metacognition, that is when and where to use a particular strategy, and finally they construct general strategy meta-knowledge, which will become domain-general. Nevertheless, research (Lin and Zabrucky, 1998) shows that experts in some specific domains overestimate their own abilities because their expertise creates a sort of 'illusion of knowing' and it leads to overconfidence. On the other hand, without adequate knowledge of a specific domain will also lead to inaccuracy in calibration. Kruger and Dunning (1999) posit that weaker learners also overestimate their own ability

when they compare theirs with the others. The weaker learners are also weaker assessors because their own weaknesses deprive them of the self-assessment ability, and therefore often overestimate their own ability.

Some studies (Schraw et al, 1995; Veenman et al, 1997; Kelemen et al, 2000; Mevarech and Fridkin, 2006) show that there is a gap between domain specific and general metacognitive knowledge. Nevertheless, Domain specific metacognitive knowledge will help learners develop their general metacognitive skills.

Research (Ackerman et al, 2002) shows that calibration accuracy varies from domain to domain; for instance, majors in sciences have higher accuracy than majors in business. Ackerman et al (2002) contend that this may be due to the different training for different disciplines. Further studies need to be done to find out the reasons. Since it is different from domain to domain, it is not difficult to imagine that it may be related to one's interest in that domain.

Motivation Lin and Zabrucky (1998) contend that motivation and metacognition should not be treated as two entities because they are strongly interconnected. However, motivational factors, such as 'interest' does not seem highly correlated to 'calibration'. The results of the study by Tenenberg and Murphy (2005) also show that neither 'interest' nor 'level of difficulty' affects their calibration. In Mabe and West's study (1982), students were told that their estimation of their own performance would be compared to their actual performance, and the results show that their calibrations have improved. This suggests that participants will be more accurately calibrate their performance if they expect it will be validated with their actual performance. In other words, people can manage better in calibration if they really want to do it. Further research needs to be done

in order to establish the correlation between ‘calibration’ and motivational factors.

Emotional factors Emotional factors can affect how precisely learners estimate their comprehension level. Since calibration of comprehension entails self-confidence, so the judgment can be subjective. Learners’ interest and familiarity with the domain may make them over estimate their ability (Lin and Zabrucky, 1998). On the other hand, when students have to face stiff competitions, such as public exams, self-rating of their own metacognition may decrease (Mok et al, 2007).

Types of information People may over-estimate their ability when the information looks familiar (Lin and Zabrucky, 1998). On the other hand, people will be more accurate assessing their awareness if they need to retrieve information from long-term memory, because either success or failure in retrieval will give them a clue for their metacognitive awareness (Pressley and Ghatala, 1988). When students are going to higher levels in school, the levels of difficulties also increase and assignments are more demanding, students’ perception of self-ability may decline even though their real ability increases (Mok et al, 2007).

Biological factors A study in Hong Kong (Mok et al, 2007) shows that girls have higher self-perception and metacognition starting from primary school until secondary, and their average academic performance is also better than those of the boys. Further studies need to be done to find out whether gender and age are variables that affect their accuracy of self-assessment.

Past experience When a learner calibrates the time needed to complete a task, it is difficult to use past experiences to help plan the new task, because previous incidents or instances seem so different in nature (Buehler et al 1994). However, when people are asked to be an observer, they will use distributional information (comparing different sources of information instead of personal experiences) because they don't need to connect it to their previous failure experiences (which they don't want to recall), and their prediction will become more accurate (Buehler et al, 1994).

The Components of Metacognition

Since metacognition is not a simple construct, many investigators have suggested that it consists of different components. The most common ones are the two-component models and three-component models. Some researchers believe that metacognition consists of knowledge and skills; others believe it consists of knowledge, skills, and beliefs; while others contend that it consists of metacognitive knowledge, metacognitive skills, and metacognitive attribution (Desoete et al, 2001).

For instance, Flavell (1987) contends that metacognition consists of two dimensions: metacognitive knowledge and metacognitive experience. Metacognitive knowledge is about how a learner understands the relationship between himself/herself as a learner, the tasks he/she faces and the strategies he/she uses to complete the tasks (Garner, 1987; White, 1999), while metacognitive experience is about how a learner thinks about his/her cognitive efforts, whether there is a confusion in the learning processes, and whether the learning process is a successful one (White, 1999). Nelson and Leonesio (1988) posits that metacognition consists of metacognitive monitoring and metacognitive control.

Monitoring is the awareness of one's own learning process, which is to evaluate the learning process, but not the outcome itself. Metacognitive control is the ability to change one's own behaviour by using his/her metacognitive monitoring (Son and Schwartz, 2002). According to Dobrovolny(2006), metacognition can be defined as self-assessment and self-correction. Self-assessment is to evaluate one's own learning processes by comparing the new materials and prior experiences to find out the similarities and differences. This is a way to check whether a learner understands the new materials. He/she will continue to read the materials to consider whether it is relevant and useful. If the learner's self-assessment is negative, i.e. he/she doesn't understand, he/she will resolve the problems by keeping on doing reflection and comparison etc. The learners will then make a decision whether it is worth continuing the task. This is a process of self-assessment and self-correction. Some researchers (Baker and Brown, 1984; Schraw and Dennison,1994; Panaoura and Philippou, 2007) contend that metacognition consists of two constructs: knowledge of cognition and regulation of cognition. Knowledge of cognition is how the learners know about themselves as a learner and the relationships between them and their tasks. Regulation of cognition is how the learners execute the learning processes. Knowledge of cognition and Regulation of cognition are different but they are related (Brown, 1987). Lin and Zabrucky (1998) contend that while metacognitive knowledge is stable, metacognitive regulation is changing, and high level of metacognitive knowledge does not guarantee a high level of metacognitive regulation. For the success of self-directed learning, metacognitive knowledge – what a leaner knows about himself or herself as a learner, the tasks they face and the strategies they use, are essential (Cotterall and Murray, 2009). Baker and Brown (1984) contend that regulation should include checking, planning, monitoring, testing and

revising, and evaluating.

On the other hand, some investigators suggest the three-component models. Efklides (2006) posits that metacognition consists of three components: metacognitive knowledge, metacognitive experiences, and metacognitive skills. Metacognitive knowledge refers to the learners' beliefs of themselves as cognitive beings and the relationship between them and the tasks and strategies. It is also called metacognitive awareness, and only a part of the construct 'metacognition'. This is very different from Schraw and Dennison's model (1994). They use 'metacognitive awareness' and 'metacognition' interchangeably in their two-component model. Metacognitive experiences refer to the affect aspects, which involve the feelings of the learners, such as a feeling of knowing. A feeling of knowing is the kind of experience that we feel we know it but can't recall it, like on the tip of tongue but can't speak it out. Being able to estimate our effort is also a kind of metacognitive experience. Both metacognitive knowledge and metacogntive experience seem like the 'Knowledge of Cognition' in the two-component models. Metacognitive skills involve control of cognition, such as planning, time management, checking the cognitive process and evaluation etc. (Efklides, 2006). This seems like the 'Regulation of Cognition' in the two-component models. Hofer (2004) posits that three components of metacognition are accepted by some of the theorists: metacognitive knowledge, metacognitive monitoring and self-regulation. Metacognitive knowledge is about knowledge of the relationships among cognition, strategies and tasks. Metacognitive monitoring involves monitoring one's comprehension and learning. Self-regulation involves strategies selection, volitional control and allocation of resources. However, I would contend that both metacognitive monitoring and self-regulation in this model seem like the 'Regulation of Cognition' in the two-component models. Hofer (2004) also

suggests a model of four components of metacognition: beliefs about the nature of knowledge, beliefs about oneself as a knower, belief about the nature of knowing and regulation cognition when constructing knowledge. I would contend that his model belongs to the study of epistemology instead of learning itself.

Some researchers (Allen and Armour-Thomas, 1991) contend that metacognition should consist of six 'components', including: Defining the nature of a problem, selecting options, choosing strategies, creating a mental representation, allocating resources, and monitoring the solutions. I would contend that this model is a model of processes instead of components, and it seems to consider metacognition as skills of problem solving. Although the elaboration of metacognition is different, it is commonly accepted that all elements can be categorised into two components: Knowledge of cognition and Regulation of cognition (Brown, 1987; Baker and Brown, 1984; Palincsar and Brown, 1987; Schraw and Dennison, 1994; Sperling et al, 2004; Vrugt and Oort, 2008). Although some investigators consider there is a high correlation between knowledge of cognition and regulation of cognition (Sungur and Senler 2009), others (Sperling et al, 2004) question the relationship of these two components. The present study is based on this two-component model. The conceptual framework of metacognition is based on Schraw and Dennison's definition, as it is comprehensive and operationally measurable.

Schraw and Dennison's model (1994) consists of Knowledge of Cognition and Regulation of Cognition:

Knowledge of Cognition

Knowledge of Cognition is how learners know about themselves as a learner, and

about their own ability to use appropriate strategies to achieve their goals. (Schraw and Dennison, 1994).

Knowledge of Cognition has three sub-components. They are Declarative Knowledge, Procedural Knowledge and Conditional Knowledge. (Schraw and Dennison, 1994).

Declarative Knowledge It is how learners know about themselves as a learner, about their own weaknesses and strengths, and about their relationships with the tasks that they want to accomplish, such as learning or problem solving. (Schraw and Dennison, 1994).

Procedural Knowledge It is to know how and what strategies learners can use to accomplish their tasks. (Schraw and Dennison, 1994).

Conditional Knowledge It is to know when and under what conditions learners can use a particular strategy to achieve their goals. (Schraw and Dennison, 1994).

Regulation of Cognition

Regulation of Cognition is to control the cognition in terms of planning, implementation and evaluation (Schraw and Dennison, 1994; Baker and Brown, 1984).

Regulation of Cognition consists of five subcomponents: Planning, Information Management Strategies, Comprehension Monitoring, Debugging Strategies, and Evaluation. (Schraw and Dennison, 1994).

Planning It is to set goals and allocate resources before beginning the task. (Schraw and Dennison, 1994).

Information Management Strategies It includes skills to process information, such as organizing, elaborating etc. (Schraw and Dennison, 1994).

Comprehension Monitoring It entails assessing one's comprehension and learning process, whether the reading materials make sense or not. (Schraw and Dennison, 1994).

Debugging Strategies It is to look for help when encountering difficulties. (Schraw and Dennison, 1994).

Evaluation It is to assess oneself to see whether he or she has accomplished his/her jobs (Schraw and Dennison, 1994).

The detailed measurements of all these components of MAI will be discussed in Chapter 3- the section of methodology, and the instrument itself can be found in Appendix 3.

Metacognition and related constructs

There are some other constructs related to metacognition, such as metacognitive knowledge, metacognitive experience, metacognition, executive control, and

metacognitive awareness.

Metacognitive knowledge and metacognitive experience

According to Flavell (1979), metacognitive knowledge is how one thinks about humans as a 'cognitive creature' and the relationships among their cognition, tasks, goals, action etc. For instance, when one knows that he or she can learn one subject better than another subject, he/she is using metacognitive knowledge. Metacognitive experience is the conscious cognitive experiences. For instance, suddenly, one becomes aware that he/she cannot recall something on the tip of his/her tongue. Flavell did not give more details to explain the differences among these constructs, but from the examples given by him, metacognitive knowledge seems like 'comprehension monitoring' and 'evaluation', two sub-components of Regulation of Cognition in Schraw and Dennison's (1994) model. Some other researchers (Rezvan et al, 2006) contend that Metacognitive Experience as the processes that oversee and regulate the use of learning strategies. This explanation tries to give Metacognitive Experience a definition much similar to the Regulation of Cognition in Schraw and Dennison's (1994) model.

Metacognition, Executive Control, and Metacognitive Awareness

Some investigators (Newell and Simon, 1972; Fernadez-Duque et al, 2000; Rezvan et al, 2006) use the term 'executive control' to refer to higher order cognition that manages human's cognitive activities. This is the same construct of metacognition. Some researchers (Schraw and Dennison, 1994; Hammann and Stevens, 1998) use metacognitive awareness as the measurement of metacognition and even use them interchangeably. Schraw and Dennison (1994) developed an instrument called

Metacognitive Awareness Inventory (MAI) to measure metacognition, which includes knowledge of cognition and regulation of cognition.

Metacognitive Strategies

It is noteworthy that metacognitive strategies can be improved by learning. Cornford (2002) contends that teaching and encouraging students to use cognitive and metacognitive strategies can result in better learning, and help students develop their life-long learning skills. Metacognitive strategies are different from general cognitive strategies (Swanson, 1990). The cognitive strategies have been discussed in the first section of this chapter. In order to monitor and apply these cognitive strategies to our learning, we need to learn metacognitive strategies.

Investigators have different opinions on this. Taraban et al (2004) divide metacognitive strategies into two categories: analytic and pragmatic strategies. Analytic strategies are those mainly cognitive control skills, such as anticipation, evaluation, checking comprehension etc. Pragmatic strategies are those related to behaviours aimed at helping academic performance, such as note-taking, underlining etc. Their study shows that Analytic strategies are highly related to academic performance while pragmatic strategies show no significant relationship. From my point of view, only these Analytic skills are metacognitive skills, these pragmatic strategies should belong to cognitive skills as mentioned in the section of cognition in this chapter. Although these pragmatic strategies are helpful for self-regulated learning, they are not metacognitive strategies. I would contend that metacognitive strategies are the strategies that are used to oversee these pragmatic activities.

Schraw and Dennison (1994) posit that metacognitive strategies involve reflection, comprehension and control of one's learning (Schraw and Dennison, 1994). Reflection is to review the learning processes after the learning activities. It is a process to find out the strengths and weaknesses of the learning, so as to improve in the future. Comprehension is to monitor the tasks to see whether it is understood or not during the learning processes. This is very important for learning. Some learners do not learn when they think they do, because they are not aware that they do not understand their learning materials. Control is to evaluate whether the learning is successful or not, and seek remedies if learning processes fail.

Metacognition is not innate and it can be acquired through learning, as mentioned by Flavell (1976); therefore, metacognitive strategies will develop when we gain more experience.

Schraw and Dennison (1994) suggest that there are at least five metacognitive strategies can be learned. They are planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation. Planning is to set learning goals, what to learn, when to learn and how to learn. It also involves the decision of allocation of learning resources. 'Information management strategies' is to organise the information when learning so as to learn more efficiently. This also involves monitoring the cognitive skills. Comprehension monitoring involves assessing one's learning to see whether he/she understands the learning materials and whether he/she is using the right strategies to learn.

Other than general metacognitive strategies, Lam (2010) suggests seven metacognitive strategies for language learning. They include problem identifying, planning content, language planning, evaluating, asking for help, giving help, and

positive self-talk. I would contend that these strategies are just the application of the general metacognitive strategies to language learning.

However, knowing metacognitive strategies does not guarantee the use of these strategies. Some psychological factors can affect the use of strategies. This will be discussed in the section of 'Metacognition training'.

Metacognition and academic performance

It is generally accepted that learners can improve their performance if they can monitor their own learning processes (Downing, 2010). Plenty of studies (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008) show that metacognitive strategies are highly related to academic performance and higher academic achievers know how to use metacognitive strategies better than the lower achievers. Some metacognitive skills have been used in our daily lives; for instance, learning how to ask and answer questions is an important part of metacognitive activities that will help improve academic performance (Gavelek and Raphael, 1985).

Since metacognition is a higher level of cognition, different aspects related to the academic performance are worth investigating. They are motivation, critical thinking and problem solving.

Motivation for academic learning

Simmons (1996) considers metacognition as a broad concept that includes motivation and factors of affect as well. Some research (Hamman and Stevens, 1998; Ablard and Lipschultz, 1998; Kuyper et al, 2000; Valle et al, 2003; Sungur and Senler,

2009) shows that motivation is highly correlated to metacognition and academic performance. Metacognitive elements of motivation entail how learners believe about their ability of learning, their ability to control the outcomes of their learning and whether the tasks are worth learning (Eccles and Wigfield, 2002; Pintrich and Schunk, 2002; Valle et al, 2003). These beliefs and values can be seem in the following theories:

Goal-orientation theories Sungur and Senler (2009) posit that there is a significant correlation between goal orientation and metacognition. Goal orientation affects learners how they use metacognitive strategies. There are mastery goals and performance goals (Eison, 1979; Ames and Archer, 1988; Ames, 1992; Sungur, 2007). Learners with mastery goals believe that learning is important and valuable and hard work will pay off, while learners with performance goals want to show themselves as capable in front of the others (Wolter, 2004). Learners with mastery goals are likely to have high metacognition and learners with performance goals are likely to have lower metacognition (Ames and Archer, 1988; Pintrich et al, 1994; Kaplan and Midgley, 1997; Elliot and McGregor, 2001), although the study of Wolters et al (1996) shows that learners with performance goals can also have high level of metacognition. Learners with mastery goals will use metacognitive strategies more often.

Attribution theories Desoete et al (2001) contend that 'attribution theories' are worth studying for metacognition research. Attribution theories are about how a learner thinks about the controllability of the learning outcomes. If learners think that the outcomes are decided by luck, innate ability, or the attitude of the teachers, which they cannot change or control, they won't put forth any efforts. In contrast, if learners think that they have the

ability to control the outcomes of learning, they will spend more time on using learning strategies. This is consistent with Bandura's theory (1977) of self-efficacy.

Expectancy-value theories 'Expectancy-value theories' is how a learner believes whether a task is worth spending time on and whether they have the ability to accomplish the task (Eccles and Wigfield, 2002; Pintrich and Schunk, 2002). In Expectancy-value theories, students' effort, cognitive engagement and their achievement are all decided by their beliefs. They will work harder if they think that they have a chance to succeed and if they think that a task is important. When the learners think that the learning materials are tailored for them, they will be more motivated to learn (Victori and Lockhart, 1995). When students are low in their level of expectancy-value motivation, their performance will be low (Pintrich and De Groot, 1990; McCoach and Siegle, 2003). When learners think that a task is important, and they can do it, they will be motivated and engage in cognitive activities more.

Problem solving

The ability to solve problems is extremely important in academic world. According to some researchers (Davidson et al, 1995; Bielaczyc et al, 1995; Howard et al, 2000b; Howard et al, 2001a; Howard et al, 2001b), the metacognitive processes can help learners solve problems. Flavell (1992) contends that metacognition plays an important role in problem solving. Research (Swanson, 1990) shows that metacognition is more important than aptitude for problem-solving success, and it especially helpful for the low achievers (Teong, 2003).

However, some students with declarative knowledge might not be able to implement

that knowledge in real situation in order to solve the problems (Volet, 1991; Schraw, 1994). Research (Hong, 1998; Hong et al, 2001; Howard et al, 2001a; 2001b) shows that knowledge of cognition can predict success in well-structured problem-solving but not sufficient for ill-structured problems, while regulation of cognition can predict the success in solving open-ended ill-structured problems (Kluwe and Friedrichsen, 1985; Rebok, 1989; Herbert and Dionne, 1993).

Research (Howard et al, 2000b) shows that metacognitive monitoring and regulatory skills are correlated to problem-solving performance. Among many methods, 'self-explanation' contributes to better performance in problem solving (Bielaczyc et al, 1995).

Other research (Downing, 2010) shows problem-based approach to learning can raise the metacognition level of learners. Problem-based approach emphases real-life situations. This real-life-problem encounter is very useful for the development of metacognition (Downing, 2010).

The study of Howard et al (2000a) shows that four factors (Knowledge of cognition, Evaluation, Problem representation, and Objectivity) are significantly correlated to problem-solving success.

Critical thinking

It is difficult to imagine that good learners in university are not good critical thinkers, because the learning in university is not just memorising. There are different definitions of critical thinking, but there is a consensus that critical thinking entails awareness of one's own thinking and the reflection on his/her own thinking (Kuhn and Dean, 2004). Critical thinking is to evaluate alternative views on acquired information and make

judgement to decide which alternative is more likely to be supported by evidence (Kuhn and Dean, 2004). Therefore, critical thinking provides a chance for learners to compare their old knowledge with the newly acquired information. Magno (2010) suggests that critical thinking is the product of metacognition. Good critical thinkers engage more in metacognitive activities, especially in planning and evaluation (Ku and Ho, 2010). Critical thinking takes place when learners want to maximize their outcome by using cognitive skills and strategies (Magno 2010). The study done by Choy and Cheah (2009) shows that there is a strong connection between metacognition and critical thinking. They conclude that cognitive skills are essential for critical thinking. Kuhn and Dean (2004) contends that the use of metacognition is important in the training for critical thinking.

Ku and Ho (2010) posit that good critical thinkers use more metacognitive strategies than poor critical thinkers, especially, in planning and evaluation, and their academic performance shown better.

Success in different disciplines

Studies in computer programming (Pirolli and Bielaczyc, 1989; Pirolli and Recker, 1994) and physics (Chi et al,1989; White and Frederiksen, 1998) suggest that students who use metacognitive and self-regulated learning strategies can perform better than those who do not. Research (Howard et al, 2001a; 2001b) shows that metacognition is important for science education and inquiry-based education, while procedural knowledge is essential to reading and writing performance (Ruan, 2004). The study of Symons and Reynolds (1999) on information-search performance and strategies shows that metacognitive awareness is important for information-searching strategies. Some other research (Palinscar and Brown, 1987) shows that teaching of metacognitive skills

and learning strategies not only enhance students' memory and comprehension, but also their mathematics skills, and writing skills.

Research (Thomas, 2006) shows that cultural and environmental differences will create differences in learning attitudes; however, the demands of metacognitive and cognitive are high for all successful learners, especially the learning environment where setting goals and choosing strategies are encouraged will promote learners' metacognition (Ames, 1990; 1992).

Language and metacognition

Using a language to learn and learning a language are both related to metacognition. According to Vygotsky's theory(1978), language makes humans different from animals, and silent speech is a way of thinking. When humans are young, they ask questions to their parents. When they grow up, they get used to using silent speech to ask questions to themselves, and this is the thinking processes. Language, no matter a sign language or a spoken language, is the means to communicate and impart knowledge. Without language, academic learning is impossible. Therefore, many studies have been done on the relationship between language development and metacognition. Research (Cotterall and Murray, 2009) shows that metacognition is important for language learning. In the process of language learning, people also develop their own metacognitive skills. Cotterall and Murray (2009) did a study on the use of metacognition of 400 Japanese students who learned English as a second language, and found that those who had a higher level of metacognition could perform better in language learning. Cotterall and Murray (2009) contend that learning language needs a long period of time. The time spent in the classroom is not enough for language learning and therefore, self-directed

learning with the help of metacognition lets learners understand the relationship among learners, strategies and tasks, and lead to successful learning. They identify five 'affordances,' which contribute to learners' metacognitive development: personalisation, engagement, reflection, experimentation, and support. 'Personalisation' is to know one as a learner, and how to adapt to their learning environment as a learner. 'Engagement' is to actively involve in the learning process instead of passively receive information from the teachers. This active engagement is an important part of metacognition. They need to learn how to motivate themselves in order to keep on learning without a teacher; they need to learn the language outside the classroom. 'Reflection' is to think about how they learn and how to improve. Reflection is also an important metacognitive strategy mentioned by Schraw and Dennison (1994) 'Experimentation' is a process to seek for suitable strategies for learning. Different learners have different strengths and weaknesses, and finding out one's weakness and strengths is a metacognitive strategy for learning. 'Support' is to know how and where to seek help from. A good learner should not be a self-isolated learner, and he/she should be able to seek help when necessary. Metacognition training for seeking help is important for success in language learning. Other than metacognitive strategies, metacognitive beliefs have been considered as important factors in language learning as well. Knowledge of cognition is related to self-efficacy, locus of control, and academic performance (Hammann and Stevens, 1998). How one believes his or her ability for language learning will affect their motivation, and therefore self-efficacy is highly related to language learning (Graham, 2003).

Metacognition training is useful for language acquisition (Palincsar and Brown, 1984; Jacobs and Paris, 1987) regardless of aptitude. When students are trained to use their own strategies and self-questioning methods, their performance will improve. In

some self-access centres, no training has been given to students, and therefore students consider the centre as a resource of information instead of a place where they can develop their autonomy of learning (Victori and Lockhart, 1995).

Just like the other domains, irrational beliefs will hinder language learning. Some students wrongly believe that they can only succeed in learning a foreign language if they started it when they were young, and this belief discourages them from putting forth more effort, and hence self-fulfil their beliefs (Victori and Lockhart, 1995).

Metacognition and Hong Kong students

Up to date, not much research on students' metacognition in Hong Kong has been done. Thomas and Mee (2005) posit that providing a metacognitive learning environment can improve the metacognition of the students. They did a study on the learning environment in Hong Kong, which they believe, affects the development of the students' metacognition level. In their study, teachers were trained to teach metacognitive strategies explicitly to some primary school students. The teachers told the students about their own thinking and learning methods in their daily classroom. The results found that the students' metacognitive awareness went up; however, the students were weak in the use of conditional knowledge, i.e. they did not know 'when' they should use the strategies. Thomas and Mee (2005) contend that it may be related to the school culture in Hong Kong primary schools where the teachers are usually in full 'control' of the classroom and seldom encourage academic autonomy. Students often rely on their teachers and they are not encouraged to make decision on their own. If teachers tell students about their own learning methods, it is a positive signal to the students, and this

will show the students a model of learning (Thomas and Mee, 2005). Mok et al (2007) did a study on 8,948 students from 12 primary and 12 secondary government-aided schools in Hong Kong for metacognition research, and found that most secondary school students underestimate their own metacognitive ability. The study of Mok et al (2007) shows that Hong Kong students score high in real academic performance in assessment, but score low in self-perception of metacognition competency. While western students are more optimistic, Asian students are more realistic; this may be due to the stiff competition in Hong Kong where students need to fight for comparatively rare opportunity for education. Mok's study (Mok et al, 2007) also shows that girls have higher self-rating in metacognition starting from primary school until secondary levels, and their average academic performance is also better than those of the boys. However, both girls and boys are continuously declining in their self-rating of their own metacognitive level, starting from primary until adolescence. This may be due to the increase in difficulty of the learning materials. Different from Mok's study, Downing's study (Downing et al, 2008) shows that male can use heuristic strategies better than female, while female students can motivate themselves and self-regulate themselves better, and female students are better than male students in academic performance. Further studies are necessary for the differences between genders in terms of the use of metacognitive strategies.

Downing et al (2008) used problem-based approach to improve the metacognition level of students. This involves the social and cultural impact on the learning processes instead of just teaching them the skills. They used real life problems to train the students. Their results were 'compelling' as mentioned by Downing et al (2008) that the differences between the two groups – the metacognition levels of the students who

received problem-solving learning approach are much higher than that of the students who received traditional learning approach in three years. They contend that firstly, learning environment should support active, discovery-oriented activities. Secondly, the interactions between learners and peers are very important for the cognitive development of the learners. Thirdly, instructional strategies are helpful for learners because they let learners beware of the conflict of their own thinking.

In another study, Downing (2009) used longitudinal method to study students for their metacognition levels. He did a study on metacognition development of the university students in Hong Kong. He used 300 students as his participants. He divided students by their G.P.A. into three groups: high achievers, average and low achievers, He used longitudinal study and measured their metacognition after three years. He first measured their metacognitive levels in 2005, and then offered them classes of metacognitive strategies in 2007 and 2008 respectively. He then measured their G.P.A and their metacognitive levels. He found that these three groups were significantly different in terms of accumulated G.P.A. as well as their metacognitive levels at the end of his study. He found that there were no significant differences among these three group students in terms of metacognition ability at the beginning. After three years, the metacognition levels of these three groups were significantly different. After three years, the low achievers showed deteriorating in both metacognition levels and academic performance. The students were measured in four areas, Anxiety level, strategies use, motivation and 'will'. The results showed that the anxiety level of high achievers and average students went up in three years sharply, while the low achievers went down first and then went up again, but still not up to the level of that of the high achievers and average students. These findings contradict the findings in some other countries that anxiety level is

negatively with academic performance. On the other hand, in both motivation levels and 'will' levels, the high achievers went up sharply, the average students went up moderately, and the low achievers went down continuously. In the area of the strategy skills, both high achievers and average students went up obviously, while the lower achiever went up a little bit. The study shows that metacognition grows with motivation as mentioned in the literature in western countries (Sungur and Senler, 2009). However, the anxiety levels of high achievers in Hong Kong also go up with time. Furthermore, Downing (2010) did a study on the impact of problem-based approach on the development of metacognition. The experimental group was some associated-degree students while the control group was full-degree students. After 15 months of training with problem-based approach to learning, the students trained with problem-based approach rose in metacognition levels dramatically while the students in the control group had no improvement in metacognition levels, even though these students had higher metacognition before the experiment. Although metacogntion levels showed a big difference among the groups, Downing's study did not show the real academic performance of these two groups after the experiment.

Metacognition training

Metacognition can be learned, and explicit strategy instruction is very useful for students to improve their learning (Palinscar and Brown, 1987; Howard et al, 2001a; 2001b; Mevarech and Fridkin, 2006; Pressley and Gaskins, 2006; Rezan et al, 2006; Michalski et al, 2007). Some researchers consider metacognitive training as a psychological preparation for learners' autonomy (Victori and Lockhart, 1995).

Mevarech and Kramarski (2003) posit that once students have learnt metacognitive strategies, they will use them not only in an immediate situation, but also other situations in the future.

Training for the use of metacognitive strategies

Plenty of studies (Veenman et al, 1994; Mevarech and Kramarski, 1997; Ruan, 2004; Mevarech and Fridkin, 2006) show that metacognition instructions are useful in learning activities, especially in domain-specific training. Studies (Brown et al, 1983; Paris et al, 1984) show that strategies learned in one subject do not automatically transferred to another domain. However, it will be easier for experts in one field to learn strategies in some other areas. In terms of the training for general metacognitive skills and domain-specific metacognitive skills, they posit that the metacognitive skills from specific domain will help learners get access to particular tasks in that domain right away; however, the transfer of skills to other areas is not as smoothly as the metacognitive skills learned from the general training.

By analysing research literature for the studies of metacognitive training, Brown and Palincsar (1982) contend that there are three kinds of training: blind training, informed training and self-control training.

In the blind training, the subjects or participants are taught some learning strategies, but not told the rationale behind. They are just shown how to use the strategies to solve problems, but given no other information.

For the informed training, the participants are taught the strategies, the terms of the strategies, as well as the reasons and benefits of the strategies, so they know that they are learning some strategies on purpose. They are told that the strategies are useful and they

can use the strategies whenever they think is suitable.

For the self-control training, the participants are told not only strategies and rationale but also taught how to self-monitor their own learning processes. They are encouraged to try out the strategies so that they can be familiar with the strategies and self-monitor the way they use the strategies.

The study of Brown and Palincsar (1982) showed that the participants with 'self-control' training performed the best while participants with 'informed' training performed better than those who received only 'blind' training.

Flavell (1979) posits that metacognition will improve with practice, and metacognition can develop when learners gain more experience in a particular domain. Research (Lee et al, 2010) shows that experienced teachers have a stronger metacognition level in teaching than the new teachers even though they have the same academic background. It may show that experiences in teaching may change their metacognitive skills. This seems the same as the blind training mentioned by Brown and Palincsar (1982).

The research of Mevarech and Kramarski (1997) showed that junior high school students who were exposed to metacognition instructions could perform in mathematics better than their counterparts who did not receive any. Some other research (Mevarech and Amrany, 2008) shows that metacognitive instructions will make a difference in mathematics performance.

Metacognition training is also useful for problem solving. The problem solving skills are not innate but learnt. After training with metacognitive skills, students can improve their problem solving skills (Delclos and Harrington, 1991).

Sungur and Senler (2009) contend that having high metacognition level as an

individual doesn't mean that he or she will use their metacognitive skills when solving problems. This depends on whether the environment is encouraging or not, such as classroom environment and social-cultural environment. Sungur and Senler (2009) suggest that promoting learning autonomy may help learners use their metacognitive skills. Supports from instructors and peers are also important for the developing of metacognitive skills. Through discussion and experience sharing, learners will know more about their learning processes and improve their metacognitive awareness (Fisher (2002).

In reading and writing, it is helpful if the teachers can model the processes. Teachers should make their thinking public, so that students can model their thinking (Hall et al, 1999). Since thinking process is unobservable, thinking aloud is a way to model metacognition. Fisher (2002) suggests that it is more important to show the students the metacognitive skills through working together rather than just teaching the students the 'thinking skills'. According to Fisher (2002), metacognitive modelling is not in wide spread use. It is easier to apply metacognition modelling in some contexts than others.

The most common methods used in metacognitive instructions are strategies for improving memory skills, writing skills, comprehension skills, and problem-solving skills for mathematics (Palinscar and Brown, 1987). Kuhn and Dean (2004) posit that metacognition training should focus on enquiry skills and arguments skills, because these skills do not emerge naturally, and therefore, educators need to help students develop these skills.

Research (Lam, 2010) shows that metacognitive strategy teaching can help activate learner's awareness of strategy use, but it is also need to raise the learner's awareness of their own existing strategies, because when learners are taught some target strategies,

they will decrease their use of pre-existing strategies (Lam, 2010).

Controlling the factors that affect the use of metacognition

Learning metacognitive strategies does not guarantee the use of metacognitive strategies. Bandura (1993) contends out that students do not use their metacognitive skills regularly, and the frequency of the use of these skills is based on their motivation and beliefs about the tasks. Some students know the strategies but do not use them in their own learning. Therefore, apart from methods, the training of metacognition should also focus on the factors that affect the use of metacognition.

Self-image Self-image of the learners is significantly correlated with their metacognition. Studies (Panaoura and Philippou, 2007) show that those students with high self-image are willing to use metacognitive strategies while those with low self-image are not willing to use their metacognitive strategies. Recent experiences of their academic performance will affect their self-image (Panaoura and Philippou, 2007).

Self-efficacy Bandura (1977) uses 'efficacy theories' to explain why some learners are motivated to use strategies and some are not. Studies (Pintrich and De Groot, 1990; Neber and Schommer-Aikins, 2002; Shu-Shen, 2002; Greene et al, 2004; Sungur, 2007) show that the use of metacognitive strategies is related to high level of self-efficacy. Self-efficacy refers to a learner's belief of his/her own ability to achieve a goal. If the learners believe that they have the ability to do it, they will use more metacognitive skills. Research (Lau and Chan, 2003; Klassen and Georgiou, 2008) also shows that the correlation between self-efficacy and academic performance, such as

reading comprehension, spelling, and writing is significant. Students who believe that they have control on their own learning will put more effort to achieve their academic goals (Bandura, 1993; Bandura et al, 1996). Some studies (Thomas and Rohwer, 1986; Bandura, 1993; Hoy, 2004) also show that learners with high competence expectation of themselves will try different strategies to achieve their goals and they are more persistent and willing to put more effort. Therefore, it is important to motivate students by improving their self-efficacy. Once they have high self-efficacy, they will be willing to learn and use strategies. Self-efficacy is the factor that affects learning motivation (Zimmerman, 2002).

Teaching metacognitive strategies to the students could help them improve their academic performance, but this has to be done when students are in their age of undergraduate life. If their self-efficacy has been damaged because poor performance, it will be more difficult to train them (Downing, 2009).

Hence, I would contend that the training of metacognition should focus not only on the cognitive and metacognitive strategies mentioned in this chapter, but also on the ways how to get rid of these negative factors or beliefs.

Part C PROCRASTIANTION AND ACADEMIC PERFORMANCE

One of the variables for this study is procrastination tendency. In this part, the literature review will focus on the phenomenon and definition of academic procrastination. It is then followed by the causes and consequences of procrastination. The literature on the treatment of procrastination and the relationship between matacognition and procrastination will also be explored.

The phenomena of procrastination

Knaus (2000) contends that procrastination might have begun 2.5 million years ago when humans were still in small clans. According to Ferrari et al (1995), procrastination is a behaviour that is so common that most researchers in the past would think that it was not worth investigating; nevertheless, procrastination does create a lot of difficulties for students when they pursue their academic goals. Some students cannot finish their schoolwork not because of their low intelligence or ability, but for the delay of their schoolwork or studies. More and more empirical studies have been done on procrastination since then (Blunt and Pychyl, 2000; DeWitte and Schouwenburg, 2002; Deniz et al, 2009).

There are at least two categories of research focusing on procrastination. One focuses on task performance and goal achievement, another one focuses on personal factors that lead to procrastination (Johnson and Bloom, 1995). These two kinds of research can help us know more about the nature of procrastination and its educational implications.

Daily procrastination

Procrastination is a common phenomenon in our daily life, and it is about 20% of adults suffering from chronic procrastination for daily jobs (Klassen et al, 2008).

Some investigators consider it as a personality trait (Orellana-Damacela et al, 2000; DeWitte and Schouwenburg, 2002). While most investigators consider procrastination as a trait, some wonder whether procrastination is just a dynamic behaviour instead of a trait (Milgram et al, 1988; Lonergan and Maher, 2000). Procrastinatory cognitions are positively related to trait procrastination (Stainton et al, 2000). Some studies (Schouwenburg, 1995; Blunt and Pychyl, 2000; Pychyl et al, 2000a) show that people are more likely to procrastinate doing a task that they have to do than a task that they want to do. The behaviour of procrastination of the same learners changes depending on time and situation, and the pattern characterised by a curvilinear function when given a deadline (Moon and Illingworth, 2005; Schouwenburg and Groenewoud, 2001).

Although some investigators (Moon and Illingworth, 2005) contend that trait based assumption of procrastination may not be adequate to explain all procrastination phenomenon, personality trait is still worth investigating for procrastination, as some procrastinators cannot control themselves and seek help from professionals (Knaus, 2000).

Although this phenomenon happens everywhere, serious consequences are mainly observed in communities where punctuality is considered as important. Milgram (1991) considers procrastination as a ‘modern malady’, which appears to be more common in more developed communities. It is reasonable to say that if there is no limitation of time, there is no sense of procrastination. According to Ferrari et al (1995), the more

industrialised a society is, the more important for the concept of procrastination, and the concept of procrastination does not prevail in many pre-industrialised countries (Ferrari et al,1995). In industrialised society, it is not uncommon to see deadlines are set for jobs. When a person delays a job after a point of time at which the job is supposed to have been done is considered to be procrastination.

Definition of procrastination

The original meaning of the term 'procrastination' is different from the meaning we are using nowadays. In ancient Rome, 'procrastination' meant a wise delay in military strategies (Ferrari et al, 1995). Since then, many investigators have tried to give a definition to 'procrastination'. However, some definitions seem to be *extensional* instead of *intensional*. For the present study, we need an *intensional definition* for the variable of procrastination, which means we only need the 'necessary and sufficient' elements for the definition.

According to Silver (1974), 'procrastination' is to finish a job after the optimal time. Optimal time means the most appropriate time. This definition features the essence of procrastination. If one cannot finish a task at the optimal time, it is a sort of procrastination (Silver, 1974; Silver and Sabini, 1981).

Some researchers (Silver, 1974; Milgram et al, 1992) suggest that the delay should create a feeling of discomfort and anxiety. This sense can be caused by oneself or by society, because either they want to do it or society wants them to do it. If they do not think a task is important, they don't want to do it.

Milgram (1991) gives a clear definition to procrastination by dividing it into four elements. Firstly, it is a sequence of postponement. Secondly, it produces substandard

products. Thirdly, it must be related to a job considered as important by the procrastinator. Fourthly, there is a feeling of frustration as the result of procrastination. However, I do not agree with the second and the fourth elements. Nobody can guarantee that procrastination must lead to substandard products, and therefore, it cannot be part of the *intensional definition*. Likewise, some procrastinators do not care about their procrastination behaviour, and some of them may get used to it. The most we can say is that procrastination can lead to poor products or a sense of guilt.

Ferrari (1993; 1994) argues that although procrastination can be self-defeating, it can also have another purpose. According to him, there are two kinds of procrastination: one is functional, and another one is dysfunctional. The dysfunctional procrastination happens only when it leads to negative consequences. If one does it on purpose as a strategy and does not lead to a negative consequence, it is functional. For instance, delaying a task in order to wait for more information coming (Ferrari, 1994). This 'functional' definition seems close to the definition of strategy used by Roman military mentioned above. Choi and Moran (2009) also suggest a new construct of procrastination, which is 'active procrastination'. According to them, active procrastinators delay their job to the last moment on purpose in order to use the time pressure to motivate themselves to finish their tasks. This active procrastinators are highly motivated to do their tasks and do not avoid their tasks, they just cannot do it without time pressure. Active procrastinators do not necessarily sacrifice the quality of their work. Choi and Moran's 'active procrastination' seems to be similar to Ferrari's 'functional procrastination', and Choi and Moran give detailed explanation for the purpose of delay. It is to create pressure to finish the targeted goals. For instance, some graduate students have all ideas in their mind, but cannot start writing until the pressure

goes up to a level, then they start pushing themselves to write. Therefore, it is a kind of procrastination. Here we can see that not all procrastinators produce sub-standard products mentioned by Milgram (1991).

By comparing all these definitions, I adopt the definition for procrastination by Silver (1974) as a delay of tasks until it has passed an optimal time. My use of the term 'procrastination' in this study includes the following elements:

1) There is a delay of a task that is supposed to be completed at a point of time.
2) This point of time is perceived individually or socially to be the last point of time for the task to be finished.

If the delay is a strategy in order to gain more; for instance, delaying an attack until your enemy are tired, it is not considered a kind of procrastination for this study. My definition in this study is a delay in which the procrastinators are supposed to finish a task, but cannot do so on time.

Different kinds of procrastination

The focus of my study is on academic procrastination, which is not a 'one-go' procrastination, which is a tendency and or a habit. It may be rooted in daily life behaviour. Therefore, it is necessary to know the phenomenon of procrastination in all aspects.

Ellis and Knaus (1977) contend that there are at least three kinds of procrastination: Delaying in personal development, delaying in personal maintenance and delaying in accomplishing responsibility. Delaying in personal development is to fail to achieve set goals; Delaying in personal maintenance is to fail to finish the daily chores that help

make daily life easier; Delaying in responsibility is to fail to do the tasks that should be done on time so as not to bring inconvenience to other people. These three kinds of delay make the procrastinators' lives miserable. Academic procrastination should entail the first and third type of their categories, when learners need to meet their academic goals, and accomplish their academic responsibilities.

Chronic delay of tasks is called dysfunctional procrastination in literature (Ferrari, 1993; Ferrari, 1994; Orellana-Damacela et al, 2000). Dysfunction procrastination consists of decisional procrastination and behavioural procrastination. Decisional procrastination is to delay making decision when there are alternatives to choose, while behavioural procrastination is to delay starting a task or completing a task (Orellana-Damacela et al, 2000). In academic learning, students need to make decision for their learning schedule, such as choosing between two activities: studies or going out with friends etc. For behavioural procrastination, some students just cannot start doing their job by distracting themselves to unimportant activities.

Jiao and Onwuegbuzie (1999) classify procrastination into five types: 1) Decisional procrastination – It is a delay in decision-making process. The procrastinators always hesitate when given choices. As they have difficulty making decision, they usually delay it until the last minute and as a result, the decision is not based on new information but the last minute choice. 2) Neurotic procrastination – It is a delay in a major life decisions, such as career, marriage etc. That will diminish the chance of success because of the delay. 3) Compulsive behaviour – It is a compulsive behaviour to do some other unimportant things when the important things are not done. 4) Life routine procrastination – It is to put off daily chores and not to finish them. They may think these chores are boring or not important. 5) Academic procrastination – The procrastinators

are not being able to finish the school assignments on time. School assignments include all kinds of academic work, such as preparing for a test, submitting school term papers etc. Although they classify procrastination into five types, I would contend that the first three types are about the nature of procrastination, while type 4 and 5 are the types of job that they delay. Academic procrastinators can involve compulsive behaviour and they can have difficulty in decision-making as well.

From the perspectives of these investigators, academic procrastination is one of the major types of procrastination.

Academic procrastination

Some investigators (Milgram et al, 1995) contend that academic procrastination is an 'endemic', and therefore has got most attention in all kinds of procrastination. According to the study conducted by Orellana-Damacela et al (2000), about one-half of college students reported to be procrastinators, and it is consistent with the study of Solomon and Rothblum (1984). Even students from Ivy League reported to have procrastinated for their studies (Knaus, 2000).

Definition of academic procrastination

To Wolters (2003), academic procrastination is the delay of academic work, even though one wants to complete it on time. For university students, this is closer to reality, because no college students would like to delay their work on purpose in order to get a poor grade.

According to Deniz et al (2009), academic procrastination is the delay of academic

responsibility, such as submitting schoolwork or a delay of preparation for examination (Deniz et al, 2009). This gives a clearer picture of academic procrastination. Academic responsibilities include not only written work, but also studying, appointments with tutors, preparation for examinations and tests etc. Academic procrastination is the delay of an academic responsibilities until it has passed the optimal point of time (Solomon and Rothblum,1984; Hess et al, 2000).

When procrastination has repeated many times and it becomes a habit, this will be considered as a personal trait (Schouwenburg and Lay, 1995). According to some studies (Ellis and Knaus, 1977; Schouwenburg, 1995; Ferrari et al, 1995; Jiao and Onwuegbuzie,1999; Klassen et al, 2008), there are about 70-95% of the undergraduate students who have experienced academic procrastination, while 50% of them have a tendency of procrastination (Hill et al,1978; Solomon and Rothblum, 1984) and 20-30% of them are considered as severe procrastinators (Klassen et al, 2008). Even worse, in the study of Beck et al (2000), academic procrastination is a chronic problem of about 70% of the college students.

By reviewing these definitions, I find the following factors have been suggested:

1) A delaying behaviour
2) Involve academic responsibilities
3) An externally set optimal time, such as dates for examination, deadlines for term papers or assignments.

I therefore adopt the following definition for this study:

'Academic procrastination is the delay of academic responsibilities until they have passed an externally set optimal time.'

Characteristics of academic procrastinators

Brownlow and Reasinger (2000) contend that procrastinators have the following characteristics:

1) Academic procrastinators may have difficulty in self-regulation, such as setting plan, and pursuing goals.
2) Academic procrastinators are dissatisfied with their own performance, and often earn lower grades than the non-procrastinators.
3) Academic procrastinators spend less time on their studies, start to work later than the time they plan to, and delay in submitting their assignments.

I would contend that the first and third points are the characteristics of procrastinators. However, whether all procrastinators have poor grades will be discussed later in this chapter and it is also the focus of the present study.

Causes of academic procrastination

Without knowing the causes of procrastination, it is impossible to help procrastinators get rid of this bad tendency or habit. Procrastinators may not be able to understand the main reasons why they procrastinate. According to Knaus (2000), procrastinators will justify their own delay with one reason, and give another reason to

other people. For instance, they will tell others that they delay because there is an unexpected event, but they may tell themselves that they want to take a rest first (Knaus, 2000).

Knaus (2000) contends that there are three kinds of diversionary activities that cause procrastination: mental, action and emotional diversions. In mental diversions, procrastinators either tell themselves they can complete a task better if they do it later, or they tell themselves that they must do something else first. In action diversions, procrastinators do a low priority task instead of the target task; for instance, reading a tabloid instead of writing a report. In emotional diversions, procrastinators try to reduce their stress by doing some 'feel good' activities, such as waiting to be inspired (Knaus, 2000).

There is no relationship between procrastination and intelligence (Taylor 1979; Ferrari, 2000). According to some research (Aitken, 1982), procrastinators might even have higher scholastic aptitude scores.

Some studies show that gender is not significantly correlated with procrastination (Effert and Ferrari,1989; Schouwenburg, 1992; Johnson and Bloom, 1995; Hess et al, 2000; Ferrari, 2000; Watson, 2001; Kachgal et al, 2001; Klaseen and Kuzucu, 2009; Gafni and Geri, 2010). Rothblum et al (1985) found that 57.4% of the female students were high-procrastinators, and 32.4.6% of the male students were high procrastinators in their study. However, there are some contradictory studies (Senecal et al, 1995; Ozer and Demir, 2009) show that male is more prone to procrastination than female. There can be a mediator-variable, such as culture or social attitudes that cause procrastination, instead of biological reasons (Ozer and Demir, 2009).

For the causes of procrastination, there are different theories and many empirical

studies have been done. According to Wolters (2003), procrastination may be a trait, such as perfectionism or self-consciousness. It can also be a state under a special situation, such as fear of failure or task aversiveness (Wolters, 2003).

There are different reasons for procrastination. Some students procrastinate because of temporal reasons, i.e. to enjoy themselves first before starting to work. Some students procrastinate because they don't know how to start working. Some students procrastinate because they are under stress and avoid the tasks. Other than job avoidance, some procrastinators are not able to begin their work and always want to start it later (Haycock et al, 1998). Research (Reasinger and Brownlow, 1996) shows that procrastination is a result of mixed factors, such as motivation, personality, perfectionism, and attribution style. The other reasons include 'being pushed by friends to do some other things', 'overwhelmed by the tasks', 'it takes too long to write a paper', 'not being able to begin a task', 'don't like term papers', ' worried about not being able to meet own expectation', 'worried to get a bad grade' (Kachgal et al, 2001).

By reading the literature of procrastination, I would contend that the following categories may include most of the main causes of procrastination, and I classify them into seven groups of theories. They are natural-instinct theories, motivation theories, time-management theories, self-esteem-protection theories, personality-traits theories, cognitive theories, and past-experience theories.

Natural instinct theories

Procrastination can be a natural normal instinct and non-procrastination is a social imposed behaviour. According to McCown (1986), behaviourists posit that procrastination is humans' preference for pleasurable activities and short-term reward.

Humans naturally want immediate satisfaction, instead of rewards that they have to wait.

These theorists (Ainslie, 1975; 1992) posit that human tend to put off jobs that have distance consequences. Humans prefer short-term goals to long-term goals because humans want to enjoy a sense of satisfaction right away (Ainslie 1975; 1992). When there are many choices available, such as social gathering, watching movies, and sports, many students will choose the one they think is most enjoyable and put aside their studies if they think the award for studies is a distant consequence. Some research (McCown et al, 1987) shows that being extrovert is directly proportional to procrastination. Research (Dietz et al, 2007) also shows that students who have a tendency to enjoy leisure activity would likely procrastinate for academic work. Nevertheless, these theories cannot explain why some students do not procrastinate without an external deadline, if procrastination is a natural instinct of human beings.

Motivation theories

In the study of Kachgal et al (2001), they found that about 78% of the procrastinators said that they were just too lazy to finish their tasks, but Kachgal did not defined the term 'lazy.' By reviewing the literature of education, there are not many investigators who give operational definition to the term 'lazy'. Literally, it is just unwilling to be active or do something. The procrastinators may mean they are unmotivated in learning or they are not interested in a particular subject.

Motivation is one of the main factors related to procrastination. It is believed that if students are highly motivated in their studies, they do postpone their studies. Research (Klassen et al, 2008) shows that motivation is negatively related to procrastination. Tuckman (1998) contends that academic procrastination is the result of lack of

motivation. Some students procrastinate to submit their assignments and delay in learning because they are not motivated. Some students put some other activities, such as going out with friends or watching movies, on the list of their priority in front of academic work, because they are just not interested in learning. Research (Dietz et al, 2007) shows that learners' values affect their motivation when they make a choice between academic work and leisure activities. According to Dietz et al (2007), students dominated by post-modern values (tolerance, appreciation of social contacts, self-actualisation etc.) tend to procrastinate more then those who embraced modern values (such as hard work, security and prosperity etc). Tuckman (1998) posits that it is difficult to motivate procrastinators who put off their tasks until the last minute. It is difficult to improve their situation unless changes have been introduced to enhance their motivation (Tuckman, 1998). According to Reasinger and Brownlow (1996), un-motivation is a predictor of procrastination.

There are two kinds of motivation which are mostly discussed. They are intrinsic motivation and extrinsic motivation. Learners' behaviours are affected by intrinsic and extrinsic motivations. Learners with intrinsic motivation learn because they like the content , and therefore they do not procrastinate, while learners with extrinsic motivation procrastinate more because they try to avoid the pressure caused by external awards or punishments (Orpen, 1998).

Behaviourists believe that behaviour can be re-enforced by awards. If one can get an award or avoid being punished by doing something, this action will be re-enforced and will continue. Behaviourists believe that procrastination is a behaviour, which has been reinforced because the procrastinator managed to escape punishment successfully in the past (Bijou et al, 1976). For example, if a student is not punished for submitting late

homework, his behaviour will be re-enforced. Some students can finish their homework at the last minute, they will believe that they have this ability and therefore their behaviours become re-enforced (Ferrari, 1993). In reality, most of the learning activities involve external control, such as the requirements of our society, and these are essential for our learning; for instance, memorising the multiplication tables is not likely to be interesting but it is a must for learning mathematics (Senecal et al, 1995). When there is a lack of external motivation, students who have no interest in academic learning will have no social purposes and they tend to procrastinate.

Without external control, some students can still be attentive and perform well, because they have high interest in academic learning or a particular subject. This is called intrinsic motivation. The study of Orpen (1998) shows that intrinsically motivated students are less likely to procrastinate academically, while extrinsically-motivated students procrastinate more than the intrinsic-motivated counterparts. The study also shows that procrastination is related to the learner's attitude towards the academic courses. Learners with both internal and external motivation procrastinate least (Brownlow and Reasinger, 2000). Research (Lau and Chan, 2003) shows that learners with low intrinsic motivation have poorer comprehension performance and use fewer strategies. Intrinsically motivated students entailed in deep-level processing which involved comprehension while extrinsically-motivated students entailed in surfaced processing, which involved rote-memorising (Orpen, 1998). Intrinsic motivation is highly related to strategy use and performance (Lau and Chan, 2003). It is not difficult to imagine that when one likes something very much, he or she will do it without being urged. This situation also applies to academic learning. When students have intrinsic motivation, they would like to accomplish their jobs without prompted by their teachers;

however, intrinsic motivation may be undermined by external factors, such as deadline or surveillance, and therefore minimise the original drive (Brownlow and Reasinger, 2000). Some other research (Conti, 2000) also shows that extrinsic motivation is essential for the prevention of procrastination. Therefore, it is important to help students develop their intrinsic motivation and help them find the extrinsic motivation that can help motivate them to accomplish their academic tasks.

Motivation theories seem to be useful to explain procrastination; however, research (Kearns et al, 2008) shows that procrastination is a serious problem among PhD students, a group of students who are supposed to be highly motivated. These theories seem to have difficulty in explaining this phenomenon.

Time management theories

Poor time management is one of the reasons for delay (Balkis and Duru, 2007), and procrastinators are often considered as having problem in their time estimation (Pychyl et al, 2000b).

I would contend that there are two kinds of time-management problems. The first one is miscalculation of time, and the second type is the lack of self-regulated skills.

For the first type, some students bear a wrong concept of time and miscalculate the time available for them to finish their assignment (Ferrari et al, 1995). Some high wishful thinkers tend to over-estimate their ability in completing tasks in a time interval; as a result, they procrastinate (Sigall et al, 2000). For this kind of procrastinators, external imposed deadline may help learners to complete their plan. Research (Buehler et al 1994) shows that most students can finish their tasks before deadlines, even though they are still later than their own predicted time (Buehler et al 1994).

The second type of time management is a lack of self-regulated skills. The lack of self-regulated skills will lead to procrastination (Tuckman and Sexton, 1989; Senecal et al, 1995). Self-regulated skills, such as planning, self-evaluation, and self-motivation are important to get one to take action (Ferrari et al, 1995). Some students do not have a plan for their studies and assignments, while some students plan for their academic work but do not follow the schedule (Ferrari et al, 1995). These skills are not innate, but can be learned. Given clearer instructions, they will enhance their ability to follow their schedules (Milgram et al, 1992). If learners perceive that previous plan failed because of unstable or uncontrollable factors, they will not connect the past experiences to the present or future plan; hence, they will become over-optimistic again (Buehler et al, 1994). Planning is an important part of self-regulation. Without planning, it is unlikely to complete academic responsibilities on time. The term 'plan fallacy' was coined by Kahneman and Tversky (1979), which means people are tend to be over-optimistic about their planned time to complete a task. Planning fallacy not only takes place among students, it is also a common phenomenon that it prevails among academics (Buehler et al 1994). Planning fallacy is an optimistic bias and it leads to frequently under-estimate the time needed for tasks (Pychyl et al, 2000b).

Research (Wolters, 2003) shows that self-regulation is a good remedy for academic procrastination. When students can self-regulate their work, they are less likely to procrastinate. Procrastination might be considered as a failure of self-regulation (Dietz et al, 2007).

Self-esteem protection theories

Self-esteem is related to procrastination (Ferrari, 1991b). Self-esteem is how the

students see themselves and how they think about the other people would see them. Ferrari (1991a; 1992) contends that procrastinators put off their tasks in order to 'save face', because their ability would not be tested if their tasks had never been done.

Research (Ferrari, 1991b) shows that there is a negative correlation between procrastination and self-esteem, which means the higher level of self-esteem, the lower level of procrastination (Ferrari, 1991b).

This is a common phenomenon in university, when students believe that asking the others would hurt their self-esteem. Not many students would like to acknowledge that they procrastinate because of their lack of capability, but would rather refer it to other reasons (Milgram et al, 1995). Some procrastinators will rationalise their procrastination by blaming others instead of themselves over their procrastination behaviour, such as being a victim of 'bad parenting' (Knaus, 2000).

In empirical studies, some constructs seem to be related to self-esteem. These include fear of failure, self-handicapping, and social-evaluation.

Research (Berry, 1975; Burka and Yuen, 1983; Solomon and Rothblum,1984; Ferrari et al, 1995; Ferrari et al, 1998; Beck et al, 2000) shows that fear of failure is a factor that leads to procrastination. Many students do not start to work, because they are afraid of failure, which will hurt their self-esteem.

Self-handicapping is also a factor related to procrastination (Garcia et al, 1995). Self-handicapping can be used as a strategy to defend one's self-esteem. By delaying doing the job, one can say that the job is not completed because of the lack of effort instead of his/her ability (Garcia et al, 1995). Beck et al (2000) contend that self-handicappers are with a fragile self-esteem. They use different self-handicapping excuses to procrastinate, and justify their own behaviour when not following their own

learning plan or not making any progress in their study. For instance, college students may report that they procrastinate because they want to improve the quality of their personal life; for instance, they need time for their friends and relatives (Schraw et al, 2007). It is not an uncommon phenomenon among university students that they cannot focus on their work, even though there are no distractions; some students will look for some unimportant things to do instead of their own work. As a result, their self-handicapping excuses affect their academic work (Balkis and Duru, 2007). Self-handicappers usually attribute their success to internal reasons, and attribute their failure to external reasons, and they tend to deny their disliked experiences and give themselves reasons to explain their own plan fallacy (Buehler et al 1994). By means of procrastination, self-handicappers use 'hope' to help them achieve a sense of relief instead of facing the reality (Knaus, 2000). In this way they can protect their self-esteem.

Social-evaluation also creates a feeling that threatens self-esteem, and this may lead to procrastination in some students. Research (Ferrari and Tice, 2000) shows that procrastinators put off their jobs when they find the jobs are evaluative and threatening; if the tasks are labelled as fun and not for evaluation, they do not procrastinate. Bui (2007) posits that high trait procrastinators try to delay when facing high evaluation threats, but do not delay when they are not evaluated. High threats mean that social evaluation may hurt their self-esteem, and therefore they delay in order to avoid negative comments. However, in a low level of evaluation threats, high procrastinators work harder to finish on time, but low procrastinators delay more (Bui, 2007). It seems that low procrastinators are motivated to work hard when there are evaluation threats, while high procrastinators are impaired by the threats (Bui, 2007). Research (Gafni and Geri, 2010)

shows that students seem to be influenced by their peers when completing their tasks. If a critical number of students complete their tasks, other students will try to avoid procrastination. It seems that they are afraid to be negatively evaluated by their peers.

Self-esteem protection theories seem to be able to explain the behavior of procrastination. According to these theories, self-esteem is negatively related to procrastination. When one's self-esteem is high, he/she does not need to procrastinate in order to protect their self-esteem. Once again, it is difficult to explain why procrastination is a serious problem among many university students and PhD students, who are supposed to have high self-esteem. Does it mean that these people's self-esteems are also fragile?

Personality-traits theories

Literature on procrastination shows that personality traits are important factors related to procrastination

Perfectionism Some research (Seo, 2008) shows that self-oriented perfectionism can raise self-efficacy and negatively related to procrastination, but some other research (Burns et al, 2000) shows that perfectionism can be a cause of academic procrastination. Some students want their schoolwork to be perfect, and therefore delay submitting their work until the last minute. Seo (2000) posits that perfectionism consists of three constructs: self-oriented perfectionism, social-oriented perfectionism, and other-oriented perfectionism. Self-oriented perfectionists are those who want to enjoy a sense of satisfaction and cannot tolerate any of their own mistakes. Self-oriented perfectionists impose unrealistic standards to themselves. They feel very stressed to submit an

imperfect assignment, and therefore they delay until the last minute. Socially-prescribed perfectionists care too much about how other people see them. They are afraid of criticisms and hence wait until the last minute before other people can judge their work. Socially-prescribed perfectionists believe that significant others, such as their relatives and friends have imposed an unrealistic standards on them and therefore they should reach these goals in order to please the significant others (Onwuegbuzie, 2000). On the other hand, other-oriented perfectionists impose unrealistic standards on other people. They not only want themselves to be perfect but also others to be perfect. This perfectionism is not related to procrastination, and is not our focus. According to Seo (2008), there is a positive relationship between socially-prescribed perfectionism and academic procrastination, but no agreement among investigators about the relationship between academic procrastination and self-oriented perfectionism. Perfectionism may explain the delay of submission of assignments, but it seems difficult to explain the delay of daily learning and preparation for tests and examinations. Perfectionists tend to suffer from anxiety as they are expecting unrealistic standards (Onwuegbuzie, 2000).

Conscientiousness Conscientiousness is another construct that investigators are interested. A number of studies show that conscientiousness is negatively correlated to procrastination (Johnson and Bloom, 1995; Schouwenburg and Lay, 1995; Lay, 1997; Van Eerde, 2004). However, this factor is very special and different from other factors because conscientiousness and over-conscientiousness have opposite effects on procrastination. Students who are conscientious do not procrastinate but students who are over-contentious tend to procrastinate. On the other hand, the lack of conscientiousness also leads to procrastination (Lay, 1997). Lack of conscientiousness may make the

students miscalculate their time, or maybe they don't even set their plan for their learning progress.

Self-consciousness When learners always want to look good in front of the others, they would not take risk in academic learning. As a result, for difficult academic assignments, they may postpone until the last minute. According to Lee (2005), self-consciousness is a positively related to procrastination because people with high self-consciousness are worried about how people think about them. They are not confident in themselves, and their self-esteems are fragile. However, some study (Beck et al, 2000) shows that the correlation between self-consciousness and procrastination is not significant. Further studies are needed to find out the relationship of these two variables.

Neuroticism Neuroticism is a tendency to breakdown when facing stress. Hess et al (2000) posit that neuroticism is related to procrastination. Some empirical studies (Johnson and Bloom, 1995; Schouwenburg and Lay, 1995; Watson, 2001) show that neuroticism is positively correlated to procrastination. Individuals who score high in neuroticism are likely to suffer anxiety and depression (Matthews and Deary, 1998). Depression is the sad feeling after an incident; for instance, a failure in an examination (Rothblum et al, 1985). When students cannot tolerate any mistakes, failure or frustration, they would just do it at the last minute and do not care about the quality of the work, or often do not complete their work (Ellis and Knaus, 1977). Different from depression, anxiety is to worry about what will happen in the future (Ferrari et al, 1995); for instance, worry about next week's exam. Anxiety is a factor that causes procrastination (Haycock et al, 1998; Milgram and Toubiana, 1999; Onwuegbuzie and

Jiao, 2000). Overall high-procrastinators reported high level of anxiety (Rothblum et al, 1985). Level of anxiety is positively related to procrastination. When learners are in a high level of anxiety, they will not able to concentrate on their studies, and become emotional. Procrastinators with low level of anxiety can do quickly if they are given leeway, but a high level of anxiety makes these procrastinators avoid the tasks, and delay more when given leeway (Milgram et al, 1992). Procrastinators tend to decrease their delay when their anxiety reaches their peak level (Rothblum et al, 1986). Since students are supposed to attend school voluntarily in college level, their feelings about the courses and the learning materials may play an important role in procrastination (Senecal et al, 1995). There is a strong relationship between academic procrastination and subject anxiety; for instance, Onwuegbuzie's study (2004) shows that procrastination and statistics anxiety are positively correlated. Other than attending classes, the use of library is very important for academic learning for university students. Research shows that high-anxious graduate students procrastinate typically when they need to do library tasks (Jiao and Onwuegbuzie, 1999). Library use is important for academic success, and anxiety levels leading to procrastination in using library is a serious problem for learning.

When facing stress, some students will delay their studies or work, and procrastination becomes a tool to cope with stress (Flett et al, 1995). Paradoxically, research (Ferrari et al, 1995) shows that reduction in life-stressors also cause procrastination in some cases. Some people can only perform well when there is a high level of stress and they are not able to accomplish their tasks punctually when the stress level is going down to a lower level.

Cognitive theories:

Procrastination is not just an inadequacy in study skills, but also has reasons for its cognitive components (Rothblum et al, 1985). Silver (1974) argues that procrastination takes place when the tasks involve more complex cognitive structuring. This helps explain why 'starting to do a task' is so difficult because 'beginning' needs to make choices among many options, which requires more cognitive structuring. Cognitive theorists believe that human behaviour is interacting with their own cognition. People tend to accept a conclusion that is consistent with what they want and avoid making a conclusion that they don't want (Sigall et al, 2000). Wishful thinking is how our cognition being affected by our motivation, i.e. our judgment will be biased by our desires (Sigall et al, 2000). When a task is attractive and pleasant, the high-wishful thinkers do not procrastinate; however, they put off a task that they consider as unpleasant (Sigall et al, 2000). As a result, people behaviors are affected by their beliefs and values, and procrastination is no exception. There are different cognitive theories to explain the behavior of procrastination.

Self-efficacy A very important concept in social cognitive theories is 'self-efficacy', a term coined by Bandura (1977). Self-efficacy includes efficacy expectation and outcome expectation (Bandura,1986). This is how a learner thinks about his/her own ability in a particular domain and this belief will boost or hinder his behaviour in learning. Bandura (1997) argues that one's confidence in his/her own ability in completing a task will make one try his/her best to accomplish the task. Research (Haycock et al, 1998; Klassen et al, 2008; Klassen et al, 2009) shows that self-efficacy is a good predictor of procrastination as they are negatively related. When students are very young, their

self-efficacy is high; however, when they grow older, their self-efficacy becomes lower (Mok et al, 2007). It is probably that they start to compare themselves with their peers, and average students will think that they are not better than their peers, and these average students comprise the majority of the population. Self-efficacy is an important factor for self-regulated learning, and low self-efficacy would lead to procrastination. When learners hold negative beliefs about their own capabilities in academic work, they will procrastinate (Balkis and Duru, 2007). Strong efficacy leads to persistence while weak efficacy beliefs will lead to job avoidance (Milgram et al, 1992).

Irrational beliefs 'Irrational beliefs' causes procrastination (Rothblum et al, 1985; Beck et al, 2000). Some students procrastinate because they want to enjoy the sudden and intense release of stress (Schraw et al, 2007). Some students procrastinate in order to achieve 'peak experience'; when time is limited, they can focus easily and finish their work more efficiently (Schraw et al, 2007). Solomon and Rothblum (1984) contend that a cognitive factor (irrational belief) has a significant correlation with procrastination. Some students legitimise procrastination by saying that it is a necessary evil; in this way, they can protect themselves from a sense of guilt; others lower their expectation of their grades (Schraw et al, 2007). Some other research (DeWitte and Schouwenwoud, 2002) shows that procrastinators do not work until the last minute, and then compensate the delay by working more hours. In the study of Schraw et al (2007), some students reported that they delayed submitting their work until the last minute because they did not want to wait for the feedback; they could get the feedback sooner if they submitted their work in the last minute (Schraw et al, 2007). Schraw et al (2007) posit that procrastination can be a kind of behaviour of misconceptions. Some people procrastinate

because they have some irrational beliefs about their own ability to finish the tasks (Ellis and Knaus, 1977). If they think that they don't have the ability to complete a job, they will wait until the last minute. Some studies (Blatt and Quinlan, 1967; Taylor, 1979) show that there is no correlation between one's academic ability and the habit of procrastination, but a wrong belief of one's own ability may lead to procrastination; even very intelligent and capable people could have a habit of procrastination which results in incomplete jobs or unsuccessful goals. Attribution style is another belief that causes procrastination (Reasinger and Brownlow, 1996). The students who attribute success and failure to uncontrollable factors, such as luck, tend to procrastinate; the students who attribute their success to a controllable factor, such as hard work, will less procrastinate. Academic procrastinators tend to attribute their success to external factors. This shows personal beliefs can contribute to procrastination (Brownlow and Reasinger, 2000). Studies (Jansen and Carton, 1999; Beck et al, 2000) show that students who show an internal locus of control will have less procrastination behaviour, and some research (Rothblum et al, 1986) shows that high procrastinators attribute their good academic performance to external and temporary factors whereas low procrastinators attribute their academic success to internal stable reasons.

I would contend that Cognitive theories are useful for academic learning, because beliefs will affect behaviour, and behaviour will affect the outcomes.

Past-Experience theories

Childhood experience is considered as a cause of procrastination. Some researchers (Blatt and Quinlan, 1967; McCown et al, 1987) posit that procrastination is a sort of rebellion behaviour against authorities. Psychodynamic theorists contend that

procrastination is a subconscious activity, which is related to previous experience, especially childhood traumas. When the parents have very high expectation of their children, and set goals of which the children cannot reach, they would procrastinate to avoid criticisms from the parents. This theory believes that procrastination behaviour would continue when they become an adult (Levy, 1963; Van der Kolk, 1987).

Other than personal experiences, the experiences in different cultures may also affect their behaviour. Research (Prohaska et al, 2000) shows that people born out of the United States, regardless of ethnic groups, have less academic procrastination tendencies. This may be because of their previous experiences from different cultures and environments.

Consequences of procrastination and academic performance

Some investigators contend that there are some negative consequences for academic procrastination. Firstly, it causes stress and, therefore, there might be some physical symptoms, such as headaches and fatigue. Secondly, the procrastinators blame and belittle themselves, and it leads to a lower self-esteem. Thirdly, the tasks remain incomplete (Ellis and Knaus, 1977). All these consequences can affect the academic performance of the students to some extent.

Health and Self-esteem

Some researchers (Tice and Baumester, 1997; Ferrari et al, 1998; Wolters, 2003) posit that procrastination will lead to high anxiety and depression, therefore causes health problems. Procrastinators suffer from stress and illnesses. Tice and Baumeister (1997)

contend that procrastinators may enjoy at the beginning of the school term but suffer when the deadlines of assignments and the dates of exams approach. Trait procrastinators will also experience frequent negative automatic thoughts (Stainton et al, 2000).

In addition to stress and health problems, self-esteem is also affected. Some studies (Solomon and Rothblum,1984; Wolters, 2003) show that academic procrastination is negatively correlated with self-esteem. Procrastination affects the academic performance when students cannot submit their academic work. This inability feeling leads to low self-esteem. Procrastinators report that they perceive themselves as less control on emotional reactions (Rothblum et al, 1986). As a result, consequences lead to despair and self-blame (Burka and Yuen, 1990). Capability-performance gap can be the reason for being upset for academic procrastination; students feel upset when they think that they should have done it but did not (Milgram et al, 1995).

Health problems and low self-esteem are likely to affect the performance of all people, and there is no evidence that students are exception.

Academic performance

Academic procrastination is the delay on academic tasks, such as writing term papers and doing revision for examinations (Prohaska et al, 2000).

Research (Semb et al, 1979; Beswick et al, 1988; Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001) shows that procrastination is negatively related to academic performance.

Nevertheless, some studies (Lay, 1986; Pychyl et al,2000b; Chu and Choi,2005; Gafni and Geri, 2010) show that there is no significant correlation between procrastination and exam performance or the quality of assignments. Chu and Choi (2005)

contend that there are two kinds of procrastination, active procrastination and passive procrastination. Active procrastination is correlated to high Grade Point Average, with good life satisfaction. This kind of procrastinators delay on purpose in order to create a pressure to push themselves work; they focus on improving their quality of their work. On the other hand, passive procrastinators are those who just cannot finish their job on time; they are desperate and focus on their emotion when deadlines approach.

The reason of the discrepancy between these two different results may be seen in some research. According to Beck's study (Beck et al, 2000), procrastination did not affect much the performance of the weaker students. Students with low SAT (Scholastic Assessment Test) scores performed poorly in the exam even though they attended classes and did not procrastinate studying; students with medium SAT scores had to attend classes in order to perform well, procrastination did not affect much their performance. On the other hand, students with high SAT scores performed well only if they attended classes or did not procrastinate. They performed poorly if they both procrastinated and failed to attend classes. Beck et al (2000) contend that procrastination affect the students with stronger academic ability more than the students who have weaker academic ability. Some investigators (Pychyl et al, 2000b) contend that there can be a point of procrastination, only above which, the effect of the academic performance can been seen.

For academic performance, Roig and DeTommaso (1995) contend that procrastination is related to cheating and plagiarism; however, this theory needs evidence to support because it raises doubt why the procrastinators need to procrastinate if they dare to cheat and plagiarise in the first place.

Treatment for Academic procrastination

Many first-year college students have already got used to 12-year high school education system, which does not encourage self-paced education. As a result, many freshmen cannot self-regulate their learning processes. When given leeway for their own pace, they cannot motivate themselves to start their work. The removal of time constraint in college may bring difficulty to these students. Many university students suffer low grades or distress because of academic procrastination. It is important to locate these students before they drop out from college (Ely and Hampton, 1973).

Ranging from 27% to 46% of undergraduate always procrastinate, which means they are chronic procrastinators (Solomon and Rothblum, 1984). Another study (Schouwenburg, 1995) shows that about 70% of college students procrastinate frequently, while 20% habitually. In the study of Rothblum and his colleagues (Rothblum et al, 1986) the subjects were 379 college students, more than 40% of the college students reported that they always procrastinated until up to a considerable level of anxiety. This percentage shows that it is a very important issue among college students and they may need help from counselling or courses. For graduate students, the situation does not show better. In the study of Jiao and Onwuegbuzie (1999), they found that 55% to 65% of the graduate students wanted to get intervention for their habit of procrastination. Since high procrastinators have high and stable levels of anxiety, they are affected in academic (Rothblum et al, 1986). Therefore it is important to introduce some methods to the students.

Procrastination has a negative impact on academic performance, so it is usually and naturally given a negative label. In western history, procrastination has been connected to

law code, sin, and virtues (Knaus, 2000). Ferrari et al (1995) contend that procrastination should not be linked with morality. Only when procrastination is not connected with morality, it can be studied in a scientific way. Ferrari et al (1995) used Schizophrenia as an example. In the past when Schizophrenia was considered as a sin, researchers would not be able to investigate the disease objectively and scientifically. Therefore it is important not to label procrastination with a socially unacceptable image (Ferrari et al, 1995).

Since the impact of procrastination on learners is severe and negative, it is important to find out some remedies. The follows are some methods used by psychologists and educators.

Time management programmes

Time management programmes are to help academic procrastinators change their behaviour directly in order to achieve their goals on time. Onwuegbuzie and Jiao (2000) contend that students will benefit from time management programmes. According to Van Eerde (2003), time management training mainly asks students to record and manage their time, and mainly focuses on two main steps. Firstly, trainees are encouraged to recall what goals they value, and how they used to achieve these goals. Secondly, they will be asked to prioritize the goals and think of plans and time schedules to achieve these goals. Planning is very important for academic success (Semb et al, 1979; Wolters, 2003; Cotteral and Murray, 2009). Setting goals, breaking down tasks into smaller ones and changing the beliefs are important strategies to prevent procrastination (Burka and Yuen, 1990). Other than goal setting, experience sharing is also important. It is useful to provide venues for procrastinators to talk to their peers and share experiences in order to

overcome their difficulties. This kind of workshops shows very useful (Kachgal et al, 2001).

Cognitive-behavioural coaching

Procrastination is not just poor time management or a poor learning habit; it involves very complicated processes, such as cognition and affect (Solomon and Rothblum, 1984). According to Kearns et al (2008), cognitive-behavioural coaching (CBC), which is to apply traditional cognitive-behaviour therapy (CBT) to non-clinical population, will help students in academic. These involve setting measurable and time-specific goals, identifying and challenging distorts beliefs, and taking action to achieve the goals. Stainton et al (2000) contend that procrastinatory cognitions are a product of the behaviour of procrastination, instead of the product of the trait. Procrastinators have a negative feeling or affect on themselves and dilatory behaviour en-enforce these cognitions. Procrastinators may first ruminate about their dilatory behaviour. When they cannot improve their situation, they start to doubt their self-worth (Stainton et al, 2000). Kearns et (2008) contend that a change of behaviour cannot last long if the beliefs of the learners do not change. So the treatments should help the procrastinators to rectify their behaviour, cognition and affect at the same time.

Kearns et al (2008) contend that self-sabotaging behaviour will hinder learning activities. There are seven self-sabotage behaviours: 1) over-committing, 2) busy on unimportant things, 3) perfectionism, 4) do things at the last minute, 5) disorganisation, 6) laziness, 7) choose performance-debilitating circumstances. Getting rid of these behaviours may help in the treatment of procrastination. Kearns et al (2008) suggest a 5-step model. In step-1, students need to set a plan for time-specific and measurable goals

for themselves. In step-2, students need to identify obstacles and behavioural patterns that hinder them from achieving their goals. In step-3, students need to explore the costs of their own behavioural patterns. In step-4, students need to take action to accomplish the goals set for their plan. In step-5, students need to challenge their irrational beliefs.

Klassen et al (2009) contend that intervention on procrastination should focus on providing tools for students so that they will improve their confidence in their ability for self-regulation. Klassen et al (2009) suggest that the trainers should:

1) emphasise the past success experiences in front of the students.
2) give students some models of self-regulation strategies.
3) verbally persuade the students that they can do it.
4) provide students with strategies to manage stress.

Knaus (2000) postulates a model of five-phase processes to overcome procrastination: awareness, action, accommodation, acceptance, and actualisation. In the first phase, the procrastinators should be aware of their own procrastination patterns. For instance, a procrastinator may hang out with friends instead of finish assignments, and tell himself or herself that he/she is too tired to do it today. Procrastinators need to be aware of this self-handicapping behaviour, and its consequences. In the second phase, procrastinators need to take action instead of waiting. Since procrastinators have difficulty starting their tasks, Knaus (2000) suggests a strategy called ‘do it now’, in which procrastinators are encouraged to do a task for five minutes first. Once they start doing the task, they are encouraged to continue another five minutes. The third phase is ‘accommodation,’ procrastinators need to motivate themselves to continue to take action by comparing the disadvantages of procrastination and the advantages of completing the

tasks. The fourth phase is ‘acceptance’. ‘Acceptance’ is to accept themselves, even though there can be a relapse of procrastination behaviour, and procrastinators need to continue to overcome these relapses. The fifth phase is ‘actualisation’. In this phase, procrastinators need to improve their ability to maintain their gains, and keep on using the ‘do it now’ strategy.

Psychodynamic therapy

Although psychodynamic is more common in clinic context, it is also used in academic procrastination (Ferrari et al, 1995). Psychodynamic therapy is to find out the unconscious thoughts that cause procrastination. These unconscious thoughts may be from childhood experiences. For instance, in some cases, the academic procrastinators are afraid of achievements, because they are unconsciously worried that their achievements may hurt the feelings of their loved ones, such as parents or siblings, who do not have the same kind of achievement (Ferrari et al, 1995).

Conceptual Framework of this study

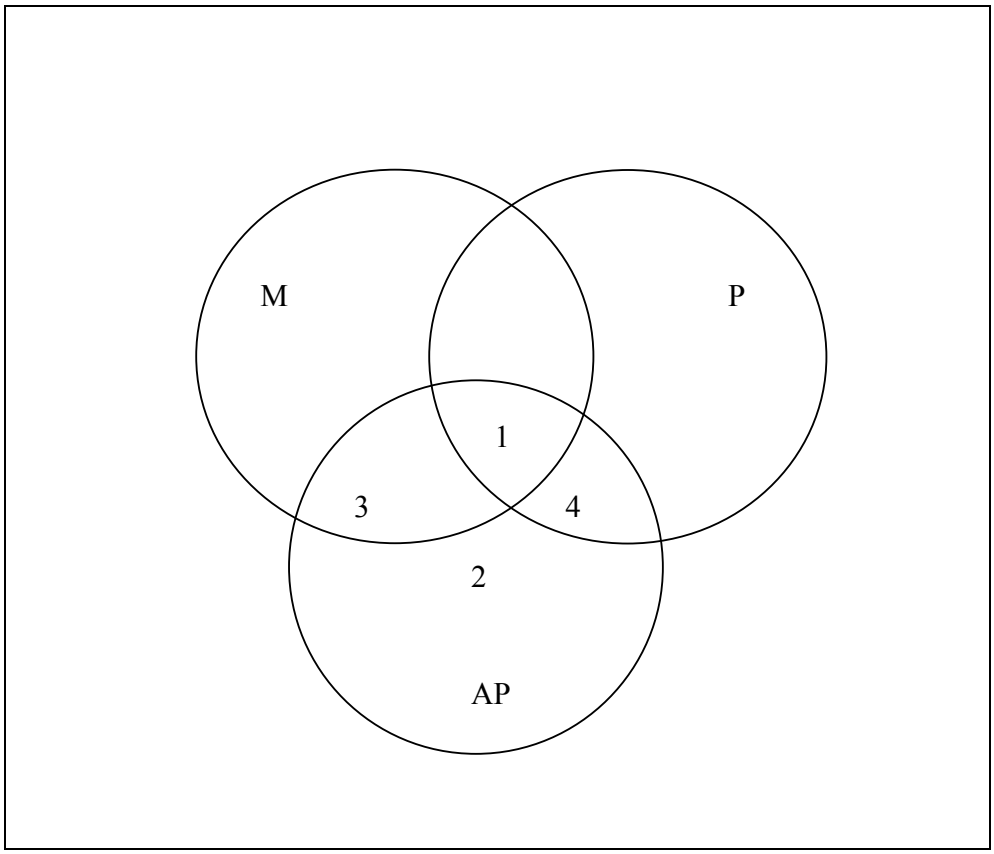
The conceptual framework of the present study owes much to Zimmerman’s theories of self-regulated learning (Zimmerman, 1986; 2001; 2002). Zimmerman defines self-regulated learning as taking action to learn metacognitively, motivationally and behaviourally. The present study addresses the importance of the use of metacognition and taking action on time for learning, and how these variables related to academic performance.

The construct of metacognition is based on the construct suggested by Flavell (1976;

1979) and the model suggested by Schraw and Dennison (1994). The construct of procrastination is based on theories of Ellis and Knaus (1977) and the model of Aitken (1982).

Plenty of research has been done on the relationship between metacognition and academic performance, and many studies have been done on the relationship between procrastination and academic performance. The present study focuses on the relationships among metacognition, procrastination and academic performance, especially on the relationship between academic performance and the following combinations of metacognition and procrastination. They are the combinations of these two variables that relate to academic performance of the university students: 1) Learners with high level of metacognition and high level of procrastination. 2) Learners with low level of metacognition and low level of procrastination. 3) Learners with high level of metacognition but low level of procrastination. 4) Learners with low level of metacognition but high level of procrastination.

Diagram 1 **Venn Diagram showing the relationships among metacognition, procrastination, and academic performance**



Circle M: High metacognition

Circle P: High procrastination

Circle AP: Academic performance with 4 different areas

Area 1: High metacognition and high procrastination

Area 2: Low metacognition and low procrastination

Area 3: High metacognition but low procrastination

Area 4: Low metacognition but high procrastination

Based on the literature review, it is sensible to assume that metacognition has a positive impact on academic performance and procrastination has a negative impact on academic performance. My tentative assumption is that learners with a high metacognition level and a low procrastination level would have the best academic performance while learners with a low metacognition level but a high procrastination would have the worst academic performance among these four combinations. On the other hand, most of the studies of metacognition, which show the positive relationship between metacognition and academic achievement, did not put the variable of procrastination under control, so my tentative assumption is that students with high metacognitive level will have better-than-average academic achievement regardless of the level of procrastination. Likewise, most of the studies of procrastination showing the negative relationship between procrastination and academic achievement did not put the variable of metacognition under control, so my tentative assumption is that students with low level of procrastination will have better-than-average academic regardless of the level of metacognition. My hypotheses mentioned in chapter 1 and chapter 3 are based on these assumptions. This study is to find out whether these assumptions are correct. The above diagram shows the relationships among these variables. Metacognition can engage in different areas, academic performance is only one of them. Procrastination can also entail in different areas, and academic procrastination is only one of them.

CHAPTER 3: METHODOLOGY AND RESEARCH DESIGN

INTRODUCTION

Before starting the research design, the following questions have been considered: What methods should be used to conduct the research? How do I know that my research has really achieved my goals after completing my study, i.e. to acquire the knowledge that I am searching for? How do I know this knowledge is the 'truth of the facts? To answer these questions, it is necessary to consider what 'truth' is and what 'knowledge' is in the first place before going on to the choice of methodology.

This chapter will first discuss paradigm consideration, and then followed by research design, research questions, hypotheses, methodology, data collection and data analysis.

PARADIGM CONSIDERATION

The importance of Paradigms

The reason we need to talk about paradigms before starting to do any research is that our choice of research methods depends on the epistemological position we take, and investigators holding different epistemological positions will draw on different paradigms. When they choose their methodology for their research, they will base it on their paradigms. Therefore, it is essential to talk about the paradigm I adopt first before I start

to discuss the methodology and design I choose.

Although researchers have been drawing on different epistemological positions for centuries when doing research, it was Thomas Kuhn (1962) who first introduced the concept of paradigm in 1962 in his first edition of Structure of Scientific Revolutions (1962; Husen, 1999). Thomas Kuhn (1962) inspired a reconsideration of paradigms adopted for scientific research. Since then, interpretivism has become a prevalent paradigm for research in qualitative design. Kuhn does not give a clear definition to the term of paradigm, he states:

'*By Choosing it, I mean to suggest that some accepted examples of actual scientific practice- examples which include law, theory, application, and, and instrumentation together – provides models from which spring particular coherent traditions and scientific research.*' (Kuhn, 1970, p.10).

Dillion et al (2000) describe a paradigm as a conceptual system that has its own internal logic, and has a set of epistemological rules which direct the decision-making for problem solving. In a simple statement, a paradigm can be defined as '*a collection of logically related assumptions, concepts, or propositions that orient thinking and research*' (Bogden and Biklen, 2003. p.22).

On the other hand, Karl Popper's ideas about empirical falsification (Popper, 1959) and conjecture (Popper, 1963) have also made people re-evaluate the traditional positivism. Post-positivism has become a common paradigm in quantitative research.

Before subscribing to a particular paradigm, all researchers need to clarify their own ontological and epistemological positions.

Ontological and Epistemological positions

The purpose of this study is to find out the 'truth' of my hypotheses; then, what is the 'truth'? How can we get access to this 'truth'?

The nature of reality of our world If I want to find out the 'truth', I have to define what is 'truth,' or at least to adopt a position of ontology that, I believe, can help me find out the 'truth'. There have been three dominant ontological positions in the history of debates: Materialism, Idealism and Dualism (Wolff, 1998). Materialism posits that all things in the universe, including mind and spirit, exist objectively. Humans are able to meditate and learn the objective world just because they have a material 'object' in their body called 'brain'. If their 'brain' is damaged, they won't be able to think and learn any more. Idealism posits that all things in the universe are just the products of our mind. Things do not exist objectively, and their existence is just the reflection of our mind. Dualism posits that there are two fundamentally things in the universe – minds and physical objects; neither of them can be substituted for the other. Among these three positions, materialism is the closet to my own personal experience. All ontological positions, up to now, are philosophical conjectures as mentioned by Popper (1959; 1963), and my ontological position is no exception. I contend that there is an objective reality of the world, and once our brain is damaged, there is no existence of spirit, our mind or our thinking is the product of our mind. However, how to get access to this reality is another issue. There are even doubts about the ability of human beings to get access to the objective reality, because our mind is the product of our brain, and our brain is subject to impairment and influence from the environment. I subscribe to Popper's position about

'knowledge'.

The nature of knowledge How to get access to the world of reality is the issues of epistemology. Epistemology has long been an important issue in academic world. Starting from the times of Rene Descartes and John Lock, the theory of knowledge has been an important issue. Rationalism posits that logic and reasoning are the models for true knowledge. On the other hand, empiricism posits that humans' sensation is the original source of knowledge and reason or logic is subordinate to senses (Wolff, 1998).

I embrace the principles of empiricism, because I contend that the reality exists objectively, and our observation and reasoning can help us get access to the nearest point of the reality, but it is still a conjecture (Popper, 1963). In social sciences and educational research, the situation is even more complicated than in natural sciences. The subjects of the research in social sciences are human beings. The researchers can observe the behaviour of human beings, but not the activities of the mind, even though scientists can now see some activities of the brain by means of MRI and PET, but not the 'mind'. Humans interpret what they observe, and therefore there is a difference between humans' knowledge and the reality. Even worse, researchers interpret the 'interpretation' of their research subjects or participants– human beings.

Based on my ontological positions and epistemological position, I choose my paradigm, and my paradigm decides my research design.

Positivism and Post-positivism

Far before the concept of paradigm being introduced by Thomas Kuhn (1962),

positivism had already dominated the field of scientific research. Positivism is one form of empiricism; however, not all forms of empiricism are positivism (Phillips, 1999).

Classic Positivism Classic positivism, starting from Auguste Comte, (Leahey, 1997; Phillips, 1999) posits that science should be based on observable facts. The basic job of science is to describe the observations instead of explaining the 'truth'. Researchers should observe and find the regular occurrences and the correlations of phenomena. The second function of science is to predict what will happen in the future after gathering enough data. The third function is to make control of the variables so as to benefit humans. From the point of view of classic positivists, control is the ultimate rationale for scientific research (Leahey, 1997; Phillips, 1999; Phillips and Burbules, 2000).

The Features of Classic Positivism

Positivism in research has the following features:

1) Researchers are required to be objective and make no personal influence on the participants, so in positivism, humans as the objects of the research, are called 'subjects'
2) Only the observable phenomena can be considered as knowledge. Feelings are considered as subjective and therefore cannot be considered as knowledge.
3) Knowledge is the verified facts that exist objectively and the researchers are only the observers who discover the facts and should not make judgement based on personal feelings.
4) Hypotheses based on former research and observed phenomenon should be set, and then tested to find out whether the hypotheses are valid.

5) The research procedures should be value-free and the personal feelings of the researchers should not be revealed.
6) Human characters and attributes are considered as variables in research.
7) Using the knowledge obtained to predict what might happen in the future (Phillips and Burbules, 2000; Morrison, 2002; Gall et al, 2003).

Logical or Neo-Positivism By the end of nineteenth century, positivism developed with logic and mathematics and produced a movement called logical positivism. Logical positivism categorises the language of science into three: observation terms, theoretical terms and mathematical terms (Leahey, 1997). The concept of operational definitions, which is important in educational research, is one of the examples in their language (Phillips, 1999). However, logic positivism has been criticised for its assumptions, especially the criterion of verifiability, which was considered as too strong to be a criterion for science. Critics posit that it is impossible to verify all situations in social sciences, but it is possible to disprove some theories, so they suggested the criterion of verification should be replaced by a criterion of falsification.

Post-positivism Since logical positivism was criticized for its criterion of verifiability, post-positivism has come to be being. Based on the fundamental principles of positivism, post-positivism has amended classic positivism and neo-positivism. Logical positivism posits that human knowledge is the reflection of the true reality, which is solid-rock and unchallengeable. However, many studies based on positivism have been disproved by some later studies. Hence, the assumptions of logical positivism were under criticism. Karl Popper (Popper, 1959;1963) introduced the constructs of falsification and

conjectures. He posits that even there is an objective reality, our knowledge of the 'truth' is 'conjectural', and what we know is only a set of 'warrants'. The term 'warrants' here means 'suspected' and they need to be justified by experiences or observation (Phillips and Burbules, 2000). Therefore, the knowledge we acquire from research is close to the reality but not guaranteed the reality itself. Post-positivism posits that there is no way to prove that a belief is true, but possible to refute a false belief. Therefore, research should set a null hypothesis. By rejecting the null hypothesis, we will get closer to the reality. Post-positivism is a kind of positivism and preserves the basic assumptions of classic positivism and recognises the ontological realism. Post-positivism has become common in social sciences. The present study adopts post-positivist paradigm.

The relationship between post-positivism and quantitative research

Paradigm is a conceptual system based on epistemology whereas methodology refers to the logic and theoretical perspective in research (Bogdan and Biklen, 2003). Different paradigms will lead to the use of different methods. Quantitative research is a methodology usually considered as an approach for positivism or post-positivism. Quantitative research is based on positivism and it emphasizes objectivity and accuracy of measurement.

Features of Quantitative research

1) The use of measurement makes it observable.
2) The use of dependent variables and independable variables makes prediction possible.
3) The data are used for generalization.
4) The research is replicable and value-free.

(Morrison, 2002; Gall et al, 2003).

.

Based on my position of epistemology, I adopt a quantitative research design, which is considered as a research approach for post-positivism.

RESEARCH DESIGN

The aims of the current study are to find out the relationships among the three variables: metacognitive awareness, procrastination, and academic performance. To achieve my aims, objectives are set as mentioned in Chapter 1, they are as follows:

(1) Find out the relation between academic performance and procrastination of university students.

(2) Find out the relation between academic performance and metacognitive awareness of university students.

(3) Find out the relation between metacognition and procrastination of university students.

(4) Find out how different levels of metacognition and procrastination affect academic performance of university students.

In order to achieve my objectives, I have to collect data to answer the following research questions.

Research Questions

1. Is procrastination related to their academic performance?
2. Is metacognition related to the academic performance?
3. Is there a relationship between metacognition of students and their procrastination?
4. Do students who have high a level of metacognition but always procrastinate in learning activities achieve academic success?
5. Do students who have a low level of metacognition but seldom procrastinate in learning activities achieve academic success?
6. Do students who have a high level of metacognition and seldom procrastinate in learning activities achieve academic success?
7. Do students who have a low level of metacognition and always procrastinate in learning activities achieve academic success?

Design of the study

The objectives of this study are to find out these relationships; therefore, a relational design is adopted for the current study. Three instruments were used to measure correlational coefficient of the above-mentioned variables. The hypotheses mentioned in Chapter-1 have been tested for these relationships.

Hypotheses

Null Hypothesis:

There are no relationships among these three variables: metacognitive awareness, procrastination, and academic performance.

Alternative Hypotheses:

1) Academic performance of a learner is negatively related to his/her level of procrastination.
2) Academic performance of a learner is positively related to his/her metacognitive awareness.
3) Metacognitive awareness of a learner is negatively related to his/her level of procrastination.
4) Learners with a high level of metacognitive awareness and a high level of procrastination will have a higher-than-average academic performance.
5) Learners with low a level of metacognitive awareness and a low level of procrastination will have a higher-than-average academic performance.
6) Learners with a high level of metacognitive awareness but a low level of procrastination will have a higher-than-average academic performance.
7) Learners with a low level of metacognitive awareness and a high level of procrastination will have a lower-than-average academic performance.

There are three major variables in this study, the dependent variable is the academic performance, and the two independent variables are metacognitive awareness and

procrastination tendency.

Variable 1 (Dependent variable): Academic Performance

Definition: The overall performance of all academic subjects of a learner.

Operational definition: The measurement of the accumulated Grade Point Average (G.P.A.) of a learner.

High G.P.A.: A score that is higher than the mean of the G.P.A. from our data

Low G.P.A.: A score that is lower than the mean of the G.P.A. from our data

Variable 2(Independent variable): Metacognitive awareness

Definition: A learner's awareness of his/her own cognition: the ability to reflect upon, understand and control one's thinking. (Flavell, 1976; Schraw and Dennison, 1994)

Operational definition: The measurements obtained from MAI (Metacognitive Awareness Inventory)

High level of MAI: A score that is higher than the mean of MAI from our data.

Low level of MAI: A score that is lower than the mean of MAI from our data.

Variable 3 (Independent variable): Procrastination

Definition: To delay a job until it has passed the optimal time (Silver, 1974).

Operational definition: The measurement obtained from API (Aitken Procrastination Inventory)

High level of API: A score that is higher than the mean of API from our data.

Low level of API: A score that is lower than the mean of API from our data.

Rationale behind the hypotheses:

To help answer my research questions, the sores of all three variables are categorised into two levels; high and low. For the sake of analysis, all scores of these three variables are divided into two groups by using their mean scores. The scores that are higher than the mean score of a particular variable will be categorised as high level of that variable, and those that are lower than the mean score of that variable will be categorised as low level. This way of categorization can ensure that there are enough scores on both categories for analysis.

Population and sampling

Population

The target population of this study is the university students in Hong Kong. Both of these universities are funded by the University Grants Committee of the Hong Kong government. Usually students admitted have to pass an advanced level examination and go through a process called JUPAS (Joint University Programmes Admissions System) before being admitted to these universities, so the students from these two universities are

considered as from the same population as ‘university students in Hong Kong’ for this study.

Samples

For the limitation of resources and accessibility, samples could only be taken from two universities in Hong Kong: Altogether there are 314 samples, 160 from the Hong Kong Polytechnic University and 154 from the University of Hong Kong.

Limitation of sampling

My samples are not randomly chosen because of the following reasons:
Firstly, a random sampling is impossible because a perfect random sampling needs information to identify all students in each university, so that everyone has an equal opportunity to be chosen. It is infeasible to get access to this information because the gatekeepers (the university administration in the present study) would not disclose this information to an outside researcher for privacy reasons.

Secondly, universities would not allow any classes to be interrupted by any research unless it was considered as an essential project for their own institution.

Thirdly, all participants must be voluntary. The universities would not help an outside researcher to get consent from the students.

METHODOLOGY

One of most popular methods to measure metacognition is to use questionnaires to ask the participants about their perception about their thinking (Downing, 2010).

Self-reported questionnaire is also a good method for measuring procrastination (Rothblum et al, 1986; Senecal et al, 1995).

This is a correlational study. Three instruments were used to collect data about procrastination, metacognition, and academic performance of college students from two universities in Hong Kong. All of these instruments are self-administered questionnaires. The relationships of the variables were analysed by using a statistical program, SPSS.

Before choosing the most suitable instruments for the present study, related instruments have been explored.

Instruments to measure metacognition

In order to find an appropriate instrument to measure the metacognition of the students, instruments related to metacognition had been explored before the present study and were analysed to see whether they were suitable for the present study. It is useful to compare these instruments before coming to a decision to use MAI.

IMSR (Inventory of Metacognitive Self-Regulation)

IMSR was developed by Howard et al (2000a). It includes 37 items that use Likert scale to measure five factors related to awareness and control processes of learning. They include (1) Knowledge of cognition, (2) Objectivity (3) Problem representation, (4) Sub-task monitoring, and (5) Evaluation. However, this instrument is designed for 12 to 18 years old students, and mainly for mathematical and scientific-problem solving. Since the population of the present study is university students, and focuses on general problem solving; therefore, it was not used for the present study.

CHILD 3-5 (Children's Independent Learning Development)

CHILD 3-5 was developed by Whitebread et al (2009) to measure children's metacognition. Since this is also not suitable for the age group of our participants, it was not chosen.

SM (State Metacognitive Inventory)

SM was developed by O'Neil and Abedi (1996). It includes 20 items with four subscales: Awareness (e.g. item1, I was aware of my own thinking.), Cognitive strategy (e.g. Item 3, I attempted to discover the main ideas of the test questions.), Planning (e.g. item 12, I made sure I understood just what had to be done and how to do it.), and Self-checking (e.g. Item 18, I checked my accuracy as I progressed through the test.) The initial samples were from high school (9^{th} -12^{th} graders), and it was used in community college to examine the relationship between metacognitive process and their performance in a mathematical task. As it can be seen from the examples that all questions are in the form of 'past tense', which is to measure the metacognitive activities for a particular situation, not to measure metacognition in general. Since my study is to measure the metacognition of the students in general, not for a particular task, this inventory is not used for the present study.

LASSI (Learning and Study strategies Inventory)

LASSI was developed by Weinstein et al (1987) LASSI has 10 scales, with 80 items to assess the students' awareness and the use of learning and study strategies, their 'will' to learn, and their self-regulation. Although Downing (2009) argues that LASSI is a good instrument to measure metacognition, I did not use this instrument because it

includes some parts of self-regulation that are related to self-regulated learning itself. LASSI includes the measurement of learning skills, will power, and self-regulation. I would contend that this instrument is more likely to measure the behaviour of self-regulated learning instead of metacognition.

SRLI (Self-regulated learning inventory)

SRLI was developed by Gordon et al (1996). It has 80 items and consists of four components: (1) Executive processing, (2) Cognitive processing, (3) Motivation, (4) Environment control and utilization. Once again, this instrument, although, contains cognitive and metacognitive elements, it also contains some self-regulated behaviours, such as environment control. Since the present study is focused on metacognition, MAI is more suitable than SRLI.

MAI (Metacognitive Awareness Inventory)

MAI was developed by Schraw and Dennison (1994). It has 52 items and consists of two components: Knowledge of Cognition (Internal consistency in the first use: 0.93) and Regulation of Cognition (Internal consistency in the first use: 0.88). It overall Cronbach's alpha was 0.9.in its first use by its developers (Schraw and Dennison, 1994). MAI has been widely used by different researchers. (e.g. Mevarech and Fridkin, 2006) It is to measure trait metacognition and is used for the present study. By considering all these instruments, MAI was chosen for the present study, because it's designed to measure metacognition in general, instead of particular subjects, and its target population was university students. Therefore, it is the most suitable instrument for the present study.

Knowledge of Cognition includes three sub-components: Declarative Knowledge,

Procedural Knowledge and Conditional Knowledge. Declarative Knowledge is to know about oneself as a learner and the relationship between himself/herself and the tasks. It involves the ability of the learners to know about their own strengths and weaknesses, about the learning content, and about their expectation of their own performance. Procedural Knowledge involves what strategies should be used and what purposes of those strategies. Conditional Knowledge involves time and situation, such as when a particular strategy should be used, under what condition the learners can learn better, when and how learners motivate themselves, and when learners use strengths to compensate for weaknesses (Schraw and Dennison, 1994).

Regulation of Cognition includes five sub-components: Planning, Information Management Strategies, Comprehension Monitoring, Debugging Strategies, and Evaluation of learning. Planning is about goals setting and time management. This involves what should be learnt, how and what goal should be set, and how to choose the best alternatives when solving problems. Information Management Strategies includes what should be done in order to make them understand more. This entails speed, focus, elaboration, visualization, organisation, the ability to refer to previous experience, and the ability to break down information into chunks. Comprehension Monitoring involves checking about one's own progress and comprehension, about what alternatives are available, and whether the strategies are useful to understand the content etc. Debugging Strategies involve the decision about learning when facing difficulties, such as what should be done if he/she doesn't understand. Evaluation is to find out whether the learning process has been successful, whether the goals have been reached (Schraw and Dennison, 1994).

According to Schraw and Dennison (1994), metacognitive awareness is different

from and more important than intellectual ability for learning. MAI involves many areas of cognitive activities, such as efficacy, affect and self-motivation. For instance, item 20 and 32 are related to efficacy; item 46 is related to affect. MAI has been used by some investigators; for instance, Lee et al (2010) used this instrument to measure the pre-service teachers metacognition. Sungur and Senler (2009) used MAI for Turkish high school students. Magno (2010) used MAI to study critical thinking. MAI has been widely used to measure metacognition. There are 52 items in MAI.

Items for Declarative Knowledge (DK): 5,10,12,16,17,20,32,46

Items for Procedural Knowledge (PK): 3,14,27,33

Items for Conditional Knowledge (CK): 15,18,26,29,35

Items for Planning: 4,6,8,22,23,42,45

Items for Information Management Strategies (IMS): 9,13,30,31,37,39,41,43,47,48

Items for Comprehension Monitoring (M): 1,2,11,21,28,34,49

Items for Debugging Strategies (D): 25,40,44,51,52

Items for Evaluation: 7,19,24,36,38,50

There are 8 items to measure Declarative Knowledge;

5	I understand my intellectual strengths and weaknesses.
10	I know what kind of information is more important to learn.
12	I am good at organizing information.
16	I know what the teacher expects me to learn.
17	I am good at remembering information.
20	I have control over how well I learn.
32	I am a good judge of how well I understand something.
46	I learn more when I am interested in the topic.

There are 4 items to measure Procedural Knowledge:

3	I try to use strategies that have worked in the past.
14	I have a specific purpose for each strategy I use
27	I am aware of what strategies I use when I study.
33	I find myself using helpful learning strategies automatically.

There are 5 items to measure Conditional Knowledge:

15	I learn best when I know something about the topic.
18	I use different learning strategies depending on the situation.
26	I can motivate myself to learn when I need to.
29	I use my intellectual strengths to compensate for my weaknesses.
35	I know when each strategy I use will be most effective.

There are 7 items to measure Planning

4	I pace myself while learning in order to have enough time.
6	I think about what I really need to learn before I begin a task.
8	I set specific goals before I begin a task.
22	I ask myself questions about the material before I begin.
23	I think of several ways to solve a problem and choose the best one.
42	I read instructions carefully before I begin a task.
45	I organize my time to best accomplish my goals.

There are 10 items to measure Information Management Strategies:

9	I slow down when I encounter important information.
13	I consciously focus my attention on important information.
30	I focus on the meaning and significance of new information.
31	I create my own examples to make information more meaningful.
37	I draw pictures or diagrams to help me understand while learning.
39	I try to translate information into my own words.
41	I use the organizational structure of the text to help me learn.
43	I ask myself if what I'm reading is related to what already know.
47	I try to break studying down into smaller steps
48	I focus on overall meaning rather than specifics.

There are 7 items to measure Comprehension Monitoring:

1	I ask myself periodically if I am meeting my goals.
2	I consider several alternatives to a problem before I answer.
11	I ask myself if I have considered all options when solving a problem.
21	I periodically review to help me understand important relationships.
28	I find myself analysing the usefulness of strategies while I study.
34	I find myself pausing regularly to check my comprehension.
49	I ask myself questions about how well I am doing while I am learning something new.

There are 5 items to measure Debugging Strategies:

25	I ask others for help when I don't understand something.
40	I change strategies when I fail to understand.
44	I re-evaluate my assumptions when I get confused.
51	I stop and go back over new information that is not clear.
52	I stop and reread when I get confused.

There are 6 items to measure Evaluation:

7	I know how well I did once I finish a test.
19	I ask myself if there was an easier way to do things after I finish a task.
24	I summarize what I have learned after I finish.
36	I ask myself how well I accomplished my goals once I'm finished.
38	I ask myself if I have considered all options after I solve a problem.
50	I ask myself if I learn as much as I could have once I finish a task.

Reliability and Validity of MAI

Reliability of MAI

MAI consists of 52 items and its Cronbach's alpha is 0.9 in its first use when it was developed. To ensure the instrument is also reliable for the present study, the Cronbach's alpha was measured. The Cronbach's α of MAI in our study of 314 participants is 0.927, which shows a very good measure of internal consistency reliability.

Validity of MAI

Since MAI was designed to measure metacognitive awareness of university students, it is suitable for this study. Our population is also university students. Hong Kong was a British colony and now English is still one of official languages used in courts and governments. For tertiary education, English is used exclusively as the medium of instruction in all government-sponsored universities in Hong Kong, especially in the two universities of our participants. Furthermore, students have to pass the Advanced-level Use of English before being admitted to any universities, there is no reason to doubt the students' ability in understanding these questionnaires.

Instruments to measure procrastination

In order to find a suitable instrument to measure procrastination, some existing instruments have been explored.

DP (Decisional Procrastination Scale)

DP is a 5-item instrument developed by Mann (1982) Since this instrument is focused on delay in decision-making, so it was not used for this study.

PASS (Procrastination Assessment Scale – Students)

PASS is a 38-item instrument developed by Solomon and Rothblum (1984). It is mainly for academic procrastination in detail. This instrument can be a good alternative for this study; however, it consists of 38 items, including the inquiry for the reasons for procrastination, which is not the focus of the present study. For the principle of parsimony, I did not choose this instrument.

GP (General Procrastination Scale)

GP is a 20-item instrument developed Lay (1986). It is used mainly to assess daily procrastination instead of academic procrastination. For this reason, it was not used for the present study.

AIP (Adult Inventory of Procrastination)

AIP is a 15-item instrument developed by McCown and Johnson (1989a; 1989b). This is also to assess daily procrastination of adults, such as item-1 is about paying bills, and item-13 is about doing routine maintenance. It is not as good as Aitken Procrastination Inventory when investigating academic procrastination.

TPS (Tuckman Procrastination Scale)

TPS is a 35-item instrument developed by Tuckman (1990; 1991). TPS is also

widely used for measuring academic procrastination. Like API, it is also suitable for the present study; however, compared with API, the language used in TPS may be difficult for some of my participants to understand; for instance, item-18 of the 35-item version states 'I am an incurable time waster' and item-33 states 'I never met a job I could "lick".

API (Aitken Procrastination Inventory)

API is different from AIP mentioned above. Aitken Procrastination Inventory (API) was developed by Margaret Aitken for her doctoral dissertation (Aitken, 1982), and it may be the first kind of self-administered instrument measuring procrastination. Since then, it has become one of the most popular scales to measure procrastination (Ferrari et al, 1995). According to Aitken (1982), the inventory was used to differentiate chronic procrastinators in college from non-procrastinators. It was designed for university students and mainly to measure academic procrastination in general, not to measure some specific areas, like PASS. It is, therefore, chosen for the present study. However, there are different versions of API. The one shown in Ferrari's book (Ferrari et al (1995) was different from the original one from Aitken's dissertation (1982). In this study, the original version was used. It consists of 19 items and its Cronbach's alpha is 0.82 in its first use. To make the questionnaire easier for the participants to fill out, a 5-point Likert scale was used. A higher score means a higher level of procrastination.

By considering all these instruments, API was chosen for the present study, because it is designed to measure trait procrastination in academic context, and its target population is university students.

Items with higher scores mean higher measurement in procrastination (A):

1,3,5,8,9,10,12,13,16

Inverted items - Items with higher scores mean lower procrastination (B):

2,4,6,7,11,14,15,17,18,19

They are calculated as: 1 as 5; 2 as 4; 3 as 3; 4 as 2; 5 as 1.

Total procrastination scores: A + (inverted scores of B)

These items are to measure procrastination, a score of '5' is the highest level of procrastination, while a score of '1', is the lowest level of procrastination.

1	I delay starting things until the last minute.
3	I often don't finish tasks on time.
5	Even when I know a job needs to be done, I never want to start it right away.
8	If there were a workshop offered that would help me learn not to put off starting my work, I would go.
9	I don't seem to know when I need to start a job to be able to get it done on time.
10	I am often late for my appointments and meetings.
12	I delay starting things so long that I don't get them done by the deadline.
13	I overestimate the amount of work that I can do in a given amount of time.
16	When I have a test scheduled soon, I often find myself working on other jobs instead of studying for that test.

The following items are to measure NOT procrastination. The score of '5' is the lowest level of procrastination while the score of '1' is the highest level of procrastination.

2	I'm careful to return library books on time.
4	I usually meet my own self-set deadlines.
6	I keep my assignments up to date by doing my work regularly from day to day.
7	If I have a number of jobs that need to be done by the end of the day, I usually get them done.
11	I use the vacant hours between classes to get started on my evening's work.
14	I don't delay when I know I really need to get the job done.
15	If I had an important project to do, I'd get started on it as quickly as possible.
17	I often finish my work before it is due.
18	I get right to work at jobs that need to be done.
19	If I have an appointment, I make sure the clothes I want to wear are ready the day before.

Reliability and Validity of API

Reliability of API

API consists of 19 items and its Cronbach's alpha is 0.82 in its first use when it was developed. In order to insure that API is also reliable in the present study, the Cronbach's alpha of the collected data was also measured. The Cronbach's α of API in the present study of 314 participants is 0.773, which shows a considerable satisfactory of internal

consistency and reliability.

Validity of API

API was designed to measure the procrastination tendency of university students. Since our population is also university students, it is suitable for this study. As mentioned before, the universities from where the samples drawn use English as the teaching medium, and all students have to pass Advanced-level English, there is no doubt that they are English literate and have no difficulty in understanding the questionnaires.

Instrument to measure academic performance

G.P.A. (Grade point average)

A demographic sheet was used to collect information about G.P.A. and other variables. Grade point average (G.P.A.) is a system used in many countries, and these two universities have also adopted this system. The performance of each subject is graded from A to E. A grade of 'A' is counted as '4 points', 'B' is counted as '3 points', 'C' as '2 points', 'D' as '1 point', and 'E' as 'No point'. G.P.A. is the accumulated points divided by the total subjects (weighted credits).

Reliability and Validity of G.P.A.

Reliability of G.P.A.

There might be some diversity about grades given by each subject and lecturer. However, the grades given in universities are under a system of standard reference. All

these two universities are funded by the University Grants Committee of the Hong Kong, and the quality of courses have to be accredited by the government.

Validity of G.P.A.

According to some researchers (Hamman and Stevens, 1998; Sungur, 2007), consequential test conditions provide accurate measure of academic performance. That is to say, if the performance results would lead to some consequences, either rewards or punishments, the students would be more careful for the tests, and the results would accurately reflect the true performance of those students. For university students, grade point average (G.P.A.) is the average of the results of consequential tests, so it can provide an accurate measure of academic performance. In college, it is unlikely that students do not value their G.P.A.; therefore, G.P.A. is used in the present study to represent the academic performance of the participants. Although, in some situations, the grade point average may not be reliable because many students dropped the courses they find difficult (Lindner and Harris, 1992), it is still a good and comprehensive indicator for comparing the academic performance of university students.

It is generally accepted that test scores represent the best effort of students for their academic performance (Wolf and Smith, 1995) On the other hand, non-consequential test scores may not represent the best effort of the students, because motivation is higher in consequential tests than the non-consequential ones; and, therefore, the average scores of the consequential ones are higher (Wise and DeMars, 2003). For university students, grade point average (G.P.A.) is the average of the results of consequential tests, so it can provide an accurate measure of academic performance.

Demographic information

Other than G.P.A., some other information may also be useful, so the demographic information sheet also includes information about gender, age, major and year of study of the participants.

Ethical issues consideration

This study has observed the guidelines in both Code of Ethics and Conduct of the British Psychological Society and APA Code of Ethics of American Psychological Association, which respect and protect the rights of all participants in research, especially their safety, privacy and their right of self-determination.

Ethical evaluation form has been filled out and approved by the University of Leicester. Consent has been obtained from the gatekeepers (The universities) and the participants. All the participants are informed their rights. Monetary incentives were used in the situation that no harm would be brought to the participants.

The protection of human subjects or participants in research is considered essential in research. It should not be ignored in any studies, and this study is no exception. There are at least three areas have been considered for this study.

Voluntary Participation

No participants should be forced to participate in any research. The participants in my study are adult students in universities. They were not forced to participate in the study by their school administrators, lecturers, parents or any others. When they were asked to complete the questionnaire, they were informed that they had the right to

withdraw any time. They were also informed of the confidentiality of the questionnaire. All participants were volunteers and they were given two MacDonald's coupons after they completed the questionnaire. Since all participants are adults, no parental consent was necessary; however, on top of the questionnaire, there was an information-consent form for them to sign. They were asked to write down their mobile phone number voluntarily on the back of the questionnaire in case the researcher needed to clarify some information. The whole process was under a voluntary condition.

Confidentiality

All participants should enjoy their own privacy. No information in the research should be used for other purposes without the permission of the participants. For this purpose, data should be kept secret so that the identity of the participants cannot be recognized by anybody other than the researcher. Any data that could be used to trace a particular participant should be destroyed after the research within a time limit. This study is a self-administered questionnaire and no names were asked to write on the questionnaire, so the participants could not be identified in any way. All information collected has been kept in a confidential way and would not be used in any situation other than this study.

No Physical or Psychological harm

No human participants should be inflicted any physical or psychological harms in any research. In this study, participants were asked to fill out a questionnaire, and there were no other physical activities. On the other hand, the content of the research was about learning process, metacognition and procrastination. It's believed that the questions

would not trigger any aversive feelings. It's unlikely that the study led to any physical or psychological harm.

Pilot study and procedure for data collection

For the present study, the following methods were used to get access to the participants.

Getting access

Seven registered request letters were sent to the administration of seven universities in Hong Kong to ask for permission to get access to their campus. Follow-up letters were sent to those universities that I had gotten no responses. Out of seven universities, only two universities allowed me to collect data on their premises: The Polytechnic university of Hong Kong and the University of Hong Kong.

Training of helpers

In order to facilitate the data collection process, two helpers were trained to collect the data. Therefore, altogether there were three investigators (two helpers and me) in the field to distribute and collect the questionnaires. As mentioned in the Appendix 10 and the Acknowledgement of this thesis, one of these helpers is my wife while another is one of my best friends. Both of them are English-Chinese bilingual. Their job was to clarify any questions raised by the participants and to ensure that the participants had completed the questionnaire before they were given the incentives. Before going to the campus, the helpers themselves had first tried out the questionnaire to figure out any questions they

need to get clarification from me.

Pilot study and the focus group

The questionnaire was then given to two university students whom I know to try it out, to count the time spent, and find out any questions they don't understand. The average time is about 16 minutes, and no questions were unclear except that they did not have a G.P.A. because they were in the first year, and this reminded me that we could only collect the data from year-2 and more senior students.

Before conducting the real study, a pilot study was done to find out what might happen and what difficulties would be encountered in the real situations. When the questionnaires were ready, the writer and the helpers went to these two universities to do a pilot in order to find out what difficulties would appear. Questionnaires were given to some university students to see how long they would need to finish the questionnaire. In the pilot studies, no students would like to continue after five minutes, as they did not want to spend time more than five minutes on the questionnaire. We then went back to the two university students whom we know to see whether they could help. They suggested that monetary incentives might help, and they suggested twenty Hong Kong dollars, with which they themselves would be willing to answer a questionnaire from a stranger. By considering that giving out cash might create chaos on the campuses, I decided to use two Mc Donald's coupons (HK$10 each).

Data gathering

The universities in Hong Kong were adopting a three-year system when this study was conducted, which meant most of the students could finish their bachelor degree after

completing their three-year education. Since year-1 students did not have their G.P.A. in their school term, we only collected data from students who were in their year-2 or higher.

On the days of data collection, it seemed that the monetary incentives worked. Students were willing to fill out the questionnaire by spending more than 15 minutes, and some of them even spent 20 minutes. The students were told that only the students studying in year-2 and above were invited to participate, but there was no identification check. Students were told their rights, including confidentiality and the right to quit any time. They were also told they would be given two HK$10 MacDonald's cash coupons if they helped to fill out the questionnaire. They then signed the consent form and filled out the questionnaire. All participants were asked to write down their contact number on the back of the questionnaire voluntarily in case there was any missing information that needed to be clarified. Most of them wrote down their telephone number, some of them refused while some of them wrote down their email address instead. The telephone number proved very useful when the data were analysed later. All participants stayed about 15 or more than 15 minutes. Before giving them the coupons, the investigators checked whether they had filled out their G.P.A. and other parts of the questionnaire. Even with this rigorous measure, some participants still needed to be called to clarify the data later.

Since we need 300 participants, we planned to collect 160 questionnaires from each university in case some questionnaires could not be used. My helpers and I checked the questionnaires before giving out the coupons to the participants. However, some participants refused to write their age. Even with this monitoring procedure, 6 questionnaires were discarded during data analysis because of incomplete information.

As a result, only 314 questionnaires can be used in this study.

Methods of data analysis

In order to ensure that there are two categories, high and low, in all three instruments, the mean score of each instrument is used as the criterion. In each instrument, a score that is higher than the mean score of the collected data is categorised as a high score, and the one below the mean as a low score. Since the total score of each participant is an integer, and the mean score of each instrument is not an integer, all participants can be placed in either high level or low level.

Data Analysis

All data were put into a spreadsheet (Microsoft Excel) for calculation and SPSS was used for data analysis.

The analysed was done as follows:

1) In ensure that the participants have filled out the questionnaires conscientiously, Cronbach's alpha was calculated for each variable to find out the internal consistency.
2) The Correlation Coefficient (Pearson's r) between different variables were analysed.
3) Data were divided into four groups by the various combination of different levels of metacognition and procrastination and ANOVA was applied to analyse whether there were significant differences among these groups in terms of their G.P.A..

Correlational analysis

The Correlational Coefficients of the following variables were analysed:

1) Metacognitive awareness and Procrastination
2) Metacognitive awareness and academic performance
3) Procrastination and academic performance

Analysis of variance (ANOVA)

Based on the collected data, participants were divided into four groups, and ANOVA was used to see whether there were significant differences among these groups in terms of academic performance.

1) Group 1 (High level of metacognitive awareness with high level of procrastination)
2) Group 2 (Low level of metacognitive awareness with low level of procrastination)
3) Group 3 (High level of metacognitive awareness with low level of procrastination)
4) Group 4 (Low level of metacognitive awareness with high level of procrastination)

T-Test

1) T-test for the 4-groups in ANOVA was employed to see if the test of ANOVA is significant.
2) T-test for academic majors
3) T-test for gender and G.P.A.
4) T-test for gender and API
5) T-test for gender and MAI
6) T-test for the two universities on MAI, API, and G.P.A.

Limitations of the study

This study is a quantitative research to find out the relationships among metacognitive awareness, procrastination, and academic performance. The present study focuses on the university students in Hong Kong. Because of difficult accessibility and limited resources, only 314 samples have been used for this study. Furthermore, these samples are not chosen randomly from the whole population, the results of the study have limitation to apply to all university students in Hong Kong.

CHAPTER 4: FINDINGS AND ANALYSIS

INTRODUCTION

The data of these 314 questionnaires were then input into the spreadsheet (Microsoft Excel) to calculate the total scores of all variables, as shown in appendix 14. Each page comprises 10 participants. There are 32 pages altogether. Each column represents one student, and each row represents one item of the instrument. Part A is the 19 items of API, and Part B is the 52 items of MAI. It is then followed by personal particulars and G.P.A. Since some items in API need to be inverted for calculation purposes, a row is used to show the total adjusted API, and this API is the real scores for analysis. After the adjusted API, the sub-components of MAI: Knowledge of Cognition and Regulation of Cognition were displayed. The sub-components of Knowledge of Cognition and Regulation of Cognition were also calculated.

For MAI, the following scores were calculated (1) The total score of MAI as a whole, (2) The total scores of its components: Knowledge of Cognition and Regulation of Cognition, (3) The total scores of the sub-components of Knowledge of Cognition: *Declarative knowledge, Procedural knowledge, and Conditional knowledge*.(4) The total scores of the sub-components of Regulation of Cognition: *Planning, Information Management Strategies, Comprehension Monitoring, Debugging Strategies, Evaluation*.

For the scores of API, some items of the scale are designed to calculate in an inverted way: Item No. 2,4,6,7,11,14,15,17,18, and 19. In the Likert scale, these inverted items were counted as ‘1’ when the participant chose ‘5’, ‘2’ was counted as ‘4’,

‘3’ counted as ‘3’, ‘4’ counted as ‘2’, and ‘5’ counted as ‘1’.

For the scores of G.P.A., no calculation was necessary since it is a single item.

After the above-mentioned scores were collected, the typical scores and the deviations of each variable were calculated for analysis purposes. Cronbach’s Alpha of each variable was measured to ensure the reliability of the instruments. Pearson’s correlation was employed to test my hypotheses 1, 2, and 3. ANOVA and the t-test were employed to test my hypotheses 4, 5, 6, and 7.

During the data input, I found that some information was missing. Five of them missed some parts or a whole page, so the participants were contacted with the phone number written on the back of the questionnaire; however, they were unwilling to answer on the phone. Another participant who did not write the G.P.A. score on the questionnaire was contacted too, but I found that he was a year-1 student and had no G.P.A. As a result, altogether 6 questionnaires were discarded. Since the samples were not randomly chosen, the 314 questionnaires were counted as 100% return rate in the analysis. Furthermore, some students refused to disclose their age, so the variable of age was discarded in this study.

All these scores were then input into the statistics programme (SPSS) for analysis. When the data were put into SPSS, the students from Polytechnic University (No.1-No.160) came first, followed by the students from the University of Hong Kong (No.161-314).

As stated in Chapter 1, the study reported here examines the relationship between academic performance and metacognition; the relationship between academic performance and procrastination. At the same time, it was also to investigate how procrastination and metacognition act together to affect the academic performance of

learners. Therefore, in this chapter, the results of descriptive statistics and inferential statistics are displayed. The data are also analysed in this Chapter.

PART A: THE TYPICAL SCORES: MEAN, MEDIAN, AND MODE

First of all, the typical scores of all variables are salient information, as they can give an overall picture of the characteristics of these variables. The common typical scores are mean, median and mode. The typical scores of G.P.A., API, and MAI are displayed in Table-1

Of these three typical scores, the mean is the most important for the present study, because we use the mean score of each variable to determine whether a particular score belongs to the category of high level of a variable or the category of low level of a variable for analysis purposes. A score of a variable will be considered as a high score when it is higher than the mean of that variable, while a score will be considered a low score when it is lower than the mean of that variable.

For our data, the mean score of Grade Point Average (G.PA) is 3.0277. For the analysis purposes, a G.P.A. score higher than 3.0277 is put into the category of 'high G.P.A.' and a score lower than 3.0277 is put into the category of 'low G.P.A'.

The mean score of the Aitken Procrastination Inventory (API) is 50.13. An API score higher than 50.13 is considered as 'high API', while a score lower than 50.13 is considered as 'low API'. Since the mean, media and mode of API are all lower than the neutral score 57(Neutral score is the middle point of a 5-point Likert Scale. The neutral score of a 5-point Likert Scale item is 3; the neutral score for 19 items is 57), students overall do not have a serious tendency or habit of procrastination. In the API scale, the

higher the score, the more a student procrastinates. Since the mode is lower than the mean, it shows that typically these students are punctual for their academic work. Out of 314 students, only 53 students who have a score in API lower than the neutral score, which means it is only about 17% of them are considered as procrastinators in API scale.

The mean score of Metacognitive Awareness (MAI) is 184.08. An MAI score higher than 184.08 is considered as 'high MAI', and a score lower than 184.08 is considered as 'low MAI'. On the other hand, the mean, median, and mode of MAI are higher than the neutral score 156 (Neutral score of one item of a 5-point Likert Scale is 3; the neutral score for 52 items is 156), which means that these university students overall are comparatively high in metacognition. The mode is higher than the neutral score although lower than the mean, which shows that most students have quite high level in metacognitive awareness, and some students are especially high. Out of the 314 students, only 26 students have a score in MAI lower than the neutral score, which means only about 8 percent of these students are considered to have low metacognitive awareness in MAI scale.

Table-1 Mean, Median, and Mode of G..P.A., API, and MAI respectively

	G.P.A.	**API**	**MAI**
Mean	3.0277	50.13	184.08
Median	3.0000	50.00	184.00
Mode	3.00	48.00	181.00

Of these three instruments, only MAI consists of different components and sub-components.

MAI is to measure the metacognition of a learner, and it consists of two components. The first component is named 'Knowledge of Cognition', which is to measure how a learner knows about strategies, his/her own strengths and weaknesses as a learner, and the relationship between he/she and the tasks. The second component is named 'Regulation of Cognition', which is to measure the knowledge about monitoring and evaluating the use of strategies.

The typical scores of Knowledge of Cognition and its sub-components are displayed in Table-2

The mean score of Knowledge of Cognition is 59.68, and it has three sub-components: *Declarative knowledge, Procedural knowledge, and Conditional knowledge*.

Declarative knowledge is the knowledge about one's skills and abilities as a learner. The mean of *Declarative knowledge* here is 28.21.

Procedural knowledge is the knowledge about how to use a learning strategy. The mean of *Procedural knowledge* is 13.62.

Conditional knowledge is the knowledge about when and why to use a particular learning strategy. The *Conditional knowledge* is 17.84.

Table-2 Typical Scores: Mean, Median, Mode of Knowledge of Cognition and its sub-components

	Knowledge of Cognition	***Declarative knowledge***	***Procedural knowledge***	***Conditional knowledge***
Mean	59.68	28.21	13.62	17.84
Median	60.00	29.00	14.00	18.00
Mode	58.00	29.00	14.00	18.00

While Knowledge of Cognition is the knowledge about one's own position as a learner, the Regulation of Cognition is the knowledge about one's monitoring and evaluating his/her own learning process and performance. The typical scores of Regulation of Cognition and its sub-components are displayed in Table-3

The mean of Regulation of Cognition is 124.41, and it has five sub-components: *Planning, Information Management Strategies, Comprehension monitoring, Debugging Strategies, and Evaluation*.

Planning is about goal setting and resources allocating. The mean of '*Planning*' here is 24.14.

Information Management Strategies is the sequences of strategies and skills used during the learning processes, such as organizing, elaborating, summarizing etc. The mean of *Information Management Strategies* here is 36.81.

Comprehension Monitoring is the assessment of one's learning or the use of strategies. The mean of *Comprehension Monitoring* here is 23.84.

Debugging Strategies is the use of strategies for the correction of comprehension and performance errors. The mean of *Debugging Strategies* here is 19.29.

Evaluation is the analysis of the effectiveness of strategies used and the learning performance. The mean of *Evaluation* is 20.33.

By using the mean scores of these variables and the sub-components, all scores are divided into two categories for the present study: high and low. The scores of a variable that are higher than its mean are considered as 'high', and those below the mean of that variable are considered as 'low'

Table 3 - Mean, Median, Mode of Regulation of Cognition and its sub-components

	Regulation of Cognition	***Planning***	***Information Management Strategies***	***Comprehension Monitoring***	***Debugging Strategies***	***Evaluation***
Mean	124.41	24.14	36.81	23.84	19.29	20.33
Median	125.00	25.00	37.00	24.00	20.00	20.50
Mode	136.00	26.00	35.00*	26.00	20.00	20.00

* Multiple modes exist. The smallest value is shown

PART B: THE SPREAD AND VARIATION OF THE SCORES

Although the mean of a variable tell us the general characteristics of that variable, it is not the whole picture. The spread of a variable can tell us more about that variable, which is especially useful for a research design of correlation. If there is no variation in one of our variables, the correlation coefficient design will not be an appropriate one. For instance, if the scores of G.P.A of all students are 4, the correlation coefficient will be zero, even though there is a big variation in API or MAI. Hence, we need to find out the range and standard deviation of these variables first. Table 4 shows the data.

The two universities where I collected data were using a 1-4 G.P.A. system, with a range of 3. For our data, the lowest score of G.P.A. obtained is 1.93 and the highest is 4, with a range of 2.07. The mean is 3.0277 and the standard deviation is 0.39. The range of G.P.A. for our data covers 69% (2.07/3) of the possible maximum range, and the ratio of standard deviation to mean is more than 10%(0.39/3.0277=13%).

For the scale of API, the higher is a score of API, the higher level of procrastination

it will be. The possible maximum score of each item of API is 5, and the minimum is 1. There are 19 items altogether in API; therefore, the possible maximum score of API scale for one participant can be 95, while the minimum can be 19, with a range of 76. The neutral score is 57. For the present study, the lowest score obtained for API is 22, and the highest score is 75, with a range of 53. The mean score is 50.13, and the standard deviation is 8.385. The range of API for our data covers 70% (53/76) of maximum range. The ratio of standard deviation to the mean is more than 10% (8.385/50.13=17%).

There are 52 items in scale of MAI, and we use a 5-point Likert scale for our study; therefore, the possible maximum score of MAI for each participant is 260, while the minimum is 52, with a range of 208. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 156. In the present study, the highest score obtained is 249 while the lowest score obtained is 119, with a range of 130. The mean is 184.08, and the standard deviation is 20.495. The range of our data covers 63% (130/208) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (20.495/184.08=11%).

From these data, we can see that there is a considerable variation for all three variables.

Table-4 Spread and Variation of G.P.A., API, and MAI

	G.P.A.	**API**	**MAI**
Range	2.07	53	130
Lowest	1.93	22	119
Highest	4.00	75	249
Standard Deviation	0.39348	8.385	20.495

Data of the Components of MAI

Metacognitive Awareness (MAI) consists of two components: Knowledge of Cognition and Regulation of Cognition.

There are 17 items in Knowledge of Cognition, the possible minimum score is 17, and the maximum score is 85, with a range of 68. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 51. For our data, the lowest score is 33, while the highest is 85, with a range of 52. The mean score of Knowledge of Cognition is 59.68. The standard deviation is 7.669. The range of our data covers 76% (52/68) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (7.669/59.68=13%). On the other hand, the mean, median and mode of Knowledge of Cognition are higher than the neutral score (51), which shows that most of the students can cognitively monitor their learning, or at least they believe so.

Data of the sub-components of Knowledge of Cognition

Knowledge of Cognition consists of three sub-components: *Declarative knowledge, Procedural knowledge,* and *Conditional knowledge.*

Declarative Knowledge has 8 items. The possible minimum score of the scale is 8, the maximum is 40, with a range of 32. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 24. From our data, the lowest score obtained is 16, and the highest score obtained is 40, with a range of 24. The mean of *Declarative Knowledge* is 28.21. The standard deviation is 3.822. The range of our data

covers 75% (24/32). The ratio of standard deviation to mean is more than 10% (3.822/28.21=14%). On the other hand, all three typical scores, mean, median and mode of *Declarative Knowledge* are very close and higher than the neutral score (24), which shows that most of the students are aware of their own strengths and weaknesses as a learner.

Procedural Knowledge has 4 items. The possible minimum score of the scale is 4, the maximum is 20, with a range of 16. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 12. From our data, the lowest score obtained is 4, and the highest score obtained is 20, with a range of 16. The mean of *Procedural Knowledge* is 13.62. The standard deviation is 2.313.The range of our data covers 100% (16/16) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (2.313/ 13.62=17%). On the other hand, the mean, median and mode of *Procedural Knowledge* are just a little bit higher than the neutral score (12), which shows most students know how to use their strategies for learning, but not very strong in this knowledge.

Conditional Knowledge has 5 items. The possible minimum score of the scale is 5, and the maximum is 25, with a range of 20. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 15. For our data, the lowest score obtained is 9, while the highest score obtained is 25, with a range of 16. The mean of *Conditional Knowledge* is 17.84. The standard deviation is 2.313. The range of our data covers 80% (16/20) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (2.313/17.84=13%). On the other hand, the mean, median and mode of *Conditional Knowledge* are very similar and all of them are higher than the neutral score (15), which shows that most students know when to use strategies for their

learning.

Table-5 Spread and Variation of Knowledge of Cognition and its sub-components

	Knowledge of Cognition	***Declarative Knowledge***	***Procedural Knowledge***	***Conditional Knowledge***
Range	52	24	16	16
Lowest	33	16	4	9
Highest	85	40	20	25
Standard Deviation	7.669	3.822	2.313	2.597

Regulation of Cognition has 35 items. The possible minimum score of the scale is 35, and the maximum is 175, with a range of 140. The neural score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 105. For our data, the lowest score obtained is 81, while the highest score obtained is 164, with a range of 83. The mean of Regulation of Cognition is 124.41. The standard deviation is 13.77. The range of our data covers 59% (83/140) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (13.77/124.41=11%). On the other hand, the mean, median and mode of Regulation of Cognition are much higher than the neutral score (105), which shows that most students can self-regulate their own learning.

Data of the sub-components of Regulation of Cognition

There are 5 sub-components in Regulation of Cognition; they are *Planning*, *Information Management Strategies*, *Comprehension Monitoring*, *Debugging Strategies*, and *Evaluation*.

Planning has 7 items. The possible minimum score of the scale is 7, and the maximum is 35, with a range of 28. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 21. For our data, the lowest score obtained is 13, and the highest score obtained is 32, with a range of 19. The mean of *Planning* is 24.14. The standard deviation is 3.556. The range of our data covers 68% (19/28) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (3.556/24.14=15%).

On the other, hand, all mean, median, and mode of *Planning* are higher than the neutral score (21), which shows that most of these students use planning as their strategies for learning.

Information Management Strategies has 10 items. The possible minimum score of the scale is 10, wile the maximum is 50, with a range of 40. The neutral (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 30. For our data, the lowest score obtained is 20, and the highest score obtained is 48, with a range of 28. The mean of *Information Management Strategies* is 36.81, and the standard deviation is 4.434. The range of our data covers 70% (28/40) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (4.434/36.81=12%). On the other hand, *Information Management Strategies* seems to be widely use by the students, as all three typical average scores are higher than the neutral score (30).

Comprehension Monitoring has 7 items. The possible minimum score of the scale is 7, while the maximum is 35, with a range of 28. The neutral (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 21. For our data, the lowest score obtained is 13, and the highest scored obtained score is 35, with a range of 22. The mean of *Comprehension Monitoring* is 23.84, and the standard deviation is 3.595. The range of our data covers 79% (22/28) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (3.595/23.84=15%). On the other hand, all mean, median, and mode scores of *Comprehension Monitoring* are higher than the neutral score (21), which means most students have comprehension monitoring skills.

Debugging Strategies has 5 items. The possible minimum score of the scale is 5, while the maximum is 25, with a range of 20. The neutral score (If a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 15. For our data, the lowest score obtained is 8, and the highest score obtained is 25, with a range of 17. The mean of *Debugging Strategies* is 19.29, and the standard deviation is 2.429. The range of our data covers 85% (17/20) of the possible maximum range. The ratio of standard deviation to mean is more than 10% (2.429/19.29= 13%). On the other hand, all three typical average scores of *Debugging Strategies* are higher than the neutral score (15), which shows that most students know how to use strategies to correct their own errors, or seek help when facing difficulties.

Evaluation has 6 items. The possible minimum score of the scale is 6, while the maximum is 30, with a range of 24. The neutral score (When a participant chooses all 3 (neutral point) in the 5-point Likert scale) is 18. For our data, the lowest score obtained is 7, and the highest score obtained is 29, with a range of 22. The mean of Evaluation is 20.33, and the standard deviation is 3.359. The range of our data covers 92%(22/24) of

the possible maximum range. The ratio of standard deviation to mean is more than 10% (3.359/20.33= 17%). On the other hand, all three typical scores, mean, median, and mode of *Evaluation* are all higher than the neutral score (18). Most students know how to evaluate their own performance.

Table–6 Spread and Variation of Regulation of Cognition and its sub-components

	Regulation of Cognition	***Planning***	***Information Management Strategies***	***Comprehension Monitoring***	***Debugging Strategies***	***Evaluation***
Range	83	19	28	22	17	22
Lowest	81	13	20	13	8	7
Highest	164	32	48	35	25	29
Standard Deviation	13.770	3.556	4.434	3.595	2.429	3.359

PART C: CRONBACH'S ALPHA OF THE INSTRUMENTS

To check the reliability and internal consistency of the instruments, Cronbach's α were calculated and displayed in this chapter. Even though the instruments have been tested for validity and reliability when they were developed, it is important to check its reliability in the present study because of the difference of the participants. The measurement of Cronbach's α is to ensure that participants were really careful and conscientious when they filled out the instruments and the differences of cultures did not affect the participants' understanding of the questionnaire; therefore, the internal

consistency and reliabilities of the data have to be found out.

Some researchers (Aron et al, 2009) suggest that internal consistency reliability or Cronbach's α should be at least 0.6 to be considered as a good measure, while others (Litwin, 2003) suggest at least 0.7.

Cronbach's Alpha of API, MAI

G.P.A. of the participants is a single item, so there is no calculation for Cronbach's α

The Cronbach's α of API in the present study of 314 participants is 0.773, which shows a considerable satisfactory of internal consistency and reliability.

The Cronbach's α of MAI in our study of 314 participants is 0.927, which shows a very good measure of internal consistency and reliability.

The high levels of Cronbach's α show the data are reliable and participants have no problem in using the instruments even though English is their second language.

Table –7 Cronbach's Alpha of API and MAI

Variables	Cronbach's α
Procrastination (API))	0.773
Metacognition (MAI)	0.927
Grade Point Average (GPA)	N/A

Cronbach's Alpha of MAI's components and sub-components

Since MAI consists of two components: Knowledge of Cognition and Regulation of Cognition. It is also important to find out the Cronbach's α of these two components and their subcomponents if we want to investigate the correlations between G.P.A. and these variables.

Table 8. Cronbach's Alpha of Knowledge of Cognition and its sub-components

Variables	Cronbach's α
Declarative knowledge	0.763
Procedural knowledge	0.729
Conditional knowledge	0.764
Knowledge of Cognition	**0.819**

The Cronbach's α of Knowledge of Cognition is 0.819, which is a good measure of internal consistency and reliability. Knowledge of Cognition consists of three sub-components: *Declarative knowledge*, *Procedural knowledge*, and *Conditional knowledge*. The results show the following findings.

The Cronbach's α of *Declarative Knowledge* is 0.763.

The Cronbach's α of *Procedural Knowledge* is 0.729.

The Cronbach's α of *Conditional Knowledge* is 0.764.

The Cronbach's α of *Regulation of Cognition* is 0.839, which is a good measure of internal consistency and reliability. The Regulation of Cognition consists of five

sub-components: *Planning*, *Information Management Strategies*, *Comprehension Monitoring*, *Debugging Strategies*, and *Evaluation*.

The Cronbach's α of *Planning* is 0.778.

The Cronbach's α of *Information Management Strategies* is 0.830.

The Cronbach's α of *Comprehension Monitoring* is 0.783.

The Cronbach's α of *Debugging Strategies* is 0.847.

The Cronbach's α of *Evaluation* is 0.783.

Table 9. Cronbach's Alpha of Regulation of Cognition and its sub-components

Variables	**Cronbach's α**
Planning	0.778
IMS	0.830
Monitoring	0.783
Debugging Strategies	0.847
Evaluation	0.783
Regulation of Cognition	**0.839**

Our findings show that our Cronbach's α of all our scales, components and sub-components are higher than 0.7, which are good measures of internal consistency and reliability.

PART D: PEARSON'R OF THE VARIABLES AND ANALYSIS FOR PARTIAL CORRELATIONS

In this part, the correlation coefficients of all variables will be displayed and analysed. My first three alternative hypotheses mentioned in Chapter 3 are as follows:

1) Academic performance of a learner is negatively related to his/her level of procrastination.
2) Academic performance of a learner is positively related to his/her metacognitive awareness.
3) Metacognitive awareness of a learner is negatively related to his/her level of procrastination.

The Pearson correlation coefficients of the variables are shown in table 10.

The Correlation Coefficients between G.P.A. and other variables and their components

The zero-order correlation coefficient between G.P.A. and API is –0.233, which is significant at the 0.01 level (2-tailed)

The zero-order correlation coefficient between G.P.A. and MAI is 0.174, which is significant at the 0.01 level (2-tailed)

The zero-order correlation coefficient between G.P.A. and Knowledge of Cognition (a component of MAI) is 0.187, which is significant at the 0.01 level (2-tailed)

The zero-order correlation coefficient between G.P.A. and Regulation of Cognition (a component of MAI) is 0.155, which is significant at the 0.01 level (2-tailed)

The Correlation Coefficients between API and other variables and their components

As mentioned above, the zero-order correlation coefficient between API and G.P.A. is –0.233, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and MAI is -0.457, which is significant at the 0.01 level (2-tailed)

The correlation coefficient between API and Knowledge of Cognition is –0.396, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and Regulation of Cognition is – 0.460, which is significant at the 0.01 level (2-tailed).

The Correlation Coefficients between MAI and other variables

The zero-order correlation coefficient between MAI and API is –0.457, which is significant at the 0.01 level (2-tailed).

The zero-order correlation coefficient between MAI and G.P.A. is 0.187, which is significant at the 0.01 level (2-tailed).

The zero-order correlation coefficient between MAI and its component K of Cog (Knowledge of Cognition) is 0.920, which is significant at the 0.01 level (2-tailed)

The zero-order correlation coefficient between MAI and its component R of Cog (Regulation of Cognition) is 0.976, which is significant at the 0.01 level (2-tailed)

The zero-order correlation coefficient between K of Cog (Knowledge of Cognition)

and R of Cog (Regulation of Cognition) is 0.812, which is significant at the 0.01 level (2-tailed)

Table 10. Zero order Pearson correlation of API, G.P.A. , MAI and MAI's components (Knowledge of Cognition and Regulation of Cognition)

Variables	Procrastination (API)	K of Cog	R of Cog	Total of MAI	G.P.A.
Procrastination (API)	1	-0.396*	-0.460*	-0.457*	-0.233*
K of Cog	-0.396*	1	0.812*	0.920*	0.187*
R of Cog	-0.460*	0.812*	1	0.976*	0.155*
Total of MAI (Metacognition)	-0.457*	0.920*	0.976*	1	0.174*
G.P.A.	-0.233*	0.187*	0.155*	0.174*	1

***The correlation is significant at the 0.01 level (2-tailed)**
K of Cog = Knowledge of Cognition
R of Cog = Regulation of Cognition

The Correlation Coefficients between G.P.A. and sub-components of Knowledge of Cognition

The correlation coefficient between G.P.A. and *Declarative Knowledge* is 0.152, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Procedural Knowledge* is 0.229, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Conditional Knowledge* is 0.126, which is significant at the 0.05 level (2-tailed).

The Correlation Coefficients between API and sub-components of Knowledge of Cognition

The correlation coefficient between API and *Declarative Knowledge* is –0.333, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Procedural Knowledge* is –0.395, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Conditional Knowledge* is –0327, which is significant at the 0.01 level (2-tailed).

Table 11. Zero order Pearson Correlation of API, G.P.A. and sub-components of Knowledge of Cognition

Variables	API	G.P.A.	MAI
Declarative Knowledge	-0.333*	0.152*	0.833*
Procedural Knowledge	-0.395*	0.229*	0.794*
Conditional Knowledge	-0.327*	0.126**	0.785*

***The correlation is significant at the 0.01 level (2-tailed)**

**** The correlation is significant at the 0.05 level (2-tailed)**

Conditional Knowledge (CK) is significant correlated with G.P.A. at the 0.05 level (2-tailed)

The Correlation Coefficients between G.P.A. and sub-components of Regulation of Cognition

The correlation coefficient between G.P.A. and *Planning* is 0.166, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Information Management Strategies* is 0.05, which is not significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Comprehension Monitoring* is 0.183, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Debugging Strategies* is 0.052, which is not significant at the 0.01 level (2-tailed).

The correlation coefficient between G.P.A. and *Evaluation* is 0.162, which is significant at the 0.01 level (2-tailed).

The Correlation Coefficients between API and sub-components of Regulation of Cognition

The correlation coefficient between API and *Planning* is –0.509, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Information Management Strategies* is –0.29, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Comprehension Monitoring* is –0.392, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Debugging Strategies* is -0.26, which is significant at the 0.01 level (2-tailed).

The correlation coefficient between API and *Evaluation* is -0.357, which is significant at the 0.01 level (2-tailed).

Table 12. Zero order Pearson correlation of API , G.P.A. and sub-components of Regulation of Cognition

Variables	API	G.P.A.	MAI
Planning	-0.509*	0.166*	0.839*
Information Management Strategies	-0.29*	0.05	0.760*
Monitoring	-0.392*	0.183*	0.824*
Debugging Strategies	-0.26*	0.052	0.580*
Evaluation	-0.357*	0.162*	0.808*
API	1*	-0.233*	-0.457*
G.P.A.	-0.233*	1*	0.174*

***The correlation is significant at the 0.01 level (2-tailed)**

Information Management Strategies (IMS) and Debugging Strategies (D) are not significantly correlated to G..P.A.

Analysis of Correlation

As mentioned before, my alternative hypothesis 1 is that the academic performance of a learner is negatively related to his/her level of procrastination. The data acquired show that correlation coefficient between G.P.A. and API is -0.233, which is significant at 0.01 level (N=314, 2-tailed), so there is a significant negative correlation between academic performance and procrastination, which means that the higher procrastination level a learner has, the lower grade point average he/she will get, or vice versa.

My alternative hypothesis 2 states that the academic performance of a learner is positively related to his/ her metacognitive awareness. The data show that the correlation coefficient between G.P.A. and MAI is 0.174, which is significant at the 0.01 level

(N=314,2-tailed), which means the higher MAI score a learner acquires, the higher accumulated grade point average she/he will get, or vice versa. Although all components of MAI are correlated to G.P.A., it is surprising to find that not all subcomponents of Regulation of Cognition are related to G.P.A. Two sub-components: Information Management Strategies (IMS) and Debugging Strategies (D) are not significantly correlated to G.P.A. Further studies, maybe qualitative research, are needed to find out why these two sub-components are not significantly related G.P.A. On the other hand, although Conditional Knowledge of Knowledge of Cognition is only correlated to G.P.A at the 0.05 level but not at the 0.01 level; which means that the correlation between CK and G.P.A. is not as strong as Declarative Knowledge and Procedural Knowledge do to G.P.A.

My alternative hypothesis 3 states that metacognitive awareness of a learner is negatively related to his/her level of procrastination. The data show that the correlation coefficient between API and MAI is -0.457, which is significant at the 0.01 level. (N=314, 2-tailed), which means the higher MAI score a learner gets, the less he/she will procrastinate, or vice versa. This means that high procrastinators are lower in metacognitive awareness than the low procrastinators.

The findings of alternative hypotheses 4 to 7 will be analysed in the section of ANOVA and t-test.

Analysis of Partial Correlations

After monitoring API

The correlation between G.P.A. and MAI is 0.174, which is significant at the 0.01

level (2-tailed, df=311). However, the correlation between G.P.A. and MAI after controlling API becomes 0.078, which is not significant at the 0.01 level (2-tailed, df=311). In short, there is no significant relationship between G.P.A. and MAI if API is controlled, which means that the impact of procrastination on academic performance is more important the metacognitive awareness level. However, when we see the ANOVA of four groups, we find that metacognitive awareness still shows an impact on academic performance.

Table-13 Partial correlations by monitoring API

Control Variables			**G.P.A.**	**MAI**
API	**G.P.A.**	Correlation	1.000	.078
		Significance (2-tailed)	.	.166
		df	0	311
	MAI	Correlation	.078	1.000
		Significance (2-tailed)	.166	.
		df	311	0

After monitoring G.P.A.

The correlation between API and MAI is -0.457 (d.f.= 311, significant at the 0.01 level, two-tailed). However, the correlation between API and MAI after controlling G.P.A. becomes -0.435, which is also significant at 0.01 level (2-tailed). In short, the negative relationship between API and MAI is not much changed if G.P.A. is controlled. Therefore MAI and API is negatively correlated no matter of the G.P.A.

Table-14 Partial correlations by monitoring GPA

Control Variables			MAI	API
G.P.A.	MAI	Correlation	1.000	-.435
		Significance (2-tailed)	.	.000
		df	0	311
	API	Correlation	-.435	1.000
		Significance (2-tailed)	.000	.
		df	311	0

After monitoring MAI

The correlation between G.P.A. and API is –0.233 is significant at the 0.01 level (2-tailed, d.f. = 311). Although the correlation between G.P.A. and API after controlling MAI declines to -0.175, which is still significant at the 0.01 level (2-tailed). In short, the relationship between G.P.A. and API is significantly negative-correlated even if MAI is controlled. However, when MAI and API work together, their influence on G.P.A. is stronger.

Table-15 Partial correlations by monitoring MAI

Control Variables			API	G.P.A.
MAI	API	Correlation	1.000	-.175
		Significance (2-tailed)	.	.002
		df	0	311
	G.P.A.	Correlation	-.175	1.000
		Significance (2-tailed)	.002	.
		df	311	0

By the analysis of the partial correlations, we find that the negative correlation between procrastination and metacognition does not change much (change from -0.457 to -0.435) by controlling the G.P.A. On the other hand, when controlling MAI, The correlation between API and academic performance changed from -0.233 to -0.175, which is still significant (two-tailed, p=0.002). However, when API is under control, the correlation between MAI and G.P.A. changed from 0.174 (df=311, significant at the 0.01 level) to 0.078, which becomes not significant. Therefore, if the students have very high level of procrastination, their level of metacognition has little effects on their G.P.A.

PART E: ANALYSIS OF VARIANCE (ANOVA) AND T-TEST

As mentioned in Chapter 3, my hypotheses are that higher metacognition is related to better academic performance, while higher procrastination is related to poorer academic performance. The scores of participants were divided into four groups for analysis purposes. The mean score of each variable is used as a measure for dividing the four groups. Here 'high' means higher than the mean score of that variable, 'low' means lower than the mean score of that variable.

Group1 : Participants with high scores of MAI and also high scores of API

Group 2: Participants with low scores of MAI and also low scores of API

Group 3: Participants with high scores of MAI but low scores of API

Group 4: Participants with low scores of MAI but high scores of API

My assumption is that both low metacognition and high procrastination will negatively affect learners' academic performance. Learners with a combination of low metacognition and high procrastination should perform the worst.

My 4th to 7th alternative hypotheses mentioned in Chapter 3 are:

Alternative hypothesis 4: Learners with high level of metacognitive awareness and high level of procrastination will have a higher-than-average academic performance.

Alternative hypothesis 5: Learners with low level of metacognitive awareness and low level of procrastination will have a higher-than-average academic performance. .

Alternative hypothesis 6: Learners with high level of metacognitive awareness but low level of procrastination will have a higher-than-average academic performance. .

Alternative hypothesis 7: Learners with low level of metacognitive awareness but high level of procrastination will have a lower-than-average academic performance.

The findings show that the G.P.A. of Group 1, Group 2, Group 3 are very close, while Group 4 seems to be different from the other groups.

The average G.P.A. of group 1 (high metacognition and high procrastination) is 3.0926.

The average G.P.A. of group 2 (low metacognition and low procrastination) is 3.0949.

The average G.P.A. of group 3 (high metacognition but low procrastination) is 3.0896.

The average G.P.A. of group 4 (low metacognition but high procrastination) is 2.8885.

In order to find out whether these differences are significant, ANOVA and t-test

were used for analysis purposes.

ANOVA of the four groups

ANOVA was first employed to test whether these four groups are significantly different. Levene's test shows that the variances of these 4 groups are similar.

The mean square of between-groups is 0.935, and the mean square of within-groups is 0.147. The F-ratio is 6.348, which is significant at the 0.01 level, which means that at least one of these 4 groups are significantly different from the others, although it did not indicate which group. Therefore, a t-test was employed to find out which group is significantly different from the other groups.

Table-16 Statistics of the 4 groups

Group	Number of Participants	Mean of G.P.A.	Standard Deviation	Standard Error	95% Confidence Interval for Mean		95% Confidence Interval for Mean	Maximum
					Lower Bound	Lower Bound		
1	57	3.0926	.41422	.05487	2.9827	3.2025	2.30	4.00
2	59	3.0949	.32363	.04213	3.0106	3.1793	2.30	4.00
3	99	3.0896	.40004	.04021	3.0098	3.1694	1.93	3.88
4	99	2.8885	.38185	.03838	2.8123	2.9646	1.99	3.70
Total	314	3.0277	.39348	.02221	2.9840	3.0714	1.93	4.00

Table 17-a Test of Homogeneity of Variances of 4 groups on G.P.A.

Levene Statistic	df1	df2	Sig.
1.473	3	310	.222

Table 17-b ANOVA of 4 groups on G.P.A.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.805	3	.935	6.348	.000
Within Groups	45.656	310	.147		
Total	48.461	313			

T-Tests of the 4 groups

T-test has been employed to find out which group is different from the others on G.P.A.

The t-value for the t-test of group-1 and group-2 is –0.033 (df=114), which is not significant at the 0.01 level (2-tailed).

The t-value for the t-test of group-1 and group-3 is 0.045 (df=154), which is also not significant at the 0.01 level(2-tailed).

The t-value for the t-test of group-1 and group-4 is 3.117 (df 154), which is significant at the 0.01 level(2-tailed).

The t-value for the t-test of group-2 and group-3 is 0.087 (df=156), which is not significant at the 0.01 level(2-tailed).

The t-value for the t-test of group-2 and group-4 is 3.474 (df=156), which is significant at the 0.01 level(2-tailed).

The t-value for the t-test of group-3 and group-4 is 3.618 (df=196), which is significant at the 0.01 level(2-tailed).

The results show that only Group-4 is significantly different from the other groups at the 0.01 level.

Table 18 T-tests among the 4 groups

Groups	T-value	Degree of freedom	Significant (2-tailed)
1 and 2	-0.033	114	0.974
1 and 3	0.045	154	0.964
1 and 4	3.117	154	0.002
2 and 3	0.087	156	0.931
2 and 4	3.474	156	0.001
3 and 4	3.618	196	0.000

So we can see that the t-values of Group-4 are significantly different from the other groups.

Group-4 is the group of students who are procrastinators and have low levels of metacognition. It is not difficult to imagine that they are the lowest group in academic performance, and the present study shows that they are.

With the same logic, we tend to assume that Group-3 (high metacognition but low procrastination) should be the group with the best academic performance; however, the present study shows that it is not the case.

Let's see the combinations of the other three groups:

The average G.P.A. of group 1 (high metacognition and high procrastination) is 3.0926.
The average G.P.A. of group 2 (low metacognition and low procrastination) is 3.0949.
The average G.P.A. of group 3 (high metacognition but low procrastination) is 3.0896.

My findings show that Group-3 is not better than Group-1 and Group-2, and their differences are not significant according to the t-tests.

Since all of them are higher than the average, the combinations of these two variables are noteworthy.

Group-1 and Group-3 have a common factor, i.e. high metacognition.

Group-2 and Group-3 have a common factor, i.e. low procrastination.

Group-4 (low metacognition and high procrastination) has no common factors with any of these three groups.

The result of Group-4 shows that 'low metacognition' and 'high procrastination' cannot be the factors that lead to higher-than-average academic performance, and therefore only 'high metacognition' and 'low procrastination' can be the two positive elements that lead to higher-than-average performance. On the other hand, 'low metacognition' and 'high procrastination' are two negative elements. The results are consistent with previous studies mentioned in the literature review in Chapter 2 that low metacognition (without controlling other variables) or high procrastination (without controlling other variables) can lead to poor academic performance.

The combination of high metacognition and low procrastination does not seem to give the learners an advantage over other two groups, which have only one positive element. Those students who are high in metacognition will perform the same even if they procrastinate. The students who have low metacognition but do not procrastinate will perform the same as well.

ANOVA of Academic Majors on API

ANOVA was employed to test whether students from different academic majors have different levels of procrastination tendency. The mean square of between-groups is 22.747, and the mean square of within-groups is 70.763. The F-ration is 0.321, which is not significant at the 0.01 level (2-tailed). The result shows that there is no relationship between level of procrastination and the students' academic major.

Table-19 ANOVA of Discipline Majors and API

API	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	68.242	3	22.747	.321	.810
Within Groups	21936.663	310	70.763		
Total	22004.904	313			

ANOVA of Academic Majors on MAI

ANOVA was employed to test whether students from different academic majors have different levels of metacognition. The mean square of between-groups is 570.345, and the mean square of within-group is 418.59. The F-ratio is 1.363, which is not significant at the 0.01 level (2-tailed). The result shows that there is no relationship between metacognitive levels and the students' academic major.

Table-20 ANOVA of Discipline Majors and MAI

MAI	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1711.035	3	570.345	1.363	.254
Within Groups	129762.812	310	418.590		
Total	131473.847	313			

ANOVA of Academic Majors on G.P.A.

ANOVA was employed to test whether students from different academic majors are significantly different in academic performance, The mean square of between-groups is 0.229, and the mean square of within-group is 0.154. The F-ratio is 1.485, which is not significant at the 0.01 level(2-tailed). The result shows that there is no relationship between academic performance and the students' academic major.

Table-21 ANOVA of Majors and G.P.A.

G.P.A.	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.687	3	.229	1.485	.218
Within Groups	47.774	310	.154		
Total	48.461	313			

T-test of Gender on API

T-test was employed to find out whether there is a significant difference in procrastination tendency between genders The t-vaule for t-test of Gender on API is

0.383, which is not significant the 0.01 level (2-tailed, df=312). The result shows that there no relationship between level of procrastination and the variable of gender.

Table 22a Group Statistics of Gender on API

	Gender	N	Mean	Std. Deviation	Std. Error Mean
API	1	126	50.35	8.421	.750
	2	188	49.98	8.379	.611

Table 22b T-test of Gender and API

		Levene's Test		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
API	Equal variances assumed	.031	.861	.383	312	.702	.370	.967	-1.532	2.273
	Equal variances not assumed			.383	267.266	.702	.370	.968	-1.535	2.276

T-test of Gender on MAI

T-test was employed to find out whether there is a significant difference in metacognitive levels between genders. The t-value for the t-test of Gender on MAI is 1.546(df=312), which is not significant at the 0.01 level(2-tailed). The result shows that there is no relationship between metacognitive levels and gender.

Table 23a Group Statistics of Gender and MAI

Gender		No. .of participants	Mean	Standard Deviation	Standard error
MAI	1 Male	126	186.26	18.176	1.619
	2 Female	188	182.62	21.838	1.593

Table –23b T-test of Gender and MAI

		Levene's Test		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MAI	Equal variances assumed	3.793	.052	1.546	312	.123	3.640	2.354	-.993	8.272
	Equal variances not assumed			1.602	297.641	.110	3.640	2.271	-.830	8.109

T-test of Gender on G.P.A.

T-test was employed to find out whether there is a significant difference in academic performance between genders. The t-value for the t-test of gender on G.P.A. is 3.721 (df=312), which is significant at the 0.01 level(2-tailed). The result shows that there is a significant difference between male and female students in academic performance. This is will be discussed in Chapter 5.

Table –24a Group Statistics of Gender and G.P.A.

Gender		N	Mean	Std. Deviation	Std. Error Mean
G.P.A.	**male**	126	2.9288	.39798	.03546
	female	188	3.0940	.37717	.02751

Table –24b T-test of Gender and G.P.A.

		Levene's Test		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
G.P.A.	Equal variances assumed	.119	.731	-3.721	312	.000	-.16523	.04440	-.25260	-.07787
	Equal variances not assumed			-3.682	258.234	.000	-.16523	.04488	-.25360	-.07687

T-Test of all API, MAI, and G.P.A between the two universities

As mentioned in Chapter 3, both universities use English as teaching medium, and most students are from local secondary schools who passed A-level exams and were admitted through a system called JUPAS. Both universities are funded by University Grants Committee of the Hong Kong government. Although students are assumed from the same population, it is interesting to find out whether there is a significant difference between the students of these two universities in terms of metacognition, procrastination tendency and academic performance.

For API, the t-value for the t-test between the two universities is 0.291(df=312), which is not significant at the 0.01 level (2-tailed). The result shows that students from these two universities are not much different in procrastination tendency.

For MAI, the t-value for the t-test between two universities is 1.142 (df=312), which is not significant at the 0.01 level (2-tailed). The result shows that students from these two universities are not much different in metacognition.

For G.P.A., the t-value for the t-test between two universities is 2.062 (df=312), which is not significant at the 0.01 level (2-tailed). The result shows that students from these two universities are not much different in grade point average, even though they were graded by academics from different campuses.

The t-tests show that students from these two universities are very similar in terms of G.P.A., API and MAI.

Table –25 T-tests for API, MAI, and G.P.A. between the two universities

Variable	***T-value***	***Degree of freedom***	***Significant level***
API	*0.291*	*312*	*0.772*
MAI	*1.142*	*312*	*0.254*
G.P.A.	*2.062*	*312*	*0.04*

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

INTRODUCITON

In this chapter, I will first discuss whether the hypotheses have been supported by the findings; then, followed by comparing previous studies in the literature with the present findings. Contribution of the present study and the limitations will also be discussed. The final part will be the conclusion, which sums up the whole paper and discusses whether my objectives have been achieved. Some recommendations for further research will also be suggested.

DISSUCSION ABOUT THE FINDINGS IN RELATION TO THE HYPOTHESES

Validity and reliability of the findings

The three instruments used to test these hypotheses are API, MAI and G.P.A. The measurements of Cronbach's Alpha of the instruments for this study show that all instruments are internally consistent and reliable. Researchers (Litwin, 2003 ;Aron et al, 2009) generally agree that an instrument with a Cronbach's Alpha higher than 0.7 is considered as internally consistent and reliable. The Cronbach's Alphas of all instruments used here are higher than 7, and therefore they are considered as reliable instruments. On

the other hand, all these instruments were designed to measure variables related to university students, and they have been widely used and are considered as valid instruments. Although there are some cultural differences between Hong Kong, a former British colony, and the United States where the instruments were developed, the universities in Hong Kong use English language as the teaching medium. Apart from that, all students have to pass Advanced-level Use of English before they are admitted to university; therefore, it is reasonable to believe that the cultural differences do not affect the validity of the instruments. Although the studies were conducted on two campuses, the participants are considered from the same population for the reasons mentioned in Chapter 3.

The findings of this study help to determine whether my hypotheses should be accepted. My null hypothesis is 'Level of metacognitive awareness and level of procrastination have no correlation with the academic performance of a learner.' There are seven alternative hypotheses as mentioned in the first Chapter.

Hypothesis-1

The first alternative hypothesis states that academic performance of a learner is negatively related to his/her level of procrastination. My findings in the present study show that the zero-order correlation coefficient between G.P.A. and API is –0.233, which is significant at the 0.01 level (2-tailed). The negative correlation shows that the higher level of procrastination a learner has, the lower G.P.A. he/she will acquire, and vice versa. This supports my first alternative hypothesis, and it is in line with some previous studies in literature review (Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001).

Hypothesis-2

The second alternative hypothesis states that academic performance of a learner is positively related to his/her metacognitive awareness. My findings show that the zero-order correlation coefficient between G.P.A. and MAI is 0.174, which is significant at the 0.01 level (2-tailed). The result shows that metacognitive awareness is positively correlated to G.P.A. The learners who use more metacognition will have higher G.P.A. and the learners who have a higher G.P.A. will also have a higher level of metacognition. This supports my second alternative hypothesis, and it is in line with some previous research in literature (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008).

Hypothesis-3

The third alternative hypothesis states that metacognitive awareness of a learner is negatively related to his/her level of procrastination. My findings show that the zero-order correlation coefficient between MAI and API is –0.457, which is significant at the 0.01 level (2-tailed), so metacognitive awareness and procrastination of the students are significantly and negatively correlated, which means that the higher level of procrastination a learner has, the lower metacognitive awareness he/she has, and vice versa. This supports my third alternative hypothesis, and in line with some previous research (Wolters, 2003).

Hypothesis-4

The fourth alternative hypothesis states that learners with a high level of metacognitive awareness will have a higher-than-average academic performance, despite that they have a high level of procrastination. My findings show that the mean-G.P.A. is 3.0277, and the G.P.A. of Group-1 (high metacognitive awareness and high procrastination) is 3.0926. The difference between the mean-G.P.A and the G.P.A. of Group-1 is significant at the 0.01 level (2-tailed), which means that students who have a high level of metacognitive awareness will have higher-than-average academic performance even though they procrastinate for their academic responsibilities. This supports my fourth alternative hypothesis.

Hypothesis-5

My fifth alternative hypothesis states that learners with low level of procrastination will have higher-than-average academic performance, despite that they have a low level of metacognitive awareness. My findings show that the G.P.A. of Group-2 (low metacognitive awareness and low procrastination) is 3.0949, which is higher than the mean-G.P.A., which is 3.0277. The difference is significant at the 0.01 level (2-tailed), which means that students who do not procrastinate for their academic responsibilities will have higher-than-average academic performance, even though their metacognitive levels are low. This supports my fifth alternative hypothesis.

Hyposthesis-6

My sixth alternative hypothesis states that learners with high level of metacognitive awareness but low level of procrastination will have higher-than-average academic performance. My findings show that the G.P.A. of Group-3 (high metacognitive awareness but low procrastination) is 3.0896, which is higher than the mean-G.P.A (3.0277) and significant at the 0.01 level (2-tailed). This means that students who have a high level of metacognitive awareness and do not procrastinate for their academic responsibilities will have a higher-than-average academic performance. This supports my sixth alternative hypothesis.

Hypothesis-7

My seventh alternative hypothesis states that learners with low level of metacognitive awareness but high level of procrastination will have a lower-than-average academic performance. My findings show that the G.P.A. of Group-4 (low metacognitive awareness but high procrastination) is 2.8885, which is lower than the mean-G.P.A. (3.0277) and the difference is significant at the 0.01 level (2-tailed). The ANOVA and t-test results show that the G.P.A. of Group-4 is lower than the mean-G.P.A. and it is significantly different from the other three groups. This supports my seventh alternative hypothesis.

Therefore, the findings of the present study support all seven alternative hypotheses mentioned in Chapter 1. Other than these findings, some other findings are worth discussing here.

By looking at the combinations of the elements of these four groups, I can see that Group-1 is high-MAI and high-API, Group-2 is low-MAI and low-API, Group-3 is high-MAI but low-API, Group-4 is low-MAI but high API. The findings show that only the G.P.A. of Group-4 is significantly different from and lower than the other three groups. By comparing the elements of each group, I can see that only two elements are shared among the three groups that have higher-than-average academic performance; these elements are high-MAI and low-API. Group-4 is the only group that does not share any of these two elements. It is, therefore, reasonable to believe that these two elements are the positive elements that lead to higher-than-average academic performance. Learners with high metacognitive awareness will have a higher-than-average academic performance, while learners with low level of procrastination will also have a higher-than-average academic performance. If a learner has a low level of metacognitive awareness, a habit of academic punctuality may help him/her keep up his/her academic performance. On the other hand, procrastinators should keep up their level of metacognitive awareness if they want to have better academic performance. It is also reasonable to assume that Group-4, which has none of these positive elements, as the worst academic performance among these four groups, and my results support this hypothesis. With the same sense, it is reasonable to assume that Group-3, which has both positive elements, should have the best academic performance among these four groups. However, the results are surprising. The results show that Group-3 (high metacognitive awareness but low procrastination) is not better than the other two groups (Group-1 and Group-2), which have only one of the positive elements. Although both high metacognitive awareness and low level of academic procrastination are highly correlated with good academic performance, the combination of both positive elements does not

give them an advantage over their counterparts who only has one of these two positive elements. It is worth studying why the combination of these two positive elements does not produce the best group.

One of the reasons may be that the population of the present study are university students; another reason is that I use the mean scores of our samples for both instruments as the criterion to put students into these four groups. My samples show that the students' metacognitive levels are higher than the neutral score of MAI, which means that those students who are low in metacognitive awareness are just comparatively lower than their counterparts in university (the mean score of the samples), but not really low in scale (not lower than the neutral score). The same phenomenon appears in procrastination; those students who are high in procrastination are just comparatively higher than their counterparts in university (the average score of the samples), but not higher than the neural score of API, which means that they are not really procrastinators. Once again, although my research design divides students into four groups, 'low' or 'high' is only a comparative value, which is used to compare with the mean of my samples.

DISCUSSION ABOUT THE FINDINGS IN RELATION TO OTHER VARIABLES

Other than testing my hypotheses, the data were also analysed for other variables and the components and sub-components of the main variables.

Knowledge of Cognition and Regulation of Cognition

The correlation coefficient between the two components (Knowledge of Cognition and Regulation of Cognition) is 0.812, which is significant at the 0.01 level (2-tailed). Although there is no evidence to show that there is a cause-and-effect relationship, it shows that learners who are aware of their strengths and weaknesses as a learner will also engage more in the use of learning strategies to achieve their academic goals.

API and the components of MAI

The correlation coefficient between API and Knowledge of cognition (a component of MAI) is –0.396, which is significant at the 0.01 level (2-tailed). This shows that the higher a learner is in Knowledge of Cognition, he/she is lower in procrastination. Maybe when learners are aware of their own ability as a learner, they try to motivate themselves to start their tasks as soon as possible. The correlation coefficient between API and Regulation of Cognition (another component of AMI) is – 0.460, which is significant at the 0.01 level (2-tailed). This shows that the higher a learner in Regulation of Cognition, he/she is lower in procrastination. Maybe when learners have a higher ability in evaluating and using their strategies, they can complete their tasks more effectively and efficiently. These results show that both components of MAI are negatively related to API. Hence, it is reasonable to believe that students who are aware of their own learning processes and know how to regulate their learning will be more punctual for their academic responsibilities.

It is interesting to see that there is a common factor shared by both procrastination and metacognitive awareness: both of them entail ‘planning’. Planning, as a sub-component of Regulation of Cognition, does set a goal for the continuing

metacognitive processes. 'Planning' is also measured in API; for instance, item 19 states: 'If I have an appointment, I make sure the clothes I want to wear are ready the day before'. It is not difficult to imagine that 'planning' is very important if people do not want to procrastinate, which can been seen in the correlation between planning and procrastination (-0.509, significant at the 0.01 level), which is the highest correlation with procrastination among all sub-components of Regulation of Cognition in the present study. The importance of 'planning' has also been documented by some empirical research as mentioned in the literature review (Semb et al, 1979; Wolters, 2003; Cotteral and Murray, 2009).

G.P.A. and the components of MAI

The zero-order correlation coefficient between G.P.A. and Knowledge of Cognition is 0.187, which is significant at the 0.01 level (2-tailed). This shows that a learner who is higher in Knowledge of Cognition can get a better academic grade. Maybe when the learners are aware of his strengths and weaknesses as a learner, they will employ some strategies to remedy their weaknesses in learning. Maybe there is a mediator variable that will be triggered because of the knowledge of cognition, and lead to action to remedy their weaknesses. The zero-order correlation coefficient between G.P.A. and Regulation of Cognition is 0.155, which is significant at the 0.01 level (2-tailed). This shows that when a learner is higher in Regulation of Cognition, their academic performance is better. Maybe when the learners know how to evaluate and use appropriate strategies for their learning, they can perform better in academic.

All five sub-components of Regulation of Cognition are negatively related to

procrastination, and procrastination is negatively related to academic performance. Hence, these sub-components are supposed to be positively related to academic performance; however, the results show that only three out of five sub-components do significantly related to academic performance. The other two sub-components of Regulation of Cognition are not correlated with academic performance; they are IMS (Information Management Strategies) and DS (Debugging Strategies). It is worth further studies why these two sub-components are different from the others.

Control variable

All of the above results are zero-order correlation. When some variables are under control, it helps us gain insight into the relationships of the variables more. When the variable of procrastination is under control, the correlation between metacognition and academic performance becomes not significant; however, when the variable of metacognition is under control, the correlation between procrastination and academic performance is still significant, which means the variable of procrastination has a stronger impact on academic performance than metacognition does. It is interesting to see whether my results can be supported by replicated studies in which the variable of procrastination is monitored.

The variable of gender

The t-test for gender in terms on API, and MAI are not significant at the 0.01 level (2-tailed), which shows that male students are not very different from female students in

these two criteria in the present study. However, female students show better than male in G.P.A. The mean-G.P.A of female is 3.0940, while the mean-G.P.A. of male is 2.9288. The t-test shows that the difference is significant at the 0.01 level (2-tailed). This means that the two sexes from these two universities, or at least from our samples, have a significant difference in academic performance. This is worth further study to see whether it is caused by environmental reasons.

The variable of academic major

When it comes to academic majors, ANOVA shows that students from different disciplines have not much difference in terms of procrastination, metacognitive awareness and academic performance. Therefore, the difference of academic major is not a factor correlated with these three variables for these two universities.

DISCUSSION ABOUT THE FINDINGS IN RELATION TO THE LITERATURE

The findings vs. metacognition in literature

The correlation test between metacognitive awareness and academic performance on students shows that these two variables are positively correlated, and the result of the present study supports many previous studies in the literature (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Downing, 2009). Although the present study is a correlational design, which cannot lead to a causal conclusion, comparing it with other

studies can help us understand more about the relation between metacognition and academic performance.

The experimental study of Mevarech and Fridkin (2006) shows that metacognition training in mathematics class can improve the metacognitive awareness of the students and their mathematic knowledge and performance. They also use MAI as the tool to measure metacognition, and the result shows that metacognitive awareness is positively correlated with the academic performance. Although the samples are from pre-college mathematics classes, the experimental design may give a cause-and-effect conclusion for their study.

The experimental design of Rezvan et al (2006) also shows that the rise of metacognition can improve the students' academic performance, especially for the university students who are on margin or called conditional students. The study also shows that metacognitive training can change the emotional state of the students, reducing their level of anxiety and improving their academic work. The results show that the use of metacognitive strategies has a significant impact on the weaker learners. Perhaps it can be interpreted that a low level of metacognition is one of the causes of poor academic performance.

The results of the present study are also consistent with some previous research in Hong Kong (e.g. Downing, 2009). Downing's study was conducted in the City University of Hong Kong on 300 participants. The same as my study, Downing also used accumulated Grade Point Average to measure the academic performance of the students. Although he used LASSI instead of MAI, he argues that it is a good instrument to measure metacognition. He measured three times for the two variables in 2005, 2007, and 2009. He concludes that students who improve significantly in academic performance are

those who also grow significantly in metacognition.

As mentioned before, my samples show that the students' metacognitive levels are higher than the neutral score of MAI, which means that those students who are low in metacognitive awareness are just comparatively lower than their peers (the average score of the samples), but not really low in scale (not lower than the neutral score of MAI). Out of 314 students, only 26 students have a MAI score that is lower than the neutral score, which means only about 8% these students can be considered as low in MAI scale. The findings counter what some researchers in the literature say about Hong Kong students. For instance, Chan (1996) contends that rote learning dominates the learning strategies among Hong Kong students. Thomas (2006) contends that Confucian-Heritage Culture, which emphases memorisation, influences Hong Kong students. The present study shows that students from these two universities have a mean score of metacognitive awareness higher than the neutral score, which means the students from these two universities have quite high metacognitive levels. Qualitative research in the future may be useful to find out how university students acquire high metacognitive levels in the local culture and environment.

The findings vs. procrastination in literature

The findings of the present study show that students in the current study have a less serious problem in procrastination than their counterparts in western countries. Out of 314 students, only 53 students have a API score that is higher than the neutral score, which means only about 17% of these students can be considered as procrastinators in API scale. The literature (Ellis and Knaus, 1977; Schouwenburg, 1995; Ferrari et al, 1995;

Jiao and Onwuegbuzie, 1999; Klassen et al, 2008) shows that 70-95% of the university students in western countries engage in procrastination.

The negative correlation between API and G.P.A. in the present study shows that the higher level of procrastination a student has, the lower G.P.A. he/she will acquire. This is in line with some previous research in literature of procrastination and academic performance (Semb et al, 1979; Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001). As far back as 1970's, there were some empirical studies about 'delayed work' or academic procrastination. After reviewing the literature, Semb et al (1979) contend that students who withdraw from courses are those who have lower G.P.A. and usually these students are procrastinators in academic work. Semb et al (1979) contend that weaker students can benefit from self-paced programs if they are taught how to set their own plans and deadlines, which will help them be more punctual for their academic responsibilities. Wesley's study (1994) on 248 students shows that the coefficient between procrastination and G.P.A is -0.48 (significant at 0.01 level). Although Wesley used another instrument (PASS -Procrastination Assessment Scale) to measure procrastination, the results show that procrastination is negatively correlated to G.P.A. The study of Senecal et al (1995) on 498 students show the coefficient between procrastination and G.P.A. is -0.41 (significant at 0.01 level). These studies show that procrastination is significantly correlated to academic performance of college students, even though they used different instruments to measure procrastination. This means that students who do not procrastinate or seldom procrastinate will have better academic performance.

However, not all studies in the literature show the same results, some studies (Lay, 1986; Pychyl et al, 2000b; Chu and Choi, 2005) show that there is no significant

correlation between procrastination and academic performance. Chu and Choi (2005) use active and passive procrastination to explain the reasons, as mentioned in the section of my literature review. Pychyl et al (2000b) contend that there may be a point of procrastination only above which academic performance will start to be affected.

The findings of the present study support most of the studies done in western countries in the literature review that procrastination will bring negative effects to their academic performance. The students from these two Hong Kong universities are no exception.

The literature review also brings one interesting phenomenon to light. Procrastination happens to most of the Doctoral students and Master students (Kearns et al, 2008). These groups of learners are supposed to be highly motivated learners, but the phenomenon of procrastination also happens to these populations. This is worth further research.

The findings vs. literature about metacognition and procrastination

According to Wolters (2003), not many studies have been done on procrastination and metacognition at the same time. Wolters (2003) did two studies in a row on procrastination and the students' use of cognitive and metacognitive skills. Although the results do not show a significant relationship between procrastination and the use of cognitive strategies, it shows a stronger relationship between metacognitive skills and procrastination (study-1 is only significant at 0.06 level, but study-2 is significant at 0.05 level). The present study shows that procrastination tendency is significantly and negatively correlated with metacognitive awareness (significant at 0.01 level).

The present study shows that procrastinators will have higher-than-average academic performance if their metacognitive awareness is high. The results support my fourth hypothesis. However, this seems to contradict most of the studies of procrastination mentioned in the literature stating that high procrastination will lead to poor academic performance (Semb et al, 1979; Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001). The main reason, perhaps, is that all these studies did not put the variable of metacognition under control. This may also explain why some other studies (Lay, 1986; Pychyl et al, 2000b; Chu and Choi, 2005; Gafni and Geri, 2010) show that procrastination has no significant correlation with academic performance. Their academic performance might have been affected by some other factors, such as metacognition.

The present study shows that students who have a low level of metacognition will have a higher-than-average academic performance if they do not procrastinate. The results support my fifth hypothesis. However, this also seems to contradict most of the studies in metacognition stating that metacognition is positively correlated to academic performance (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008). Once again, the reason may be that these studies did not put the variable of procrastination under control. My findings of the partial correlation analysis show that metacognition seems to have no effect on academic performance if the variable of procrastination is put under control. It would be interesting to see whether the previous studies in the literature would have the same results if the variable of procrastination were put under control.

The findings vs. gender in literature

The G.P.A. scores of male and female students in the present study are significantly different. This is consistent with Mok's study (Mok et al, 2007) that girls have better academic performance in Hong Kong's primary schools and also consistent with Downing'study (Downing et al 2008) that female students outperform male students in A-level exams. There may be a mediator-variable, such as culture or social attitudes, instead of a variable related to the biological differences that lead to the differences in academic performance. Further studies are needed to investigate the reasons.

Some studies (Effert and Ferrari,1989; Solomon and Rothblum, 1984; Ferrari, 2000) show that female is prone to procrastination. The study of Rothblum and colleagues (1985) shows that female (51.6%) has more high-procrastinators than male (32.4.6%). However, there are some contradictory studies (Milgram et al, 1995; Senecal et al, 1995) show that male is more prone to procrastination than female. The study of Ozer and Demir (2009) shows that there is no significant correlation between procrastination and gender. The present study shows that gender is not related to procrastination, which is consistent with the study of Ozer and Demir (2009).

The present study shows that there is no correlation between gender and MAI. This is not consistent with previous study done by Zimmerman and Martinez-Pons (1990), in which they found female students used more metacognitive strategies, such as goal setting, planning and monitoring than male students.

DISCUSSION ABOUT THE LIMITATIONS AND POSSIBLE BIASES

Seven universities in Hong Kong were invited to participate in the study, but only two universities allowed me to collect data on their campuses. Therefore, the samples of the present study were only from two local universities, and they were not drawn on random. However, data collection processes were arranged near the main entrances of both universities to enhance the possibility of equal chance of students being chosen for the study. Since year-1 students did not have their accumulated G.P.A., and therefore they were excluded from our samples. On the other hand, the researcher had no access to the students' official academic records, so there was no other means to triangulate the data given by the students. If access were possible, samples from more than two universities would provide more representative data. Other than the size of the samples, another limitation of the present study is that we cannot make a causal conclusion because the data are correlational. However, it is reasonable to believe that there is a positive correlation between metacognitive awareness and academic performance, and a negative correlation between procrastination and academic performance among students from these two Hong Kong universities.

CONTRIBUTIONS OF THE STUDY AND RECOMMENDATIONS FOR FURTHER RESEARCH

Since the participants of the present study chosen were not truly random, it is unsafe to generalise the findings to the whole population of university students in Hong Kong. Nevertheless, it helps us gain insight into self-regulated behaviour of Hong Kong

university students. In addition to testing my hypotheses, the contribution of the present study seems to bring more questions that can be used as research questions for future studies.

To the existing knowledge of metacognition

The findings of the present study support the theories that metacognition is positively correlated to academic performance, and negatively correlated to procrastination as mentioned in the discussion section.

The present study also helps add more information to the literature in Hong Kong context. The findings show that the students of these two universities have a quite high metacognitive level. The mean of the metacognitive awareness of them is higher the neutral score of the MAI scale; therefore, memorisation and rote learning seem not to be their common learning practice. It would be interesting to conduct a qualitative research in the future to investigate how these students acquire a high level of metacognitive awareness in this Confucian-Heritage city.

The findings show that two of the sub-components of Regulation of Cognition are not correlated with academic performance. They are IMS (Information Management Strategies) and DS (Debugging Strategies). Information Management Strategies entail monitoring the cognitive strategies, such as elaboration, organisation and elaboration etc, in order to make them understand more. Debugging Strategies entail decision-making, such as seeking for help, when facing difficulties in order to solve the learning problems. Vrugt and Oort (2008) contend that it is generally accepted that Regulation of Regulation comprises three sub-components: Planning, Monitoring, and Evaluation. The present

findings show that these three sub-components are correlated with academic performance, but IMS and DS do not. This will raise a doubt on whether IMS and DS should be excluded from Regulation of Cognition or that they are just not a good predictor of academic performance. . Further studies should be conducted to find out why these two sub-components are not correlated with academic performance.

Another finding may also contribute to the existing knowledge of metacognition. After controlling the variable of procrastination in the present study, metacognition seems not to relate to academic performance significantly. In most of the studies of metacognition and academic performance in the literature, the results reported are zero-order correlation, which means that there might be some mediator variable being ignored. The present study may shed light on the relationship between academic performance and metacognition. More studies should be done on metacognition by monitoring the variable of procrastination.

To the study of procrastination of students in Hong Kong

The research of procrastination on university students in Hong Kong is scanty. The present study contributes to the literature of procrastination by giving a clearer picture of the procrastination of university students in Hong Kong context.

The findings show that the mean of procrastination of the samples is lower than the neutral score, which means that the students from these two universities have a low level of procrastination. The findings also support the theories that procrastination is negatively related to both academic performance and metacognition, as mentioned in the discussion section.

The present study brings a question about procrastination tendency of Hong Kong university students. Compared with their western counterparts, my samples from these two universities show that only about 17% of these students can be considered as procrastinators. It is worth doing further research on this issue if accessible to more universities and samples are feasible to find out whether this lower rate of procrastination applies to all university students in Hong Kong. If this is the case, qualitative studies will be useful to find out whether this discrepancy between Hong Kong and its western counterparts is caused by cultural differences or because of other reasons; for instance, only a small portion of the secondary students can be admitted to university in Hong Kong.

To the existing knowledge of the relationship between procrastination and metacognition

Most studies in the literature related to the present study are either on the relationship between metacognition and academic performance or on the relationship between procrastination tendency and academic performance. The present study focuses on the relationship between academic performance and the combination of metacognition and procrastination.

The present study has produced some information that can contribute to the literature of the relationship between metacognition and procrastination.

From my samples from these two universities, there is an interesting finding: ‘high metacognitive awareness’ and ‘low procrastination tendency’ are two positive elements for academic performance. Students who have either one of these positive elements can

perform in academic better-than-average among their peers, while students who do not have any of these positive elements will perform in academic worse than their peers; however, students who posses both positive elements do not outperform the students who only possess one positive element. It can be an interesting research question to investigate why the students who have both positive elements do not outperform those who have only one of these positive elements.

As mentioned above, when the variable of procrastination is put under control, it seems that metacognition is not significantly correlated to academic performance. If more studies can be done by monitoring the variable of procrastination to see whether metacognition is really uncorrelated to academic performance. If it were the case, it would be a significant finding in the research of metacognition.

Another finding worth mentioning is about a sub-component of Regulation of Cognition, known as 'Planning'. As mentioned in discussion section, 'planning' is a factor appears in both metacognition and procrastination. It outstands all other sub-components of Regulation of Cognition to be most significantly correlated to academic performance. How is 'planning' related to metacognition and procrastination is an interesting research question.

Implications for the practice in Hong Kong education

Since metacognition is significantly correlated with academic performance, it is likely that metacognition training would benefit students. Rezvan et al (2006) suggests that metacognition training should be provided for conditional students; conditional students means students who are on margin. Downing (2009) also suggests that

metacognition training should be given to the students before their self-efficacy being affected by their poor performance; otherwise it would be too late. Hence, it is reasonable to give metacognition training to the university students once they are admitted to the university. Since it also benefits younger students (Ruan, 2004), metacognition training should be introduced to students in secondary and primary schools in Hong Kong as well.

On the other hand, the findings also show that academic procrastination is related to poor academic performance, and therefore treatments for procrastinators are necessary if the students want to achieve their optimal academic performance. Ferrari et al (1995) contend that the most common treatments for academic procrastination are cognitive-behavioural oriented programs and time management programs. Since procrastination is labelled in society as a negative attribute, students who are referred to the treatment programs may risk stigmatisation (Ferrari et al, 1995); therefore, it is not easy to locate the students in need. The same as metacognition training, procrastination tendency should be located as early as possible. Wesley (1994) suggests college admission office should take procrastination tendency as a consideration in their selection process as it is related to their academic performance. Wesley's suggestion may not be feasible in Hong Kong because of different educational systems and social factors. Perhaps we should educate the newly admitted students about the importance of seeking help for academic procrastination, and not to give procrastination a negative label.

Recommendations for the practice in Hong Kong education

Other than the abovementioned recommendations for further research in this section, I would like to make some recommendations for the practice in Hong Kong.

The present study shows that G.P.A. (Grade Point Average) is positively related to metacognitive awareness, so it is reasonable to believe that helping students develop their metacognition may help increase students' G.P.A. Metacognitive skills help learners become aware of their own thinking, and let them know whether they have understood the targeted learning materials. With training, learners who find that they have not yet understood, will try to use different strategies to carry out the learning processes again until they are aware that they have learnt the materials successfully. In practice, I would recommend that learners of different levels should be taught different strategies. For instance, in the teaching of a foreign language, when new learners are taught how to use vocabulary words, the strategies of elaboration and rehearsal should be useful to help them memorise the newly learnt materials. For advanced learners, the focus may change to the use of collocation, proofreading and the analysis of first language errors. They may need to use the strategies of evaluation and debugging, which will help them develop their ability in academic autonomy. Therefore, learners should be taught the strategies that fit their learning needs. On the other hand, how to evaluate whether the students have acquired and applied the metacognitive skills is one of my concerns. As mentioned in the literature review, when a leaner can use a strategy automatically, it becomes his /her skill. In order to develop a skill, it needs time, and metacognitive skills are no exception. It is sensible if a learner learns a skill at the beginning of a school term and be evaluated at the end of the school term. In practice, a questionnaire of metacognition and the scores of G..P.A. can be used to estimate the improvement of learning. However, if it is for research purposes, a control group should be used to see whether a group without training performs the same as the experimental group.

My study also shows that G.P.A. is negatively related to procrastination. Therefore, it

is reasonable to believe that helping students diminish their habit of procrastination may help them increase their G.P.A. I would contend that there are two causes of procrastination, which the training should target. One of the causes is the miscalculation of time needed for academic tasks, and another cause is a lack of motivation to complete academic tasks. The problem of miscalculation can be solved by helping students set measurable goals, and divide goals into smaller parts, so as to achieve a goal step buy step; in terms of motivation, educators can help students develop intrinsic motivation, and figure out what distorted and negative beliefs are hindering them from taking action at the beginning of a school term. To evaluate whether the procrastinators have alleviated their academic procrastination problem, educators can ask student to keep a record of their own procrastination behaviour, such as tardiness in study for tests and exams; being late in submitting projects etc. At the end the school term, educators can evaluate whether students have diminished their procrastination behaviour and whether the scores G.P.A. of the students have increased by checking their self-kept records and their actual G.P.A.

CONCLUSION

The aims of this study are to find out the relationships between three variables: metacognitive awareness, procrastination, and the academic performance of the university students in Hong Kong. My objectives are to find out, firstly, whether there is a relationship between procrastination and academic performance of the Hong Kong university students, and how they are related if there is a relationship; secondly, the relationship between metacognitive awareness and academic performance; thirdly, the relationship between metacognitive awareness and procrastination; fourthly, the

relationships among all these variables, then how the combination of different levels of metacognitive awareness and procrastination affect academic performance of the university students in Hong Kong.

The findings show that metacognitive awareness is positively correlated with academic performance and the results of the present study support many previous studies in the literature (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Downing, 2009). Nevertheless, the findings are not in line with some researchers' opinion about Hong Kong students. For instance, Chan (1996) and Thomas (2006) contend that Hong Kong students use rote learning as their main strategy. The present study shows that students from these two universities have quite high metacognitive levels.

The findings of the present study show that procrastination is negatively correlated with academic performance. This is in line with some previous research in literature of procrastination and academic performance (Semb et al, 1979; Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001), but counter some studies (Lay, 1986; Pychyl et al, 2000b; Chu and Choi, 2005), which show that there is no significant correlation between procrastination and academic performance.

The findings of the present study also support most of the studies done in western countries in the literature review that procrastination will bring negative effects to their academic performance. The students from these two Hong Kong universities are no exception. However, The findings of the present study show that students in the current study have a less serious problem in procrastination than their counterparts in western countries. Only about 17% of my samples can be considered as procrastinators, while the literature (Ellis and Knaus, 1977; Schouwenburg, 1995; Ferrari et al, 1995; Jiao and Onwuegbuzie, 1999; Klassen et al, 2008) shows that 70-95% of the university students in

western countries engage in procrastination.

When it comes to the relationship between metacognition and procrastination, the findings show that these two variables are negatively correlated.

The present study shows that procrastinators will have higher-than-average academic performance if their metacognitive awareness is high. The results support one of my hypotheses, but contradict most literature in procrastination (Semb et al, 1979; Wesley, 1994; Tice and Baumeister, 1997; Steel et al, 2001). On the other hand, The present study also shows that students who have a low level of metacognition will have a higher-than-average academic performance if they do not procrastinate. The results support one of my hypotheses, but contradict most literature in metacognition (Mevarech and Fridkin, 2006; Rezvan et al, 2006; Vrugt and Oort, 2008). The main reason, perhaps, is that all these studies did not put some variables under control.

My findings of the partial correlation analysis show that metacognition seems to have less effect on academic performance than procrastination does.

The findings also show that only the students who have low metacognition levels and have high level of procrastination gets lowest G.P.A. Students with low metacognitive awareness can still keep a higher-than-average G.P.A. if they have a habit of punctuality. On the other hand, procrastinators who have a high level of metacognitive awareness also enjoy a higher-than-average G.P.A. Surprisingly, the group of students who have two positive factors: low in procrastination but high in metacognition do not get a significantly higher G.P.A. than other two groups which have only one positive element, although they can also enjoy a higher-than-average scores in performance. This is worth further studies.

When it comes to gender, this study shows that there is no relationship between

gender and procrastination tendency and metacognition, but shows that there is a difference in academic performance between male and female students.

Some studies (Rothblum et al, 1985; Effert and Ferrari,1989; Solomon and Rothblum, 1984; Ferrari, 2000) show that female is prone to procrastination. However, there are some contradictory studies (Milgram et al, 1995; Senecal et al, 1995) show that male is more prone to procrastination than female. The present study shows that gender is not related to procrastination, which is consistent with some studies (Effert and Ferrari, 1989; Schouwenburg, 1992; Johnson and Bloom, 1995;Ozer and Demir, 2009), which show that there is no significant correlation between procrastination and gender.

The present study shows that there is no correlation between gender and the use of metacognition. This does not support the findings of previous studies (Zimmerman and Martinez-Pons, 1990; Downing et al, 2008) that there is a difference between two sexes in the use of metacognition.

However, it shows that there is a relation between gender and academic performance of the university students in Hong Kong. Female students academically perform better than the male students in this study. The G.P.A. scores of male and female students in the present study are significantly different. This is consistent with Mok's study (Mok et al, 2007) that girls have better academic performance in Hong Kong's primary schools and also consistent with Downing's study (Downing et al, 2008) that female students outperform male students in A-level exams. There can be a mediator-variable, such as culture, that causes the difference, instead of biological reasons (Ozer and Demir, 2009). This may be related to the culture in Hong Kong, where females treasure their learning opportunity in order to be financially independent from males, as most females financially relied on males in the past and therefore were subject to the dominance of

males. Further studies should be conducted on the reasons why the female students' academic performance is significantly better than that of the male students. However, the samples of this study are only from two universities, and they were not randomly chosen, it should be treated with caution if wanting to apply these findings to all universities' students in Hong Kong.

REFERENCES

Ablard, K.E. and Lipschultz, R.E. (1998) Self-regulated learning in high-achieving students: relations to advanced reasoning, achievement goals, and gender, *Journal of Educational Psychology*, 90(1), 94-101.

Ackerman,P.L., Beier, M.E. and Bowen, K.R. (2002) What we really know about our abilities and our knowledge, *Personality and Individual Differences*, 33(4), 587-605.

Ainslie, G. (1975) Specious reward: a behavioural theory of impulsiveness and impulse control, *Psychological Bulletin*, 82(4), 463-496.

Ainslie, G (1992) *Picoeconomics: the strategic interaction of successive motivational states within the person*, Cambridge, England: Cambridge University Press.

Aitken, M. (1982) *A personality profile of the college student procrastinators*, Unpublished doctoral dissertation, University of Pittsburgh.

Allen, B. and Armour-Thomas, E.A. (1991) Construct validation of metacognition, *the Journal of Psychology*, 127(2), 203-211

Ames, C. (1984) Achievement attributions and self-instructions under competitive and individualistic goal structures, *Journal of Educational Psychology*, 76(3), 478-487.

Ames, C. (1990) Motivation: what teachers need to know, *Teachers College Record, 91*, 410-421.

Ames, C. (1992) Classroom: goals, structures, and student motivation, *Journal of Educational Psychology*, 84(3), 261-271.

Ames, C. and Archer, J. (1988) Achievement goals in the classroom: student learning strategies and motivation process, *Journal of Educational Psychology*, 80(3), 260-267.

Aron, A., Aron, E. and Coups, E.J. (2009) *Statistics for Psychology*, Upper Saddle, New Jersey: Pearson Education.

Audet, R. H., Hickman, P. and Dobrynina, G. (1996). Learning logs: a classroom practice for enhancing scientific sense making, *Journal of Research in Science Teaching,* 33(2), 205-222.

Bahrick, H.P. and Hall, L. K. (2005) The importance of retrieval failures to long-term retention: A metacognitive explanation of the spacing effect, Journal of Memory and Language, 52, 566–577.

Baker, L. and Brown, A.L. (1984) Metacognitive skills and reading, in P.D. Pearson, R. Barr, M.L. Kamil, & P. Mosenthal (ed.), Handbook of Reading Research, New York: Longman, 353-393.

Balkis, M. and Duru, E. (2007) The evaluation of the major characteristics and aspects of the procrastination in the framework of psychological counselling and guidance, *Educational Sciences: theory and Practice,* 7(1), 376-385.

Bandura, A. (1977) Self-efficacy: toward a unifying theory of behavioural change, *Psychological Review*, 84(2), 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human agency, *The American Psychologist*, 37(2), 122–147.

Bandura, A. (1986) *Social foundations of thought and action: a social cognitive theory*, Englewood Cliffs, NJ: Prentice Hall.

Bandura, A (1993) Perceived self-efficacy in cognitive development and functioning, *Educational Psychologist*, 28 (2), 117-148.

Bandura, A (1997) *Self-efficacy: the exercise of control*, New York: Freeman.

Bandura , A., Barabaranelli, C., Caprara,G.V. and Pastorelli, C. (1996) Multifaceted impact of self-efficacy beliefs on academic functioning, *Child Development*, 67, 1206-1222.

Beck, B.L., Koons, S.R. and Milgrim, D.L. (2000) Correlates and consequences of behavioural procrastination: the effects of academic procrastination, self-consciousness, self-esteem and self-handicapping, *Journal of Social Behaviour and personality*, 15(5), 3-13.

Benson, P. (2001) *Teaching and researching autonomy in language learning*, England: Pearosn Edcuation Ltd.

Berry, R.G. (1975) Fear of failure in the student experience, *The Personnel and Guidence Journal*, 54(4), 190-203.

Beswick, G.., Rothblum., E.D. and Mann, L. (1988) Psychological antecedents of student procrastination, *Australian Psychologist*, 23, 207-217.

Bielaczyc, K., Pirolli, P.L. and Brown, A.L. (1995) Training in self-explanation and self-regulation strategies: investigating the effects of knowledge acquisition activities on problem solving, *Cognition and Instruction*, 13(2), 221-252.

Bijou, S., Morris, E. and Parsons, J. (1976) A PSI course in child development with a procedure for reducing student procrastination, *Journal of Personalized instruction*, 1, 36-40.

Bjork, R. A. (1995) Memory and metamemmory considerations in the training of human beings, in Metcalfe, J. and Shimamura, A.P. (ed.), *Metacognition: knowing about knowing,* Massachusetts: the M.I.T. Press, 185-206.

Blatner, A. (2004) The Developmental nature of consciousness transformation, *Revision*, 26(4), 2-7.

Blatt, S,J. and Quinlan, P (1967) Punctual and procrastinating students: a study of temporal parameters, *Journal of Consulting psychology*, 31(2), 169-174.

Blunt, A.K. and Pychyl, T.A. (2000) Task aversiveness and procrastination: a multi-dimensional approach to task aversiveness across stages of personal projects, *Personality and Individual Differences*, 28(1),

153-167.

Boekaerts, M. (1997) Self-regulated learning: a new concept embraced by researchers, policy makers, educators, teachers and students, *Learning and Instruction*, 7(2),161-186.

Bogdan, R.C. and Biklen, S.K. (2003) *Qualitative research for education: an introduction to theories and methods,* Boston: Allyn and Bacon.

Boud, D. (1988) *Developing student autonomy in learning(2nd ed.)*, London: Kogan Page Ltd.

Bransford, J., Brown, A. and Cocking, R. (2000) How people learn, Washington, DC: National Academy Press.

Brown, A.L. (1978) Knowing when, where, and how to remember: a problem of metacognition, *Advances in Instructional Psychology*, 1, 77-165.

Brown, A.L. (1987). Metacognition, executive control, self-regulation and other more mysterious mechanisms, in Weinert, F.E. and Kluwe, R.H. (ed.) *Metacognition, motivation, and understanding*, Hillsdale, NJ: Lawrence Erlbaum Associates , 65-116.

Brown,A.L., Bransford, J.D., Ferrara, R.A. and Campione, J.C. (1983) Learning, remembering, and understanding, in Flavell, J.H. and Markman, E.M. (ed.) Handbook of child psychology: cognitive development, New York: Wiley, 3, 77-166.

Brown, A.L. and Palincsar, A.S. (1982) Inducing strategic learning from texts by means of informed, self-control training, *Technical Report No.262*, University of Illinois at Urbana-Champaign.

Brownlow, S. and Reasinger, R. D. (2000) Putting off until tomorrow what is better done today: Academic procrastination as a function of motivation toward college work, *Journal of Social Behavior and Personality*, 2000, 15(5), 15–34.

Bruner, J.S. (1964) The course of cognitive growth, *American Psychologist*, 19(1), 1-15.

Buehler, R., Griffin, D.W. and Ross, M. (1994). Exploring the "planning fallacy": why people underestimate their task completion times. *Journal of Personality and Social Psychology, 67,* (3), 366–381

Bui, N.H. (2007) Effect of evaluation threat on procrastination behaviour, *The Journal of Social Psychology*, 147(3), 197-209.

Burka, J.B. and Yuen, L.M. (1983) Procrastination: why you do it, what to do about it, New York: Addison-Wesley.

Burka, J. B. and Yuen, L. M. (1990) Procrastination: Causes and consequences. *New Realities*, May/June, 42-45.

Burns, L.R., Dittmann, K., Nguyen, N.L. and Mitchelson, J.K. (2000) Academic procrastination, perfectionism, and control: associations with vigilant and avoidant coping, *Journal of Social Behaviour and*

Personality, 15(5), 35-46.

Carr, M., Alexander, J., Schwanenflugel, P. (1996) Where gifted children do and do not excel on metacognitive tasks, *Roeper Review*, 18(3), 212-218.

Chan, J. (1996). Chinese intelligence. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (pp. 93–108). Hong Kong, PRC: Oxford University Press.

Chi, M.T.H., Bassok, M., Lewis, M.W., Reimann, P. and Glaser, R. (1989) Self-explanations: how students study and use examples in learning to solve problems, *Cognitive Science*, 13(2), 145-182.

Choi, J.N. and Moran, S.V. (2009) Why not procrastinate? Development and validation of a new active procrastination scale, *The Journal of Social Psychology*, 149(2), 195-211.

Choy, S. C. and Cheah, P. K. (2009). Teacher perceptions of critical thinking among students and its influence on higher education. *International Journal of Teaching and Learning in Higher Education*, 20(2), 198–206.

Chu A. H.C. and Choi, J.N. (2005) Rethinking procrastination: positive effects of 'active' procrastination behaviour or attitudes and performance, *The Journal of Social Psychology*, 145(3), 245-264.

Conti, R. (2000) Competing demands and complimentary motives: procrastination on intrinsically and extrinsically motivated summer projects, *Journal of Social Behavior and Personality*, 15(5), 47-59.

Cornford, I.R. (2002) Learning-to-learn strategies as a basis for effective lifelong learning, *International Journal of Lifelong Education*, 21 (4), 357-368.

Cotterall, S. (1995) Readiness for autonomy: investigating learner beliefs, *System,* 23(2), 195-205.

Cotterall, S. and Murray, G. (2009) Enhancing metacognitive knowledge: structure, affordances and self, *System*, 37(1), 34-45.

Crabbe, D. (1993) Fostering autonomy from within the classroom: the teacher's responsibility, *System*, 21 (4), 443-452.

Davidson, J.E., Deuser,R. and Sterberg, R. J. (1995) The Role of Metacognition in problem solving, in Metcalfe, J. and Shimamura, A.P. (ed.), *Metacognition: Knowing about knowing,* Massachusetts: The MIT Press, 207-226.

Davis, E. A. (1998). *Scaffolding students' reflection for science learning.* Unpublished doctoral dissertation, University of California, Berkeley, CA.

DeCarvalho Filho, M.K. and Yuzawa, M. (2001) The effects of social influences and general metacognitive knowledge on metamemmory judgements, *Contemporary Educational Psychology*, 26(4), 571-587.

Delclos, V.R. and Harrington, C. (1991) Effects of strategy monitoring and proactive instruction on children's problem-solving performance, *Journal of Educational Psychology*, 83(1),35-42.

Dembo, M.H. and Eaton, M.J. (2000) Self-regulation of academic learning in middle-level schools, *The Elementary School Journal*, 100(5), 473-490.

Deniz, M.E., Tras, Z. and Aydogan, D. (2009) An Investigation of Academic procrastination, locus of control, and emotional Intelligence, *Educational Sciences: Theory & Practice*, 9(2), 623-632.

Desoete, A., Roeyers, H. and Buysse, A. (2001) Metacogntion and mathematical problem solving in grade 3, *Journal of learning disability*, 34(5), 435-447.

DeWitte, S. and Schouwenburg, H. (2002) Procrastination, temptation, and incentives: the struggle between the present and the future in procrastinators and the punctual, *European Journal of Personality*, 16(6), 469-489.

Dietz, F., Hofer, M. and Fries, S. (2007) Individual values, learning routines and academic procrastination, *British Journal of Educational Psychology*, 77(4), 893-906.

Dillion, D.R., O'Brien, D.G. and Heilman, E.E. (2000) Literacy research in the next millennium: from paradigms to pragmatism and practicality, *Reading Research Quarterly*, 35 (1), 10-26.

Dinsmore, D. L., Alexander, P. A. and Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning, *Educational Psychology Review*, 20(4), 391-409.

Dobrovolny, J. (2006) How adults learn from self-paced, technology-based corporate training: new focus

for learners, *Distance Education*, 27(2),155-170.

Dodge, B.R. (1998) Unintentional learning and the occupational health and safety experience, Educational and Training, 40(3), 109- 114.

Donovan, S. and Bransford, J.D. (ed.) (2005) *How students learn: history, mathematics, and science in classroom*, Washing DC: the National Academies Press.

Downing, K.J. (2009) Self-efficacy and metacognitive development, *The International Journal of Learning*, 16(4), 185-198.

Downing, K.J. (2010) Problem-based learning and metacognition *,Asian Journal on. Education and Learning,* 1(2), 75-96

Downing, K.J., Kwong, T., Chan, S.W., Lam, T.F. and Downing, W.K. (2008) Measuring gender differences in cognitive functioning, *Multicultural Education &Technology Journal*, 2(1), 4-18.

Downing, K.J., Kwong, T., Chan, S.W., Lam, T.F. and Downing, W.K. (2009) Problem-based learning and the development of metacognition, *Higher Education*, 57(5), 609-621.

Eagle, M. N. (1967) The Effect of Learning Strategies upon Free Recall, *American Journal of Psychology*,80(3), 421-425.

Eccles,J.S. and Wigfield, A. (2002) Motivational beliefs, values, and goals, in *Annual Review of*

Psychology , 53(1),109-132.

Eccles, J.S., Midgley, C., Wigfield, A., Buchanan, C.M., Reuman, D., Flanagan, C. and Iver, D.M. (1993) Development during adolescence: the impact of stage-environment fit on young adolescents' experiences in school and in families, *American Psychologist*, 48(2), 90-101.

Effert, B.R. and Ferrari, J.R. (1989) Decisional procrastination: Examining personality correlates, *Journal of Social Behaviour and Personality*, 4, 151-156.

Efklides, A. (2006) Metacognition and affect: what can metacognition experiences tell us about the learning process? *Educational Research Review*, 1(1), 3-14.

Eison, J.A. (1979). *The development and validation of a scale to assess different student orientations towards grades and learning*. Unpublished doctoral dissertation, University of Tennessee, Knoxville.

Elliot, A.J. and McGregor, H.A.(2001) A 2X2 achievement goal framework, *Journal of Personality and Social Psychology*, 80(3), 501-519.

Ellis, A. and Knaus, W.J. (1977) *Overcoming procrastination*, New York: Institute for Rational Living.

Ely, D.D. and Hampton, J.D. (1973) Prediction of procrastination in a self-pacing instructional system, *paper presented at American Educational Research Association Meeting*, New Orleans, March 1973.

Ericsson, A.K. and Charness, N. (1994) Expert performance: its structure and acquisition, *American*

Psychologist, 49(8), 725-747.

Fernadez-Duque, D., Baird, J. and Posner, M. (2000) Awareness and metacognition, *Consciousness and Cognition*, 9(2), 324-326.

Ferrari, J.R. (1991a) A preference for a favourable public impression by procrastinators: selecting among cognitive and social tasks, *Personality and individual Differences*, 12(11), 1233-1237.

Ferrari, J.R. (1991b) Self-handicapping by procrastinators: protecting self-esteem, social esteem, or both? *Journal of Research in Personality*, 25(3), 245-261.

Ferrari, J.R. (1992) Procrastination in the workplace: attributions for failure among individuals with similar behavioural tendencies, *Personality and Individual Differences*, 13(3), 315-319.

Ferrari ,J.R. (1993) Procrastination and impulsivity: two sides of a coin? in McCown, W., Shure, M.B. and Johnson, J. (ed.) , *The impulsive client: theory, research, and treatment* , Washington DC: American Psychological Association, 265-271.

Ferrari, J.R. (1994) Dysfunctional procrastination and its relationship with self-esteem, interpersonal dependency, and self-defeating behaviours, *Personality and Individual Difference,* 17(5), 673-679.

Ferrari, J.R. (2000) Procrastination and Attention: Factor Analysis of Attention Deficit, Boredomness, Intelligence, Self-Esteem, and Task Delay Frequencies, *Journal of Social Behavior and Personality*, 15(5), 185–196.

Ferrari, J.R. and Tice, D.M. (2000) Procrastination as a self-handicap for men and women: a task-avoidance strategy in a laboratory setting, *Journal of Research in Personality*, 34, 73-83.

Ferrari, J.R., Johnson, J.L. and McCown, W. (1995) *Procrastination and Task Avoidance: theory, research, and treatment*, New York: Plenum Press.

Ferrari, J.R., Keane, S.M., Wolfe, R.N. and Beck, B.L. (1998) The antecedents and consequences of academic excuse-making, examining individual differences in procrastination, *Research in Higher Education*, 39(2), 199-215.

Fisher, R. (2002) Shared Thinking: metacognitive modelling in the literacy hour, *Reading Literacy and Language*, July 2002, 63-66.

Fitzgerald, T., Gruppen, L., White, C. and Davis, W. (1997) Medical student self-assessment abilities: accuracy and calibration, in *Annual Meeting of American Educational Research Association*.

Flavell, J. H. (1971) First discussant's comments: what is memory development the development of? *Human Development*, 14, 272-278.

Flavell, J.H. (1976) Metacognitive aspects of problem solving, in Resnick, L.B. (ed.) *The Nature of Intelligence*, Hillsdale, New Jersey: Erlbaum, 231-235.

Flavell, J.H. (1979) Metacognition and cognitive monitoring, *American Psychologist*, 34(10), 906-911.

Flavell, J.H. (1987) Speculation about the nature and development of metacognition, in Weinert, F. and Kluwe, R. (ed.) *Metacognition, motivation and understanding*, Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.

Flavell, J.H. (1992) Metacognition and cognitive monitoring: a new area of cognitive development inquiry, in Nelson, T.O. (ed.) *Metacognition core readings*, Boston: Allyn and Bacon, 3-8.

Flett, G.L., Blankstein, K.R. and Martin, T.R. (1995) Procrastination, negative self-evaluation, and stress in depression and anxiety: a review and preliminary model, in Ferrari, J.R., Johnson, J.L. and Mc Cown, W.G.. (ed.) *Procrastination and task avoidance: theory, research and treatment*, New York: plenum Press.

Gafni, R. and Geri, N. (2010) Time management: procrastination tendency in individual and collaborative tasks, *Interdisciplinary Journal of Information, Knowledge, and Management*, 5, 115-125.

Gall, M.D.; Gall, J.P.; Borg, W.R. (2003) *Educational Research (7th Edition)*, New York: Allyn and Bacon.

Garner, R. (1987) *Metacognition and reading comprehension*, Norwood, New Jersey: Ablex Publishing Corporation.

Garcia, T., Matula, J.S., Harris, C.L., Egan-Dowdy, K., Lissi, M.R. and Davila, C. (1995) Worriers and procrastinators: differences in motivation, cognitive engagement, and achievement between defensive pessimists and self-handicappers, *paper presented at the Annual Meeting of the American Educational Research Association*, San Francisco, April 1995.

Gavelek, J.R. and Raphael, T.E. (1985) Metacognition, instruction, and the role of questioning activities, in Forrest-Pressley, D.L., MacKinnon, G.E. and Waller, T.G. (ed.) *Metacognition, Cognition and human performance*, Orlando, Florida: Academic Press.

Georghiades, P. (2004) From the general to the situated: three decades of metacognition, *International Journal of Science Education*, 26 (3), 365-383.

Glatthorn, A.A., Boschee, F. and Whitehead, B.M. (2009) *Curriculum leadership: strategies for development and implementation,* Los Angeles: Sage.

Gordon, W.I., Lindner, R.W. and Harris, B.R. (1996) A factor analytic study of the self-regulated learning inventory, *paper presented at the annual meeting of the American Educational Research Association*, New York, April 1996.

Graham, S.J. (2003) Learner's metacognitive beliefs: a modern foreign languages case study, *Research in Education*, 70, 9-20.

Greene, B.A., Miller, R.B., Crowson, M., Duke, B.L. and Akey, K.L. (2004) Predicting high school students' cognitive engagement and achievement: contributions of classroom perceptions and motivation, *Contemporary Educational Psychology,*29(4), 462-482.

Hacker, D. and Dunlosky, J. (2003) Not all metacognition is created equal, *New Directions for Teaching and Learning*, 95, 73-79.

Hall, K., Bowman, H. and Myers, J. (1999) Metacognition and reading awareness among samples of nine-year-olds in two cities, *Educational Research*, 41(1), 99-107.

Hamman, L.A. and Stevens, R.J. (1998) Metacognitive Awareness Assessment in self-regulated learning and performance measures in an introductory educational psychology course, *paper presented at the Annual Meeting of the American Educational Research Association*, San Diego, April 1998.

Haycock,L.A., McCharty,P. and Skay, C.L. (1998) Procrastination in college students: the role of self-efficacy and anxiety, *Journal of counselling and development*, 76(3), 317-324.

Herbert, M.E. and Dionne, J.P. (1993) Implicit theories about everyday problem solving, *paper presented at the Annual Meeting of the American Educational Research Association*, Atlanta, GA.

Hergenhahn, B.R. and Olson, M.H. (2005) *An introduction to theories of learning,* London: Pearson Education.

Hess, B., Sherman, M.F. and Goodman, M. (2000) Eveningness predicts academic procrastination: the mediating role of neuroticism, *Journal of Social Behaviour and Personality*, 15(5), 61-74.

Heydenberk, R. and Heydenberk, W.R. (2005) Increasing metacognitive competence through conflict resolution, *Education and Urban Society*, 37(4), 431-452.

Hill, M.B., Hill, D.A., Chabot, A.E. and Barrall, J.F. (1978) A survey of college faculty and student

procrastination, *College student Journal*, 12, 256-262.

Hofer, B.K. (2004) Epistemological understanding as a metacognitive process: thinking aloud during online searching, *Educational Psychologist*, 39(1), 43-55.

Hofer, B.K., Yu, S.L. and Pintrich, P.R. (1998) Teaching college students to be self-regulated learners, in Schunk, D.H. and Zimmerman, B.J. (ed.) *Self-regulated Learning: from teaching to self-reflexive practice*, New York: The Guilford press.

Holec, H. (1981) *Autonomy and foreign language learning*, Oxford: Pergamon.

Hollins, E.R. (2008) *Culture in school learning: revealing the deep meaning*, New York: Routledge.

Hong, N. (1998) The relationship between well-structured and ill-structured problem solving in multimedia simulation, *Unpublished doctoral dissertation, Pennsylvania State University,* State College, PA.

Hong, N.S., McGee, S. and Howard, B.C. (2001) Essential components for solving various problems in multimedia learning environments, *paper presented at the Annual Meeting of the American Educational Research Association*, Seattle, WA.

Howard, B.C., McGee, S., Shia, R. and Hong, N.S. (2000a) Metacognitive self-regulation and problem solving: expanding the theory base through factor analysis, *paper presented at the Annual Meeting of the American Educational Research Association*, New Orleans, L.A.

Howard, B.C., McGee, S., Hong, N.S. and Shia, R (2000b) The influence of metacognitive self-regulation on problem-solving in computer-based science inquiry, *paper presented at the Annual meeting of the American Educational Research Association,* New Orleans, L.A.

Howard, B.C., McGee, S., Shia, R. and Hong, N.S. (2001a) Computer-Based Science Inquiry: how components of metacognitive self-regulation affect problem-solving, *paper presented at the Annual Meeting of the American Educational Research Association*, Seattle, WA.

Howard, B.C., McGee, S., Shia, R. and Hong, N.S. (2001b) The influence of metacognitive self-regulation and ability levels on problem solving, *paper presented at the Annual Meeting of the American Educational Research Association*, Seattle, WA.

Hoy, A.W. (2004) What do teachers need to know about self-efficacy? *paper presented at the Annual Meeting of the American Educational Research Association,* San Diego, CA.

Husen, T. (1999) Research paradigm in education, in Keeves, J.P. and Lamomski, G. (ed.), *Issues in Education Research,* New York: Pergamon, 31-39.

Jacobs, J. and Paris, S. (1987) Children's metacognition about reading: issues in definition, measurement, and instruction, *Educational Psychologist, 22*, 255–278.

Janssen, T. and Carton, J.S. (1999) The effects of locus of control and task difficulty on procrastination, *The Journal of Genetic Psychology*, 160(4), 436-442.

Jegede, O., Fan, R.Y.K., Chan, M.S.C., Yum, J. and Taplin, M. (1999) Locus of control and metacognition in open and distance learning: a comparative study of low and high achievers, *paper presented at the 13th Annual Conference of the Asia Association of Open Universities (AAOU) held at the China Central Radio & TV University, Beijing, People Republic of China*, 14-17 October, 1999

Jiao, Q.G. and Onwuegbuzie, A.J. (1999) I'll go to the library tomorrow, the role of procrastination in library anxiety, *paper presented at the Annual Meeting of the Mid-South Educational Research Association*, November 1999.

Johnson, J.L. and Bloom, M. (1995) An analysis of the contribution of the five factors of personality to variance in academic procrastination, *Personality and Individual Differences*, 18(1), 127-133.

Kachgal, M.M., Hansen, L.S. and Nutter, K.J. (2001) Academic procrastination prevention/intervention: strategies and recommendations, *Journal of Developmental Education*, 25(1), 14-24.

Kahneman, D. and Tversky, A. (1979) Intuitive prediction: biases and corrective procedures, TIMS Studies in Management Science, 12, 313-327.

Kanfer, R. and Kanfer, F. H. (1991) Goals and self-regulation: applications of theory to work settings, in Maehr, M.L. and Pintrich, P.R. (ed.) Advances in motivation and achievement, Greenwich, CT: JAI Press, 7, 287-326.

Kaplan, A. (2008) Clarifying metacognition, self-regulation, and self-regulated learning: what's the purpose? *Educational Psychology Review*, 20(4), 477-484.

Kaplan, A. and Midgley, C. (1997) The effect of achievement goals: does level of perceived academic competence make a difference? *Contemporary Educational Psychology*, 22(4), 415-435.

Kearns, H., Gardiner, M. and Marshall, K. (2008) Innovation in PhD completion: the hardy shall succeed (and be happy), *Higher Education Research & Development*, 27(1), 77-89.

Kelemen, W.L., Frost, P.J. and Weaver III, C.A. (2000) Individual differences in metacognition: evidence against a general metacognitive ability, *Memory and Cognition*, 28, 92-107.

Kim, H-K. (2003) Critical thinking, learning and Confucius: a positive assessment, *Journal of Philosophy of Education*, 37(1), 71-87.

Kimble, G.. A. (1961) *Hilgard and Marquis' conditioning and learning,* Englewood Cliffs, New Jersey: Prentice Hall.

King, A. (1992) Comparison of self-questioning, summarizing, and note-taking review as strategies for learning from lectures, *American Educational Research Journal*, 29, 303-323.

King, W.R. (1988) How effective is your information systems planning? *Long Range Planning*, 21(5), 103-112.

Klassen, R.M. and Georgiou, G.K. (2008) Spelling and writing self-efficacy of Indo Canadian and Anglo Canadian early adolescents, *Journal of International Migration and Integration*, 9(3), 311-326.

Klassen, R.M. and Kuzucu, E.C. (2009) Academic procrastination and motivation of adolescents in Turkey, *Educational Psychology*, 29(1), 69-81.

Klassen, R.M., Krawchuk, L.L. and Rajani, S. (2008) Academic procrastination of undergraduates: low self-efficacy to self-regulate predicts higher levels of procrastination, *Contemporary Educational Psychology*, 33(4), 915-931.

Klassen, R.M., Ang, R.P., Chong, W.H., Krawchuk, L.L., Huan, V. S., Wong, I.Y.F. and Yeo, L.S. (2009) A cross-cultural study of adolescent procrastination, *Journal of Research on Adolescence*, 19(4), 799-811.

Kluwe, R.H. and Friedricksen, G. (1985) Mechanism of control and regulation in problem solving, in Kuhl, J. and Beckmann, J. (ed.) *Action Control: from cognition to behaviour*, New York: Spring-Verlag, 183-218.

Knaus, W.J. (2000) Procrastination, Blame, and Change , *Journal of Social Behavior and Personality*, 15(5), 153–166

Kruger, J. and Dunning, D. (1999) Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments, *Journal of Personality and Social Psychology*, 77(6), 1121-1134.

Ku, K.Y. L. and Ho, I.T. (2010) Metacognitive strategies that enhance critical thinking, *Metacognition and Learning*, 5(3), 251-267.

Kuhn, T. (1962) *The structure of scientific revolution (1st edition)*, Chicago: University of Chicago Press.

Kuhn, T. (1970) *The structure of scientific revolution (2nd edition)*, Chicago: University of Chicago Press.

Kuhn, D. and Dean, D. (2004) Metacognition: a bridge between cognitive psychology and educational practice, *Theory into Practice*, 43(4) , 268-274.

Kuyper, H., Van der Werf, M.P.C. and Lubbers, M.J. (2000) Motivation, metacognition and self-regulation as predictors of long term educational attainment, *Educational Research and Evaluation: An International Journal of Theory and Practice,* 6(3), 181-205.

Lajoie, S.P. (2008) Metacognition, Self Regulation, and Self-regulated Learning: A Rose by any other Name? *Educational Psychology Review*, 20, 469 – 475.

Lam, W.Y.K. (2010) Metacognitive strategies teaching in the ESL oral classroom: ripple effect on non-target strategy use, Australian Review of Applied Linguistics, 33(1), 02.1 – 02.19.

Lau, K-L. and Chan, D.W. (2003) Reading strategy use and motivation among Chinese good and poor readers in Hong Kong*, Journal of Research in Reading*, 26(2), 177-190.

Lay, C. H. (1986) At last, my research article on procrastination, *Journal of Research in Personality*, 20(4), 474-495.

Lay, C.H. (1997) Explaining lower-order traits through higher-order factors: the case of trait procrastination, conscientiousness, and the specificity dilemma, *European Journal of personality*, 11(4), 267-278.

Leahey, T.H. (1997) A history of psychology: main currents in psychological though, New Jersey: Prentice Hall.

Lee, C. D. (2003). Why we need to re-think race and ethnicity in educational research. *Educational Researcher, 32*(5), 3–5.

Lee, E. (2005) The relationship of motivation and flow experience to academic procrastination in University Studies, *The Journal of Genetic Psychology*, 166(1), 5-14.

Lee, C.B., Teo, T. and Chai, C.S. (2010) Profiling pre-service teacher's awareness and regulation of their own thinking; evidence from an Asian country, *Teacher Development*, 14 (3), 295-306.

Levy, L. H. (1963) *Psychological interpretation,* New York: Holt, Rinehart & Winston.

Lin, L. M. and Zabrucky, K. (1998) Calibration of Comprehension: Research and Implications for Education and Instruction, *Contemporary Educational Psychology,* 23(4), 345-391.

Lindner, R. and Harris, B. (1992) Self-regulated learning and academic achievement in college students, *paper presented at the American Educational Research Association Annual Meeting*, San Francisco, CA, April, 1992.

Little, D. (1995) Learning as dialogue: the dependence of learner autonomy on teacher autonomy, *System*, 23(2), 175-181.

Litwin, M.S. (2003) *How to Assess and Interpret Survey psychometrics*, Thousand Oaks: Sage Publications.

Lonergan, J. M. and Maher, K.J. (2000) The relationship between job characteristics and workplace procrastination as moderated by locus of control, *Journal of Social Behaviour and Personality*, 15(5), 213-224.

Mabe, III. P. A. and West, S.G. (1982) Validity of self-evaluation of ability: a review and meta-analysis, *Applied Psychology*, 67(3), 280-296.

Mace, F.C., Belfiore, P.J. and Hutchinson, J.M. (2001) Operant theory and research on self-regulation, in Zimmerman, B.J. and Schunk, D.H. (ed.) *Self-regulated Learning and Academic Achievement: Theoretical perspectives,* Mahwah, New Jersey: Erlbaum.

Magno, C. (2010) The role of metacognitive skills in developing critical thinking, *Metacognition and Learning,* 5(2), 137-156.

Mann, L. (1982) Decision-making questionnaire, unpublished inventory, Flinders University of South Australia, Australia.

Manning, B.H. and Glasner, S.E.(1996) The self-regulated learning aspect of metacognition: a component of gifted education, *Roeper Review*, 18(3), 217-223.

Matthews, G. and Deary, I.J. (1998). *Personality traits*. Cambridge, UK: Cambridge University Press.

McCoah, D.B. and Siegle, D (2003) Factors that differentiate underachieving gifted students from high achieving gifted students, *Gifted Child Quarterly*, 47(2), 144-154.

McCormick, C. B. and Pressley, M. (1997) *Educational Psychology: Learning, Instruction, and Assessment*, New York: Longman.

McCown, W. (1986) An empirical investigation of the behaviours of procrastinators, *Social and Behavioural Documents*, 16, 1-89.

McCown, W. and Johnson, J. (1989a) Validation of an adult inventory of procrastination, *paper presented at the Society for Personality Assessment*, New York.

McCown, W. and Johnson, J. (1989b) Non-student validation of an adult inventory of procrastination, *paper presented at the American Psychology Association,* New Orleans, L.A.

McCown, W., Petzel, T. and Rupert, P. (1987) An experimental study of some hypothesized behaviours and personality variables of college student procrastinators, *Personality and Individual Differences*, 8(6), 781-786.

McDaniel, M.A. and Einstein, G.O. (1989) Material-appropriate processing: a contextualist approach to reading and studying strategies, *Educational Psychology Review*, 1, 113-145.

Mevarech, Z.R. and Amrany, C. (2008) Immediate and delayed effects of metaconitive instruction on regulation of cognition and mathematics achievement, *Metacognition and Learning*, 3(2), 147-157.

Mevarech, Z.R. and Fridkin, S. (2006) The effects of IMPROVE on mathematical knowledge, mathematical reasoning and metacognition, *Metacognition and Learning*, 1(1),85-97.

Mevarech, Z.R. and Kramarski, B. (1997) IMPROVE: a multidimensional method for teaching mathematics in heterogeneous classrooms, *American Educational Research Journal*, 34(2), 365-394.

Mevarech, Z.R. and Kramarski, B. (2003) The effects of metacognitive training versus work-out examples on student's mathematical reasoning, *British Journal of Educational Psychology*, 73, 449-471.

Michalski, T. Zion, M. and Mevarech, Z.R. (2007) Developing student's metacognitive awareness in asynchronous learning networks in comparison to face-to-face discussion groups, *Journal of Educational Computing Research*, 36(4), 395-424.

Milgram, N.A. (1991) Procrastination, in Dulbecco, R. (ed.) *Encyclopaedia of human biology*, New York: Academic Press, 6, 149-155.

Milgram, N.A. and Toubiana, Y. (1999) Academic anxiety, academic procrastination, and parental involvement in students and their parents, *British Journal of Educational Psychology*, 69, 345-361.

Milgram, N.A., Dangour, W. and Raviv, A. (1992) Situational and personal Determinants of academic

procrastination, *The Journal of General Psychology,*119(2), 123-133.

Milgram,N. A., Marshevsky, S. and Sadeh, A. (1995) Correlates of academic procrastination: discomfort, task aversiveness, and task capability, *The Journal of Psychology*, 129(2), 145-155.

Milgram, N.A., Sroloff, B. and Rosenbaum, M. (1988) The procrastination of everyday life, *Journal of research in Personality,* 22(2), 197-212.

Mok, Y.F., Fan, R.M.T. and Pang, S.K. (2007) Developmental patterns of school students' motivational - and cognitive-metacognitive competencies, *Educational Studies,*33(1), 81-89.

Moon, S. and Illingworth, A.J. (2005) Exploring the dynamic nature of procrastination: a latent growth curve analysis of academic procrastination, *Personality and Individual Differences*, 38(2), 297-309.

Morrison, M. (2002) What do you mean by educational research, in Coleman, M. and Briggs, R.J. (ed.) *Research Methods in Educational leadership and management*, London: Sage Publications.

Neber, H. and Schommer-Aikins, M. (2002) Self-regulated science learning with highly gifted students: The role of cognitive, motivational, epistemological, and environmental variables, *High Ability Studies*, 13(1), 59-74.

Nelson, T. O. and Leonesio, R. J. (1988) Allocation of self-paced study time and the labour-in-vain effect, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14, 676-686 (reprinted in Thomas O. Nelson, (ed.)(1992) *Metacognition: Core Readings*, MA: Allyyn and Bacon, 235-249).

Newell, A. and Simon, H.A. (1972) Human problem solving, Englewood Cliffs, New Jersey: Prentice-Hall.

O'Malley,J. and Chamot, A. (1989) *Learning strategies in second language acquisition*, Cambridge: Cambridge University Press.

O'Neil, H.F. and Abedi, J. (1996) Reliability and validity of a state metacognitive inventory: potential for alternative assessment, *Journal of Educational Research*, 89, 234-245.

Onwuegbuzie, A.J. (2000) Academic procrastinators and perfectionistic tendencies among graduate students, *Journal of Social Behaviour and personality*, 15(5), 103-109.

Onwuegbuzie, A.J. (2004) Academic procrastination and statistics anxiety, *Assessment and Evaluation in Higher Education*, 29(1), 3-19.

Onwuegbuzie, A.J. and, Jiao, Q.G. (2000) I'll go to the Library later: the relationship between academic procrastination and library anxiety, *College and Research Libraries*, 61(1), 45-54.

Orellana-Damacela, L.E., Tindale, R.S. and Suárez-Balcázar, Y. (2000) Decisional and behavioral procrastination: how they relate to self-discrepancies, *Journal of Social Behavior and Personality*, 15(5), 225–238.

Ormrod, J. E. (1995) *Human Learning*. New Jersey: Prentice-Hall, Inc.

Orpen, C. (1998) The causes and consequences of academic procrastination: a research note, *Westminster Studies in Education*, 21(1), 73-75.

Ozer, B.U. and Demir, A. (2009) Exploring academic procrastination among Turkish students: possible gender differences in prevalence and reasons, *The Journal of Social Psychology*, 149(2), 241-257.

Palincsar, A.S. and Brown, A.L. (1984) Reciprocal teaching of comprehension - fostering and comprehension monitoring activities, *Cognition and Instruction*, 1(2), 117-175.

Palincsar, A.S. and Brown, A.L. (1987) Enhancing instructional time through attention to metacognition, *Journal of Learning Disability*, 20(2), 66-75.

Panaoura, A. and Philippou, G. (2007) The developmental change of young pupils' Metacognitive ability in mathematics in relation to their cognitive abilities, *Cognitive Development*, 22(2), 149-164.

Paris, S.G., Cross, D.R. and Lipson, M.Y. (1984) Informed strategies for learning: a program to improve children's reading awareness and comprehension, *Journal of Educational Psychology*, 76(6), 1239-1252.

Phillips, D.C. (1999) Positivism, anti-positivism and empiricism, in Keeves, J. and Lakomski, G. (ed.) *Issues in Educational Research*, Oxford: Elsevier Science Ltd.

Phillips, D.C. and Burbules, N.C. (2000) *Post-positivism and educational research*, Lanham, Maryland: Rowman & Littlefield Publisher.

Piaget, J. (1964) *Six psychological studies*, New York: Vintage.

Pieschl, S. (2009) Metacognitive calibration – an extended conceptualisation and potential application, *Metacognition and Learning*, 4(1), 3-31.

Pintrich, P.R. and De Groot, E. (1990) Motivational and self-regulated learning components of classroom academic performance, *Journal of Educational Psychology*, 82(1),33-40.

Pintrich, P.R. and Schunk,D.H.(2002) *Motivation in education: Theory, research, and application*, Columbus, O.H: Merrill.

Pintrich, P.R., Roeser, R.W. and De Groot, E.A.M. (1994) Classroom and individual difference in early adolescnet's motivation and self-regulated learning, *Journal of Early adolescence*, 14(2), 139-161.

Pirolli, P. and Bielaczyc, K. (1989) Empirical analyses of self-explanation and transfer in learning to program, *in Proceeding of the 11th Annual Conference of the Cognitive Science Society*, Hillsdale, New Jersey: Erlbaum, 450-457.

Pirolli, P. and Recker, M. (1994) Learning strategies and transfer in the domain of programming, *Cognition and instruction*, 12(3), 235-275.

Popper, K. (1959) *The logic of Scientific Discovery*, London: Hutchison.

Popper, K (1963) *Conjectures and Refutations*, London: Routledge & Kegan Paul.

Pressley, M., Gaskins, I.W. (2006) Metacognitively competent reading comprehension is constructively responsive reading: how can such reading be developed in students? *Metacognition and Learning*, 1, 99–113.

Pressley, M. and Ghatala, E. (1988) Delusions about performance on multiple-choice comprehension tests, *Reading research Quarterly*, 23(4), 454-464.

Prince, M. (2004) Does active learning work? A review of the research, *Journal of Engineering Education*, 93(3), 223-231.

Prohaska, V., Morrill, P., Atiles, I. and Perez, A. (2000) Academic procrastination by nontraditional students, *Journal of Social Behavior and Personality*,. 15(5), 125–134.

Pychyl, T.A., Lee, J.M., Thibodeau, R. and Blunt, A. (2000a) Five days of emotion: an experience sampling study of undergraduate student procrastination, *Journal of Social Behaviour and Personality*, 15(5), 239-254.

Pychyl, T.A., Morin, R.W. and Salmon, B.R. (2000b) Procrastination and the Planning Fallacy: An Examination of the Study Habits of University Students, *Journal of Social Behavior and Personality*, 2000, 15(5), 135–150.

Raya, M. and Fernandez, J. (2002) Learner's autonomy and new technologies, *Educational Media International,* 39(1), 61-68.

Reasinger, R. and Brownlow, S. (1996) Putting off until tomorrow what is better done today: academic procrastination as a function of motivation toward college work, *poster presented at the Annual Meeting of the South-eastern Psychological Association*, March 1996.

Rebok, G.W. (1989) Plans, actions, and transactions in solving everyday problems, in Sinnott, J.D. (ed.) *Everyday problem solving: theory and application*, New York: Praeger,, 100-122.

Remmert, D. (1997) Introducing autonomous learning in a low ability set, *Language Learning Journal,* 15, 14-20.

Resnick, L.B. and Klopfer, L.E. (ed.) (1989) Toward the thinking curriculum: current cognitive research, *ASCD Yearbook*, Alexandria, VA: ASCD Publications.

Rezvan,S.; Ahmadi, S.A.; Abedi, M.R. (2006) The effects of metacognitive training on the academic achievement and happiness of Esfahan University conditional students, *Counselling Psychology Quarterly*, 19(4), 415–428

Richards, J.C., Platt, J. and Platt, H. (1992) *Longman Dictionary of Language Teaching and Applied Linguistics*, London: Longman Group UK Limited.

Roig, M. and DeTommaso, L. (1995) Are college cheating and plagiarism related to academic procrastination, *Psychological Reports,* 77(2), 691-698

Rothblum, E.D., Solomon, L.J. and Murakami, J. (1985) Behavioural, affective, and cognitive differences between high and low procrastinators as an academic deadline approaches, *paper presented at the Annual Meeting of the Association for Advancement of Behaviour Therapy*, Huston, November, 1985.

Rothblum, E.D., Solomon, L.J. and Murakami, J. (1986) Affective, cognitive, and behavioural differences between high and low procrastinators, *Journal of Counselling Psychology*, 33(4), 387-394.

Ruan, J. (2004) Bilingual Chinese/ English first graders developing metacognition about writing, *Literacy*, 38(2), 106-112.

Scardamalia,M. and Bereiter, C. (1991) Higher levels of agency for children in knowledge building: a challenge for the design of new knowledge media, *Journal of the Learning Sciences*, 1, 37–68.

Schouwenburg, H.C. (1992) Procrastinators and fear of failure: an exploration of reasons for procrastination, *European Journal of Personality*, 6(3), 225-236.

Schouwenburg, H.C. (1995) Academic procrastination: theoretical notions, measurement, and research, in Ferrari, J.R., Johnson, J.L. and McCown, W.G. (ed.) *Procrastination and task avoidance: theory, research, and treatment*, New York: Plenum Press.

Schouwenburg, H.C. and Groenewoud, T. (2001) Study motivation under social temptation: effects of trait procrastination, *Personality and Individual Differences*, 30(2), 229-240.

Schouwenburg, H.C. and Lay, C.H.; (1995) Trait procrastination and the big –five factors of personality, *Personality and Individual Differences*, 18(4), 481-490.

Schraw, G. (1994) The effect of metacognitive knowledge on local and global monitoring, *Contemporary Educational Psychology*, 19(2), 143-154.

Schraw, G. (2009) A conceptual analysis of five measures of metacognitive monitoring, *Metacognition and Learning*, 4(1), 33-45.

Schraw, G. and Dennison, R.S. (1994) Assessing metacognitive awareness, *Contemporary Educational Psychology*, 19(4), 460-475.

Schraw, G. and Moshman, D. (1995) Metacognitive theories, *Educational Psychology Review*, 7(4), 351-371.

Schraw, G., Dunkle, M.E., Bendixen, L.D. and Roedel, T.D. (1995) Does a general monitoring skills exist? *Journal of Educational Psychology*, 87(3), 433-444.

Schraw, G., Crippen, K.J. and Hartley, K. (2006) Promoting self-regulation in science education: metacognition as part of a broader perspective on learning, *Research in Science Education*, 36, 111–139.

Schraw, G.., Wadkins, T. and Olafson, L. (2007) Doing the things we do: a ground theory of academic procrastination, *Journal of Educational Psychology,* 99(1), 12-25.

Schunk, D.H. (1983) Progress self-monitoring: effects on children's self-efficacy and achievement, *Journal of Experimental Education*, 51(2), 89-93.

Schunk, D.H. (2008) Metacognition, self-regulation, and self-regulated learning: research recommendation, *Educational Psychology Review*, 20(4), 463-467.

Schunk, D.H. (2009) Learning theories: an educational perspective, New.Jersey: Pearson.

Semb, G., Glick, D.M. and Spencer, R.E. (1979) Student withdrawals and delayed work patterns in self-paced psychology courses, *Teaching of Psychology*, 6(1), 23-25.

Senecal, C., Koestner, R. and Vallerand, R. (1995) Self-regulation and academic procrastination, *The Journal of Social Psychology*, 135(5), 607-619.

Seo, E.H. (2008) Self-efficacy as a mediator in the relationship between self-oriented perfectionism and academic procrastination, *Social Behaviour and Personality*, 36(6), 753-764.

Shu-Shen, S. (2002) Children's self-efficacy beliefs, goal setting behaviours, and self-regulated learning, *Journal of National Taipei Teachers College*, 15, 263-282.

Shuell, T.J. (1986) Cognitive conceptions of learning, *Review of Educational Research*, 56(4), 411-436.

Sigall, H., Kruglanski, A. and Fyock, J. (2000) Wishful Thinking and Procrastination, *Journal of Social Behavior and Personality*, 15(5), 283–296.

Silver, M (1974) Procrastination, *Centerpoint*, 1, 49-54

Silver, M. and Sabini, J (1981) Procrastination, *Journal for the Theory of Social Behaviour,* 11, 207-221.

Simmons, P.R.J. (1996) Metacognition in E.D. Corte and F.E. Weinert (ed) International encyclopaedia of developmental and instructional psychology, Oxford, U.K, Elsevier Science, 436-444.

Solomon, L.J. and Rothblum, E.D. (1984) Academic procrastination: frequency and cognitive-behavioural correlates, *Journal of Counselling psychology*, 31(4), 503-509.

Son, L. K. and Schwartz, B. L. (2002) The relation between metacognitive monitoring and control, in Perfect, T.J. and Schwartz, B.L. (ed.), *Applied Metacognition*, UK: Cambridge University Press.

Sperling, R.A., Howard, B.C., Staley, R. and DuBois, N. (2004) Metacognition and self-regulated learning constructs, *Educational Research and Evaluation*, 10(2), 117-139.

Stainton, M., Lay, C.H. and Flett, G.L. (2000) Trait Procrastinators and Behavior/Trait-Specific Cognitions, *Journal of Social Behavior and Personality*, 15(5), 297–312.

Steel, P., Brothen, T. and Wambach, C. (2001) Procrastination and personality, performance, and mood, *Personality and Individual Differences*, 30(1), 95-106.

Sungur, S. (2007) Contribution of motivational beliefs and metacognition to students' performance under consequential and non-consequential test conditions, *Educational Research and Evaluation*, 13(2), 127-142.

Sungur, S. and Senler, B. (2009) An analysis of Turkish high school students' metacognition and motivation, *Educational Research and Evaluation*, 15(1), 45-62.

Swanson, H.L. (1990) Influence of metacognitive knowledge and aptitude on problem solving, *Journal of Educational Psychology*, 82(2), 306-314.

Symons, S. and Reynolds, P.L. (1999) Middle school students' information–seeking skills and metacognitive awareness, *paper presented at the Biennial Meeting of the Society for research in child development*, Albuquerque, NM.

Taraban, R., Kerr, M. and Rynearson, K. (2004) Analytic and pragmatic factors in college students' metacognitive reading strategies, *Reading Psychology: an international quarterly*, 25(2) 67-81.

Taylor,R. (1979) Procrastination: The personality and situational correlates of procrastination behaviour for achievement tasks, *Dissertation Abstracts International*, 40(4-b).

Tenenberg, J. and Murphy, L. (2005) Knowing what I know: An investigation of undergraduate knowledge and self-knowledge of data structures, *Computer Science Education*, 15(4), 297-315.

Teong, S.K. (2003) The effect of metacognitive training on mathematical word problem solving, *Journal of Computer Assisted Learning*, 19(1), 46-55.

Terry, W.S. (2000) *Learning and memory*, M.A, Boston: Allyn & Beacon.

Thomas, G. P. (2002). The social mediation of metacognition. In McInerny,D and Etten, S.V. (ed.), *Sociocultural influences on motivation and learning(II): Research on sociocultural influences on motivation and learning* : Greenwich, CT: Information Age Publishing, 2, 225-247.

Thomas G. P. (2006) An Investigation of the Metacognitive Orientation of Confucian-Heritage Culture and Non-Confucian-Heritage Culture Science Classroom Learning Environments in Hong Kong*, Research in Science Education* , 36, 85–109.

Thomas, G.. P. and Mee, D.A. K. (2005) Changing the learning environment to enhance students' metacognition in Hong Kong primary school classrooms, *Learning Environments Research*, 8(3), 221-243.

Thomas, J. W. and Rohwer, W.D. (1986) Academic studying: the role of learning strategies, *Educational Psychologist*, 21(1), 19-41.

Tice, D.M. and Baumeister, R.F. (1997) Longitudinal study of procrastination, performance, stress, and health: the costs and benefits of dawdling, *Psychological Science*, 8(6), 454-458.

Tuckman, B.W. (1990) Measuring procrastination attitudinally and behaviourally, *paper presented at the annual meeting of the American Educational Research Association,* Boston, April 1990.

Tuckman, B.W. (1991) The development and concurrent validity of the Procrastination Scale, *Educational and Psychological Measurement*, 51(2), 473-480.

Tuckman, B. W. (1998) Using tests as an incentive to motivate procrastinators to study, *The Journal of Experimental Education*, 66(2), 141-147.

Tuckman, B.W. and Sexton, T. (1989) Effects of relative feedback in overcoming procrastination on academic tasks, *paper given at the meeting of the American Psychological Association*, New Orleans, L.A.

Valle, A., Cabanach, R.G., Nunez, J.C., Gozalez-Pienda, J., Rodriguez, S. and Pieniro,I. (2003) Cognitive, motivational, and volitional dimension of learning, *Research in Higher Education*, 44, 557-580.

Van der Kolk, B. (1987) *Psychological Trauma*, Washington, DC: American Psychiatric Association Press.

Van Eerde, W. (2003) Procrastination at work and time management training, *The Journal of Psychology*, 137(5), 421-434.

Van Eerde, W. (2004) Procrastination in academic settings and the Big-Five Model of personality: A meta-analysis, in Schouwenburg, H.C., Pychyl, T.A.., Lay,C.H. and Ferrari, J.R. (ed.) *Counselling the procrastinator in academic setting,* Washington D.C.: American Psychology Association.

Van Rossum, E.J. and Schenk, S.M. (1984) The relationship between learning conception, study strategy, and learning outcome, *British Journal of Educational Psychology,* 54, 73-83.

Veenman, M.V. J., Elshout, J. J. and Busato, V.V. (1994) Metacognition mediation in learning with computer-based simulation, *Computers in Human Behaviour*, 10(1), 93-106.

Veenman, M.V. J., Elshout, J. J. and Meijer, J. (1997) The generality vs. domain-specific of metacognition skills in novice learning across domains, *Learning and Instruction*, 7(2), 187-209.

Veenman, M.V. J., Wilhelm, P. and Beishuizen, J. J. (2004) The relation between intellectual and metacognitive skills from a developmental perspective, *Learning and Instruction*, 14(1), 89-109.

Veenman, M.V.J., Van Hout-Wolters, B.H. and Afflerbach, P. (2006) Metacognition and learning: conceptual and methodological considerations, *Metacognition and Learning*,1, 3-14.

Victori, M.and Lockhart, W. (1995) Enhancing metacognition in self-directed langugae, learning, System, 23(2), 223-234.

Volet, S.E. (1991) Modelling and coaching of relevant metacognitive strategies for enhancing university students learning, *Learning and Instruction*, 1(4), 319-336.

Vrugt, A. and Oort, F.J.(2008) Metacognition, achievement goals, study strategies and academic achievement: pathways to achievement*, Metacognition and Learning*,30, 123–146.

Vygotsky, L. (1978) Mind in society: the development of higher psychological processes, Cambridge, MA: Harvard University Press.

Watson, D.C.(2001) Procrastination and the five-factor model: a facet level analysis, *Personality and Individual Differences*, 30(1), 149-158.

Weistein, C.E. and Mayer, R.E. (1986) The teaching of learning strategies, in Wittrock, M.C. (ed.), *Handbook of Research on Teaching,* New York: Macmillan, p.315-327.

Weinstein, C. E., Schulte, A. and Palmer, D. R. (1987). *The Learning and Study Strategies Inventory*. Clearwater, FL: H & H Publishing.

Wesley, J. (1994) Effects of ability, high school achievement and procrastinatory behaviour on college performance, *Educational and Psychological Measurement*, 54(2), 404–408.

White, C. J. (1999) The Meta-cognitive knowledge of distance learners, *Open Learning*, 14(3), 37-46.

White, B. and Frederiksen, J (1998) Inquiry, modelling, and metacognition: making science accessible to all students, *Cognition and Instruction*, 16(1), 3-118.

Whitebread, D., Coltman,P., Pino-pasternak, D., Sangster, C., Grau, V., Bingham, S., Almeqdad, Q. and Demetriou, D. (2009) The development of two observational tools for assessing metacognition and self-regulated learning in young children, *Metacognition and Learning*, 4(1), 63-85.

Winne, P.H. and Hadwin, A.F. (1998) Studying as self-regulated learning, in D.J. Hacker, J. Dunlosky, and A.C. Graesser (ed.) *Metacognition in Educational Theory and Practice*, Lawrence Erlbaum Association,

publishers, New Jersey.

Wise, S.L. and DeMars, C.F. (2003) Examinee motivation in low-stakes assessment: problems and potential solutions, *paper presented at the Annual Meeting of the American Association of Higher Education Assessment Conference*, Seattle, WA.

Wolf, L.F. and Smith, J.K. (1995) The consequence of consequence: motivation, anxiety, and test performance, *Applied Measurement in Education,* 8(3), 227-242.

Wolff, R.P. (1998) *About Philosophy*, New Jersey: Simon & Schuster.

Wolters, C.A. (2003) Understanding procrastination from a self-regulated learning perspective, *Journal of Educational Psychology*, 95(1), 179-187.

Wolters, C.A. (2004) Advancing achievement goal theory: using goal structures and goal orientations to predict students' motivation, cognition, and achievement, *Journal of Educational Psychology*, 96(2), 236-250.

Wolters, C.A., Yu, S.Y. and Pintrich, P.R. (1996) The relation between goal orientation and students' motivational beliefs and self-regulated learning, *Learning and Individual Differences*, 8(3), 211-238.

Yilmaz-Tuzun, O. and Topcu, M.S. (2010) Investigating the relationships among elementary school students' epistemological beliefs, metacognition, and constructivist science learning environment, *Journal of Science Teacher Education*, 21, 255-273.

Zimmerman, B. J. (1986) Becoming a self-regulated learner: which are the key sub-processes? *Contemporary Educational Psychology*, 11(4), 307-313.

Zimmerman B.J. (1989) A social cognitive view of self-regulated academic learning, *Journal of Educational Psychology*, 81(3), 329-339.

Zimmerman, B.J. (2001) Theories of Self-Regulated Learning and Academic achievement: an overview and analysis, in Zimmerman, B. J. and Schunk, D.H. (ed.) *Self-regulated Learning and Academic Achievement: Theoretical perspectives*, Mahwah, ,New Jersey: Erlbaum.

Zimmerman, B.J. (2002) Becoming a self-regulated learner: an overview, *Theory into Practice*, 41(2), 64-70.

Zimmerman, B.J. and Martinez-Pons, M. (1990) Student differences in self-regulated learning: relating grade, sex, and giftedness to self-efficacy and strategy use, *Journal of Educational Psychology*, 82(1), 51-59.

Zimmerman, B.J. and Schunk, D.H. (ed.) (2001) *Self-regulated learning and academic achievement: theoretical perspectives*, Mahwah, New Jersey: Erlbaum.

APPENDICES

Appendix 1

Personal particulars and G.P.A.

1. I am

   a) female b) male

2. I am now studying for my

   a) first year b) second year c) third year d) fourth year or more

3. I am now _____ years old.

4. My accumulated G.P.A. is _____

5. My major is _____.

6. I am an undergraduate / postgraduate student.

Appendix 2

The Aitken Procrastination Inventory (API)

5=Strongly Agree	4=Agree	3=Cannot Say	2=Disagree	1=Strongly Disagree

1. I delay starting things until the last minute.
2. I'm careful to return library books on time.
3. I often don't finish tasks on time.
4. I usually meet my own self-set deadlines.
5. Even when I know a job needs to be done, I never want to start it right away.
6. I keep my assignments up to date by doing my work regularly from day to day.
7. If I have a number of jobs that need to be done by the end of the day, I usually get them done.
8. If there were a workshop offered that would help me learn not to put off starting my work, I would go.
9. I don't seem to know when I need to start a job to be able to get it done on time.
10. I am often late for my appointments and meetings.
11. I use the vacant hours between classes to get started on my evening's work.
12. I delay starting things so long that I don't get them done by the deadline.
13. I overestimate the amount of work that I can do in a given amount of time.
14. I don't delay when I know I really need to get the job done.
15. If I had an important project to do, I'd get started on it as quickly as possible.
16. When I have a test scheduled soon, I often find myself working on other jobs instead

of studying for that test.

17. I often finish my work before it is due.
18. I get right to work at jobs that need to be done.
19. If I have an appointment, I make sure the clothes I want to wear are ready the day before.

Items with higher scores mean higher measurement in procrastination (A):

1,3,5,8,9,10,12,13,16

Inverted items - Items with higher scores mean lower procrastination

(B):2,4,6,7,11,14,15,17,18,19 They are calculated as: 1 as 5; 2 as 4; 3 as 3; 4 as 2; 5 as 1.

Total procrastination scores: A + inverted scores of B

Appendix 3

Metacognitive Awareness Inventory (MAI)

5=Strongly Agree	4=Agree	3=Cannot Say	2=Disagree	1=Strongly Disagree

1. I ask myself periodically if I am meeting my goals.
2. I consider several alternatives to a problem before I answer.
3. I try to use strategies that have worked in the past.
4. I pace myself while learning in order to have enough time.
5. I understand my intellectual strengths and weaknesses.
6. I think about what I really need to learn before I begin a task.
7. I know how well I did once I finish a test.
8. I set specific goals before I begin a task.
9. I slow down when I encounter important information.
10. I know what kind of information is more important to learn.
11. I ask myself if I have considered all options when solving a problem.
12. I am good at organizing information.
13. I consciously focus my attention on important information.
14. I have a specific purpose for each strategy I use.
15. I learn best when I know something about the topic.
16. I know what the teacher expects me to learn.
17. I am good at remembering information.
18. I use different learning strategies depending on the situation.
19. I ask myself if there was an easier way to do things after I finish a task.

20. I have control over how well I learn.
21. I periodically review to help me understand important relationships.
22. I ask myself questions about the material before I begin.
23. I think of several ways to solve a problem and choose the best one.
24. I summarize what I have learned after I finish.
25. I ask others for help when I don't understand something.
26. I can motivate myself to learn when I need to.
27. I am aware of what strategies I use when I study.
28. I find myself analysing the usefulness of strategies while I study.
29. I use my intellectual strengths to compensate for my weaknesses.
30. I focus on the meaning and significance of new information.
31. I create my own examples to make information more meaningful.
32. I am a good judge of how well I understand something.
33. I find myself using helpful learning strategies automatically.
34. I find myself pausing regularly to check my comprehension.
35. I know when each strategy I use will be most effective.
36. I ask myself how well I accomplished my goals once I'm finished.
37. I draw pictures or diagrams to help me understand while learning.
38. I ask myself if I have considered all options after I solve a problem.
39. I try to translate information into my own words.
40. I change strategies when I fail to understand.
41. I use the organizational structure of the text to help me learn.
42. I read instructions carefully before I begin a task.
43. I ask myself if what I'm reading is related to what already know.

44. I re-evaluate my assumptions when I get confused.
45. I organize my time to best accomplish my goals.
46. I learn more when I am interested in the topic.
47. I try to break studying down into smaller steps.
48. I focus on overall meaning rather than specifics.
49. I ask myself questions about how well I am doing while I am learning something new.
50. I ask myself if I learn as much as I could have once I finish a task.
51. I stop and go back over new information that is not clear.
52. I stop and reread when I get confused.

Items for Declarative Knowledge (DK): 5,10,12,16,17,20,32,46

Items for Procedural Knowledge (PK): 3,14,27,33

Items for Conditional Knowledge (CK): 15,18,26,29,35

Items for Planning: 4,6,8,22,23,42,45

Items for Information Management Strategies (IMS): 9,13,30,31,37,39,41,43,47,48

Items for Comprehension Monitoring (M): 1,2,11,21,28,34,49

Items for Debugging Strategies (D): 25,40,44,51,52

Items for Evaluation: 7,19,24,36,38,50

Appendix 4

Informed form and Consent form for participants

Informed Consent Form for Participation in a Questionnaire Based Study

School of Education, University of Leicester

Researcher: Brian S.C.Wong

Supervisor: Professor Paul Cooper, University of Leicester

Title of research project: Metacognitive Awareness, Procrastination and academic performance of university students in Hong Kong.

Rights of Participants

Thank you for agreeing to participate to take part in the study. Please note, however, that you are free to stop taking part at any time, without giving any reason, and your questionnaire will be destroyed.

Purpose of the Research

The purpose of this project is to find out the correlation of the three factors that will affect the success of learning in university students: Metacognitive awareness, academic procrastination and self-regulated learning. The information acquired in this study may help improve learning in college students.

Participation in this research will involve

After signing the informed consent form, you will be asked to complete a questionnaire which should take no longer than 15 minutes. All questions are multiple-choice.

What will happen to your data

All data collected from this study will be stored and recorded anonymously; your identity will not be revealed in any presentations or publications arising from this study. The data will only be used for research purposes.

Possible Discomfort

It is not anticipated that answering the questionnaire will cause psychological or emotional discomfort. However, in the unlikely event that you should experience discomfort at any time as a result of your participation in this project, you will be free to withdraw from the project, without giving any reason, and your questionnaire will be destroyed.

Benefits to the participants of this study

Being a participant in this study will make contribution to the research in learning. If you want to get a report of the analysis of the data, you can contact the researcher via

email brianscw@gmail.com.

I confirm that I have read the above information. The nature, demands and risks of the project have been explained to me. I have also been informed of any benefits to me from participation. I understand that I have the right to withdraw form this study at any time without having to give any reason.

(Please note that you muse be at least 18 years of age to participate)

Participant's signature _____ Date _____

Researcher's signature _____ Date _____

Appendix 5

Ethical approval from Ethics office of the University of Leicester

Ethical approval

Wilde, Melanie E. [mew8@leicester.ac.uk]

You forwarded this message on 9/29/2010 3:35 PM.

Sent: Monday, September 27, 2010 1:33 PM

To: bscw1@le.ac.uk [bscw1@leicester.ac.uk]

Cc: gg72@le.ac.uk [gg72@leicester.ac.uk]; sys2@le.ac.uk [sys2@leicester.ac.uk]

Dear Brian,

Thank you for your ethical approval form. You have clearly considered the ethical implications of your work. Please consider your research approved. Good luck.

Yours sincerely,

Melanie Wilde

Lecturer in Education

Research Ethics Officer

Appendix 6

Email to ask for the scoring instruction of MAI

> On Wed, Aug 4, 2010 at 2:59 AM, Brian W <brianscw@gmail.com> wrote:
>
> Dear Dr. Schraw
>
> I am planning to do a study on metacognitive awareness in Hong Kong, and I want to use the instrument Metacognitive Awareness Inventory (MAI) developed by you and Dr Dennison in 1994 (or a new version if available).
> I would appreciate it if you could let me know how and where to get access to the handbook (instructions how to use it) of this instrument.
> My email is brianscw@gmail.com
> Your help is important to me and will be much appreciated.
> Best wishes
>
> Brian

Appendix 7

The reply for the scoring instructions of MAI

On Wed, Aug 4, 2010 at 11:16 PM, Gregory Schraw <gschraw@unlv.nevada.edu> wrote:

> Brian,
>
> Attached are simple scoring instructions for the MAI.
>
> Gregg

Appendix 8

Letter to H.K. Polytechnic University for getting access

Brian S. Wong

Flat 2, 10/F Fai Lun House

Siu Lun Court

Tuen Mun, H.K.

brianscw@gmail.com

23rd September, 2010

Communications & Public Affairs Office,

The Hong Kong Polytechnic University,

Chatham Road, Hung Hom,

Kowloon,

Hong Kong.

Dear sir/ madam

I am a Hong Kong citizen doing a research program with the University of Leicester (U.K.) on metacognition and learning behavior of adult students. My study is focused on

university students in Hong Kong and a survey is to be carried out on adult students who use English as their medium of instruction. The Hong Kong Polytechnic University is renowned not only for its academic excellence but also its contribution to research. I would appreciate it if I am allowed to come to your campus and conduct the survey on your campus. For this study, no classes will be visited and no special arrangements are needed. The details of my study are as follows:

Methods:

Some of my trained interviewers and the researcher myself will go to some places of the campus, such as entrances of restaurants or places where students are available during school days. The questionnaires will be distributed to students who are voluntary to answer, and the questionnaires will be collected right away on the spot. All participants will be told their right to withdraw anytime without having to give a reason. It needs about 13 minutes to complete the questionnaire. Incentives may be used to boost the return of the questionnaires.

Confidentiality & Ethics considerations: An informed consent form will be attached on top of the questionnaire and the rights of the participants will be explained clearly.

Instruments will be used: Metacognitive Awareness Inventory (MAI) developed by Shraw and Dennison, the Aitken Procrastination Inventory (API) developed by developed by M.Aitken, and a sheet for Demographic information will be included in a set of questionnaire.

Risk assessment: Since the questionnaire is about learning behavior, there is no potential possibility to trigger memory of adverse experiences. There seem no other obvious hazards.

Dates: Any school days in October or November at your convenience.

Report : All data are in anonymous. However, if the participants would like to know the analysis of the overall data, they are allowed to get access via my email account brianscw@gmail.com . The analysis of the report is also available for your reference.

Your permission is crucial for the success of this research and I would be grateful for it. Look forward to hearing form you.

Attached please find the instruments and the informed consent form.

Best wishes

Brian

(Wong, Brian Shingchi)

Appendix 9

First reply from H.K. Polytechnic University

]

<Jo.CM.Leung@inet.polyu.edu.hk>

to	brianscw@gmail.com
date	Thu, Sep 30, 2010 at 6:14 PM
subject	Re: Request for conducting survey on PolyU campus
mailed-by	inet.polyu.edu.hk

To: Mr Brian S. Wong

Dear Mr Wong,

Thank you for your letter to our Director of Communications and Public Affairs dated 23 September 2010. Your request for conducting a survey on the campus of The Hong Kong Polytechnic University by trained interviewers and yourself, with the use of questionnaires, from October to November this year, is being processed. Meanwhile, your provision of the below details would facilitate our processing of your application:

- the total number of interviewers involved in the survey for the said activity.
- specific date(s) planned for the activity (please specify the total no. of days, and the period in a day e.g.

from 9am-12nn).

- location(s) where the activity will take place.

- please specify if there will be any photo-taking/video-taking activities.

- any work pass/document (or any means) to facilitate identification of your researchers.

- please provide your contact number (mobile number) for further liaison.

Look forward to your reply. Should you have any question, please feel free to contact me.

Best regards,

Jo Leung

Assistant Manager, Communications and Public Affairs

Communications and Public Affairs Office

The Hong Kong Polytechnic University

Tel: 2766 5104 Fax: 2364 0246

Email: pajleung@inet.polyu.edu.hk

Appendix 10

Follow-up email to H.K. Polytechnic University

Brian W

<brianscw@gmail.com>

to	"Jo CM Leung [CPA]" <Jo.CM.Leung@inet.polyu.edu.hk>	
date	Sun, Oct 3, 2010 at 2:19 PM	hide details 10/3/10
subject	Re: Request for conducting survey on PolyU campus	
mailed-by	gmail.com	

Dear Ms Leung

Thank you very much for your reply. The following details may be useful

1) There will be three interviewers including myself

Wong,Shing-Chi (Brian) H.K.ID: E (2)

Yiu, Siu-Kwan (Ivy) H.K.ID: H (1)

To, Yui-Sang (Roger) H.K.ID: G (1)

2) Planned dates: 26th and 27th October (Tuesday & Wednesday)

or any other dates at your convenience.

Planned time: 9 a.m. to 5 p.m. or any time period at your convenience.

3) Location: Area near Pao Yue-kong Library, or area near Student Canteen (1) or (2),

or any area at your convenience.

4) There won't be any photo-taking or video-taking activities.

5) All interviewers will wear a name-tag.

6) Our mobile phones : 9236-5198 (Brian) 9089-9538 (Roger)

We are willing to offer any information you need to facilitate the process. Your help will be crucial for our success in this research.

Best wishes

Brian

Appendix 11

Approval from H.K. Polytechnic University

On Tue, Oct 5, 2010 at 4:39 PM, Jo CM Leung [CPA]

<Jo.CM.Leung@inet.polyu.edu.hk> wrote:

> Dear Mr Wong,
>
> Thank you for the supplementary information. We are pleased to inform you that your request for conducting a survey with the details and related arrangements listed below and in your letter dated 23 September (copy attached) is accepted. The relevant department of our University, in particular, the University security team, has been informed of the details of your survey. Thank you.
>
> Best regards,
>
> Jo Leung
>
> Assistant Manager, Communications and Public Affairs
>
> Communications and Public Affairs Office
>
> The Hong Kong Polytechnic University
>
> Tel: 2766 5104 Fax: 2364 0246
>
> Email: pajleung@inet.polyu.edu.hk

Appendix 12

Letter to University of Hong Kong for getting access

Brian S. Wong

Flat 2, 10/F Fai Lun House

Siu Lun Court

Tuen Mun, H.K.

brianscw@gmail.com

23rd September, 2010

Communications and Public Affairs Office,

University of Hong Kong,

Fokfulam,

Hong Kong.

Dear sir/ madam

I am a Hong Kong citizen doing a research program with the University of Leicester (U.K.) on metacognition and learning behavior of adult students. My study is focused on university students in Hong Kong and a survey is to be carried out on adult students who

use English as their medium of instruction. The University of Hong Kong is renowned not only for its academic excellence but also its contribution to research. I would appreciate it if I am allowed to come to your campus and conduct the survey on your campus. For this study, no classes will be visited and no special arrangements are needed. The details of my study are as follows:

Methods:

Some of my trained interviewers and the researcher myself will go to some places of the campus, such as entrances of restaurants or places where students are available during school days. The questionnaires will be distributed to students who are voluntary to answer, and the questionnaires will be collected right away on the spot. All participants will be told their right to withdraw anytime without having to give a reason. It needs about 13 minutes to complete the questionnaire. Incentives may be used to boost the return of the questionnaires.

Confidentiality & Ethics considerations: An informed consent form will be attached on top of the questionnaire and the rights of the participants will be explained clearly.

Instruments will be used: Metacognitive Awareness Inventory (MAI) developed by Shraw and Dennison, the Aitken Procrastination Inventory (API) developed by developed by M.Aitken, and a sheet for Demographic information will be included in a set of questionnaire.

Risk assessment: Since the questionnaire is about learning behavior, there is no potential

possibility to trigger memory of adverse experiences. There seem no other obvious hazards.

Dates: Any school days in October or November at your convenience.

Report : All data are in anonymous. However, if the participants would like to know the analysis of the overall data, they are allowed to get access via my email account brianscw@gmail.com . The analysis of the report is also available for your reference.

Your permission is crucial for the success of this research and I would be grateful for it. Look forward to hearing form you.

Attached please find the instruments and the informed consent form.

Best wishes

Brian

(Wong, Brian Shingchi)

Appendix 13

Approval from University of Hong Kong

From: **byyto** <byyto@hkucc.hku.hk>

Date: 2010/10/4

Subject: questionnaire study at HKU

To: brianscw@gmail.com

Dear Mr Wong,

Thank you for your letter to our office. We have no objection to your carrying out your study by handing questionnaires to our students on campus. However, please understand that it doesn't mean that we are endorsing your study nor have we given you an official authorisation for doing the questionnaire. That means if you are questioned, you can say that you have already informed the central administration of HKU that you will be carried out the study on our campus and we have no objection to it based on the fact that it is an academic study. Whether our students would be willing to complete the questionnaire you provide is solely up to individual's decision.

While you are on campus, please observe the rules and regulations on campus, eg, not to block any passage ways or create noise or other disturbance to members of the University etc. If any complaint is received against your activity, you may be asked to terminate it or even leave the premises.

You are free to pick any date within this month or November as they are still within term time. Our best wishes to every success in your study.

Regards,

(Ms) Benny To

Executive (Events)

Communications and Public Affairs Office

Appendix 14 (Whole set of raw data provided as addenda)

Raw scores - Part of data file p.1/32

Hong Kong U data (raw scores - before adjusting the inverted items)

Question No.

Part A	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
1	4	3	3	1	3	3	3	4	2	4
2	2	2	4	2	5	5	5	5	4	5
3	2	3	5	1	1	1	2	1	1	2
4	2	3	4	2	3	3	2	2	2	4
5	4	2	4	1	1	4	4	2	4	4
6	2	4	3	2	3	3	2	4	2	5
7	2	3	4	3	4	3	4	4	5	4
8	4	4	4	3	1	4	3	2	5	3
9	4	3	2	1	2	2	1	4	1	4
10	3	2	1	1	1	2	2	2	4	2
11	2	3	3	3	3	3	4	5	2	3
12	3	2	2	1	2	1	4	1	3	2
13	2	4	2	4	3	4	4	4	4	3
14	4	2	5	5	5	5	2	5	5	4
15	2	4	4	5	5	4	3	4	4	4
16	4	2	3	3	2	4	4	2	2	3
17	4	4	4	4	4	4	4	5	5	4
18	2	3	4	4	4	5	2	4	5	4

19	2	4	3	3	3	3	4	2	3	4
Part B										
1	2	3	5	4	5	4	3	5	3	4
2	2	4	4	4	4	4	4	3	5	4
3	4	3	4	4	5	3	4	4	4	4
4	4	3	4	4	4	4	4	5	4	4
5	4	4	4	3	5	4	4	3	4	4
6	2	3	4	4	5	4	4	2	3	4
7	2	4	3	4	5	5	3	2	3	4
8	2	2	4	4	5	4	4	3	5	4
9	4	4	4	4	5	4	4	5	4	3
10	3	3	4	4	4	4	4	4	5	4
11	2	2	4	4	4	4	4	2	4	4
12	2	2	3	5	4	3	4	4	4	4
13	3	4	4	4	4	4	2	2	5	4
14	2	3	3	3	4	4	4	4	3	5
15	2	5	4	5	4	4	4	5	5	4
16	3	2	3	3	4	3	4	3	4	3
17	4	2	4	4	3	4	3	3	3	4
18	3	4	4	3	4	4	4	3	5	3
19	2	4	4	4	3	4	4	2	4	3
20	3	4	4	3	4	4	3	1	3	4

21	4	4	4	4	3	5	4	1	4	4
22	2	2	3	4	5	4	4	2	5	3
23	2	2	4	4	5	5	4	1	4	3
24	3	3	4	4	4	4	4	1	4	3
25	4	3	4	4	4	4	5	5	5	2
26	4	4	4	3	4	4	4	2	3	4
27	2	3	3	4	4	4	4	2	5	4
28	2	2	4	4	4	4	4	2	4	3
29	3	4	4	3	3	3	2	2	5	3
30	4	4	3	4	4	4	4	5	4	4
31	4	2	4	3	3	4	4	3	5	4
32	3	2	3	4	4	4	4	3	4	4
33	2	3	4	3	4	3	3	2	5	4
34	4	2	4	3	4	4	4	2	4	3
35	3	3	4	3	3	3	4	2	4	3
36	2	3	4	4	5	4	4	2	4	2
37	4	4	5	2	5	4	4	5	3	2
38	2	2	3	4	4	4	4	1	4	4
39	4	4	4	4	5	4	4	5	5	3
40	3	4	4	4	4	4	4	2	4	3
41	2	4	3	5	5	4	4	5	4	4
42	4	2	2	4	4	4	4	5	4	4
43	4	4	3	4	4	4	5	5	4	4

44	4	4	4	5	4	4	4	3	5	4
45	2	2	4	4	4	3	2	3	5	4
46	5	5	4	5	5	4	3	5	4	5
47	2	3	4	5	4	4	2	5	5	3
48	4	5	3	3	5	3	2	4	3	4
49	3	2	4	4	4	4	4	1	4	4
50	2	4	4	3	4	4	4	1	4	3
51	4	4	5	4	4	4	4	5	5	4
52	5	4	5	4	5	5	4	4	5	4

Personal Particulars and G.P.A.

1 Gender	f	f	f	f	m	f	f	m	m	m
2 years	3	3	3	4	3	3	3	4	4	4
3 age	23	23	21	26	22	21	21	23	24	24
4 G.P.A.	2.67	2.27	2.88	3.7	2.17	3.48	3.21	2.8	2.62	2.54
5 Major	s	n	n	s	n	a	s	s	s	s
6 under/post	u	u	u	p	u	u	u	u	u	u

* m=male ; f=female

n=natural sciences ; s=social sciences ; a=arts(humanities)

u=undergraduate ; p=postgraduate

API-adjusted	66	53	48	43	37	47	55	42	49	46

DK	27	24	29	31	33	30	29	26	31	32
PK	10	12	14	14	17	14	15	12	17	17
CK	15	20	20	17	18	18	18	14	22	17
P	18	16	25	28	32	28	26	21	30	26
IMS	35	38	37	38	44	39	35	44	42	35
M	19	19	29	27	28	29	27	16	28	26
D	20	19	22	21	21	21	21	19	24	17
E	13	20	22	23	25	25	23	9	23	19
Knowledge of Cognition										
	52	56	63	62	68	62	62	52	70	66
Regulation of Cognition										
	105	112	135	137	150	142	132	109	147	123
Total of Metacognitive Awareness										
	157	168	198	199	218	204	194	161	217	189