Faculty of Cognitive Sciences and Human Development

RELATIONSHIP BETWEEN MATHEMATICS SELF-EFFICACY (MSE) AND MATHEMATICS SELF-REGULATED LEARNING STRATEGIES (MSRLS) AMONG SECONDARY SCHOOL STUDENTS

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The research paper entitled 'Relationship between Mathematics Self-Efficacy (MSE) and Mathematics Self-Regulated Learning Strategies (MSRLS) Among Secondary School Students' was prepared by Chung San San and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfilment of the requirements for Master of Science (Learning Sciences).

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Statement of Originality

The work described in this Research Paper, entitled **"Relationship between Mathematics Self-Efficacy (MSE) and Mathematics Self-Regulated Learning Strategies (MSRLS) Among Secondary School Students"** is to the best of the author's knowledge that of the author except where due reference is made.

No part of this work has been submitted in support of an application for a degree or qualification of this or any other university or educational establishment. However, some parts of this work have been published in co-authorship with Prof. Dr. Hong Kian Sam in the following paper:

1) Chung, S. S., & Hong, K. S. (2014). Mathematics self-efficacy and mathematics self-regulated learning strategies among secondary school students. In L. Law, M. H. Hashim, J. L. A. Cheng, & A. Annuar (Eds.), *PIXELS Volume III: Evolution of learning* (pp. 1-14). Kota Samarahan, Sarawak: Lee Ming Press.

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LIST OF ABBREVIATIONS

MSE	Mathematics Self-Efficacy
MSRLS	Mathematics Self-Regulated Learning Strategies
OECD	Organisation for Economic Cooperation and Development
PISA	Programme for International Student Assessment
SISC	School Improvement Specialist Coaches
SPSS	Statistical Packages for the Social Science

ABSTRACT

RELATIONSHIP BETWEEN MATHEMATICS SELF-EFFICACY (MSE) AND MATHEMATICS SELF-REGULATED LEARNING STRATEGIES (MSRLS) AMONG SECONDARY SCHOOL STUDENTS

Chung San San

Mathematics Self-Efficacy (MSE) is an individual's confidence towards accomplishments of a variety of tasks, ranging from understanding of concepts to problem solving in mathematics. Mathematics Self-Regulated Learning Strategies (MSRLS) is an academically effective form of learning, through which the learner sets the goals; monitors and regulates his or her cognition, motivation and behaviour during the learning process. This research highlights the importance of MSE, MSRLS and the relationship between MSE and MSRLS in teaching and learning of mathematics in school. In addition, the differences in MSE and MSRLS between gender and academic stream are also discussed. The samples in this study consisted of 211 students from Form Four Science and Arts Classes at two secondary schools, Lundu Secondary School and Sematan Secondary School in Lundu, Sarawak. Two research instruments were used to collect data in this study namely Students' Mathematics Self-Efficacy (MSE) and Students' Mathematics Self-Regulated Learning Strategies (MSRLS). This study was conducted using a *Cross-Sectional Survey* research design. Independent samples t-tests were used to determine the differences in MSE and MSRLS based on gender and academic stream. Pearson's Moment Correlation Coefficients (r) were used to measure the relationships between MSE and MSRLS. The finding from the present study reported no significant difference in MSE and MSRLS based on gender. In addition, finding indicated students' MSE did not differ significantly between science and arts stream. Nevertheless, there was significant difference in MSRLS based on academic stream. Furthermore, positive and strong relationships were found between MSE and MSRLS.

Keywords: Mathematics Self-Efficacy (MSE) and Mathematics Self-Regulated Learning Strategies (MSRLS)

ABSTRAK

HUBUNGAN ANTARA EFIKASI-KENDIRI MATEMATIK (MSE) DAN STRATEGI PEMBELAJARAN REGULASI-KENDIRI MATEMATIK (MSRLS) DI KALANGAN PELAJAR SEKOLAH MENENGAH

Chung San San

Efikasi-Kendiri Matematik (MSE) ialah keyakinan individu terhadap pencapaian pelbagai tugasan yang merangkumi pemahaman konsep dan penyelesaian masalah dalam matematik. Strategi Pembelajaran Regulasi-Kendiri Matematik (MSRLS) ialah bentuk pembelajaran akademik yang berkesan di mana pelajar menetapkan matlamat, memantau dan mengawal kognisi, motivasi dan tingkah lakunya semasa dalam proses pembelajaran. Kajian ini menekankan kepentingan MSE, MSRLS dan hubungan antara MSE dan MSRLS dalam pengajaran dan pembelajaran matematik di sekolah. Di samping itu, perbezaan dalam MSE dan MSRLS berdasarkan jantina dan aliran akademik turut dibincangkan. Sampel dalam kajian ini terdiri daripada 211 orang pelajar Tingkatan Empat aliran Sains dan aliran Sastera di kedua-dua buah sekolah menengah yakni Sekolah Menengah Lundu dan Sekolah Menengah Sematan di Lundu, Sarawak. Dua instrumen kajian yang digunakan untuk mengumpul data dalam kajian ini ialah Soal Selidik terhadap Efikasi-Kendiri Matematik (MSE) dan Soal Selidik terhadap Strategi Pembelajaran Regulasi-Kendiri Matematik (MSRLS) di kalangan para pelajar. Kajian ini dijalankan dengan menggunakan reka bentuk Survei Keratan Rentas. Ujian-t sampel tidak bersandar digunakan untuk menentukan perbezaan dalam MSE dan MSRLS berdasarkan jantina dan aliran akademik. Ujian Pekali Korelasi Pearson (r) telah digunakan untuk mengukur dan menilai hubungan antara MSE dan MSRLS. Dapatan kajian menunjukkan tiada perbezaan yang signifikan antara MSE dan MSRLS berdasarkan jantina. Hasil kajian juga menunjukkan tiada perbezaan yang signifikan dalam MSE pelajar berasaskan aliran Sains dan aliran Sastera. Namun begitu, terdapat perbezaan yang signifikan dalam MSRLS berdasarkan aliran akademik. Selain itu, hubungan korelasi positif yang kuat antara MSE dan MSRLS didapati dalam kajian ini.

Katakunci: *Efikasi-Kendiri Matematik (MSE) and Strategi Pembelajaran Regulasi-Kendiri Matematik (MSRLS)*

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter is divided into nine main sections. Section 1.1 discusses the background of the study. Section 1.2 provides the problem statement of this study. Section 1.3 lists the research objectives of the study. Section 1.4 provides the research questions of the study. This is followed by Section 1.5 which discusses the research hypotheses of the study. The next section, Section 1.6 gives an overall view of the research through the research framework of the study. Section 1.7 provides the meanings and definitions of the relevant terms used in this study. Section 1.8 discusses the significance and the importance of the study. This is then followed by Section 1.9, which lists the limitations of this study. Lastly, Section 1.10 summarizes the chapter.

1.1 Background of the Study

Mathematics is important to prepare the learners to cope with the demands of a progressive nation towards various developments in science and technology. As a field of study, mathematics trains our minds to think systematically and logically in making decisions and solving problems. This discipline promotes meaningful learning and challenges the mind of the learner, and therefore contributes towards an individual's holistic development. Additionally, mathematics is essential to solve problems in everyday life (Mohamed & Waheed, 2011).

Aligned with the National Education Philosophy, the mathematics curriculum provides opportunities for learners from different backgrounds and levels of abilities to acquire mathematical knowledge and skills. Learners are then able to seek relevant information, and be creative in formulating solutions and alternatives when facing challenges (Curriculum Development Centre, 2013).

In Malaysia, mathematics is a mandatory subject in the curriculum. It is compulsory for primary and secondary schools and it is compulsory for external examinations such as Ujian Pencapaian Sekolah Rendah (UPSR), Penilaian Menengah Rendah (PMR) and Sijil Pelajaran Malaysia (SPM). The recent 2013 SPM examination results showed improvement for all subjects except mathematics. Thus, the education ministry intended to conduct a detailed study to identify the reasons behind the weak performances in mathematics in the 2013 SPM examinations by taking into account of the role of the teachers as well as the subject content (Mustafa & Wong, 2014). This is important as mathematics serves as a foundation for the

learners who intend to pursue their studies in science, computer science, engineering, architecture, medicine and other related fields.

In addition to that, global tests revealed that our secondary schools students did not perform to the expected level. Malaysian students scored below the global average of the Programme for International Student Assessment (PISA) 2012. According to the results released by the Organisation for Economic Cooperation and Development (OECD), Malaysia scored 421 in Mathematics which is below the global average score of 494. Malaysia is still placed in the bottom third, ranking 52 out of 65 countries based on the mean score for 2012. PISA 2012 reported that Mathematics Self-Efficacy (MSE) functions as an important element that reflects students' performance in mathematics (OECD, 2013).

Thus, MSE can be defined as an individual's beliefs on his or her abilities in mathematics (May, 2009). MSE has been found to be a better predictor of mathematics performance than mathematics self-concept, mathematics anxiety or prior experience and it has a powerful direct effect on mathematics performance (Nuruddin, Tong, Moo, & Yap, 2008). Liu, Hsieh, Cho and Schallert (2006) found Self-Efficacy (SE) to be a statistically significant predictor of achievement in a study investigating the relationships among students' SE, attitude towards science and achievement. Likewise, students with higher MSE persist longer on difficult mathematical problems and are more accurate in computations than those having lower MSE (Hoffman & Schraw, 2009). According to Fast, Lewis, Bryant, Bocian, Cardullo, Rettig, and Hammond (2010), one way to increase scores on standardised mathematics tests is to increase students' SE, and teachers can positively influence MSE by creating a challenging, caring and mastery-oriented classroom environment.

In addition, self-regulated learning strategies (SRLS) are important in solving mathematical problems (Marchis & Balogh, 2010). Some of the important SRLS include SE, self-reaction, self-monitoring, self-control, self-judgment, and perception of task difficulty. Furthermore, self-regulated learners tend to take on challenging tasks, develop a deep understanding of subject matter and exert effort will promote success in school (Perry, Phillips & Hutchinson, 2006).

Moreover, many researchers have investigated the relationship between gender and MSE. It is in the area of mathematics where even more emphasis is placed on gender in SE studies, possibly because of the valued role that mathematics plays in academia, high-stakes examinations for scholarships and admissions, and the filtering of students in highly specialized and technical jobs (Pajares, 2005). Many studies have shown that perceived academic efficacy plays an influential role in students' academic choices and their school success (Schunk & Pajares, 2005).

According to Goodwin, Ostrom, and Scott (2009), high SE could make a substantial difference for students in undergraduate mathematics. Better understanding of the relationship between gender and MSE would help teachers to be more effective in their classroom management as well as assessment. Additionally, Zimmerman and Schunk (2003, cited in Goodwin et al., 2009) suggested that teachers who consider their students' SE beliefs, strategy use, goal setting, and other forms of SRLS in their instructional plans not only improve students' academic knowledge, but they also enhance students' capability for self-directed learning throughout their life span (p. 452). Thus, it is important for teachers to know the level at which a student performs in order to better understand his or her perceptions of own performances.

1.2 Statement of the Problem

There is a need to explore the relationship between MSE and MSRLS among secondary school students. This is required as the past decade; there are accumulating evidences that MSE and MSRLS are correlated (Abdullah, Abu Bakar, Roslan, Wong & Abd Rahman, 2006; Al-Harthy & Was, 2010; Bouffard-Bouchard, Parent & Larivee, 1991; Kitsantas & Zimmerman, 2009). Additionally, Spence and Usher (2007) suggested MSE to be among the most significant predictors of mathematics achievement. Similarly, MSRLS has been found to be positively correlated to achievement (Pintrich & De Groot, 1990). Therefore, this study aimed to look at the relationship between MSE and MSRLS among secondary school students and investigated the relationships in MSE and MSRLS based on gender and academic stream.

1.3 Research Objectives

The main objective of this study was to determine whether there was a relationship between MSE and MSRLS among secondary school students. Based on the statement of the problem, the following were the research objectives of the study:

RO1 - To determine the significant differences in MSE based on demographic variables.

- To determine the significant differences in MSE based on gender.
- To determine the significant differences in MSE based on academic stream.

RO2 - To determine the significant difference in MSRLS based on demographic variables.

- To determine the significant differences in MSRLS based on gender.
- To determine the significant differences in MSRLS based on academic stream.

RO3 - To determine the significant relationship between MSE and MSRLS.

1.4 Research Questions

The following research questions were investigated in this study based on the research objectives stated previously:

RQ1 - Were there any significant differences in MSE based on demographic variables?

- Was there a significant difference in MSE based on gender?
- Was there a significant difference in MSE based on academic stream?

RQ2 - Were there any significant differences in MSRLS based on demographic variables?

- Was there a significant difference in MSRLS based on gender?
- Was there a significant difference in MSRLS based on academic stream?

RQ3 - Was there a significant relationship between MSE and MSRLS?

1.5 Research Hypotheses

Based on the research questions, the following were the research hypotheses of the study:

$H_0$1 - There were no significant differences in MSE based on demographic variables.

- There was no significant difference in MSE based on gender.
- There was no a significant difference in MSE based on academic stream.

$H_0$2 - There were no significant differences in MSRLS based on demographic variables.

- There was no significant difference in MSRLS based on gender.
- There was no significant difference in MSRLS based on academic stream.

$H_0$3 - There was no significant relationship between MSE and MSRLS.

1.6 Research Framework

The research framework of the research is shown in Figure 1.1.

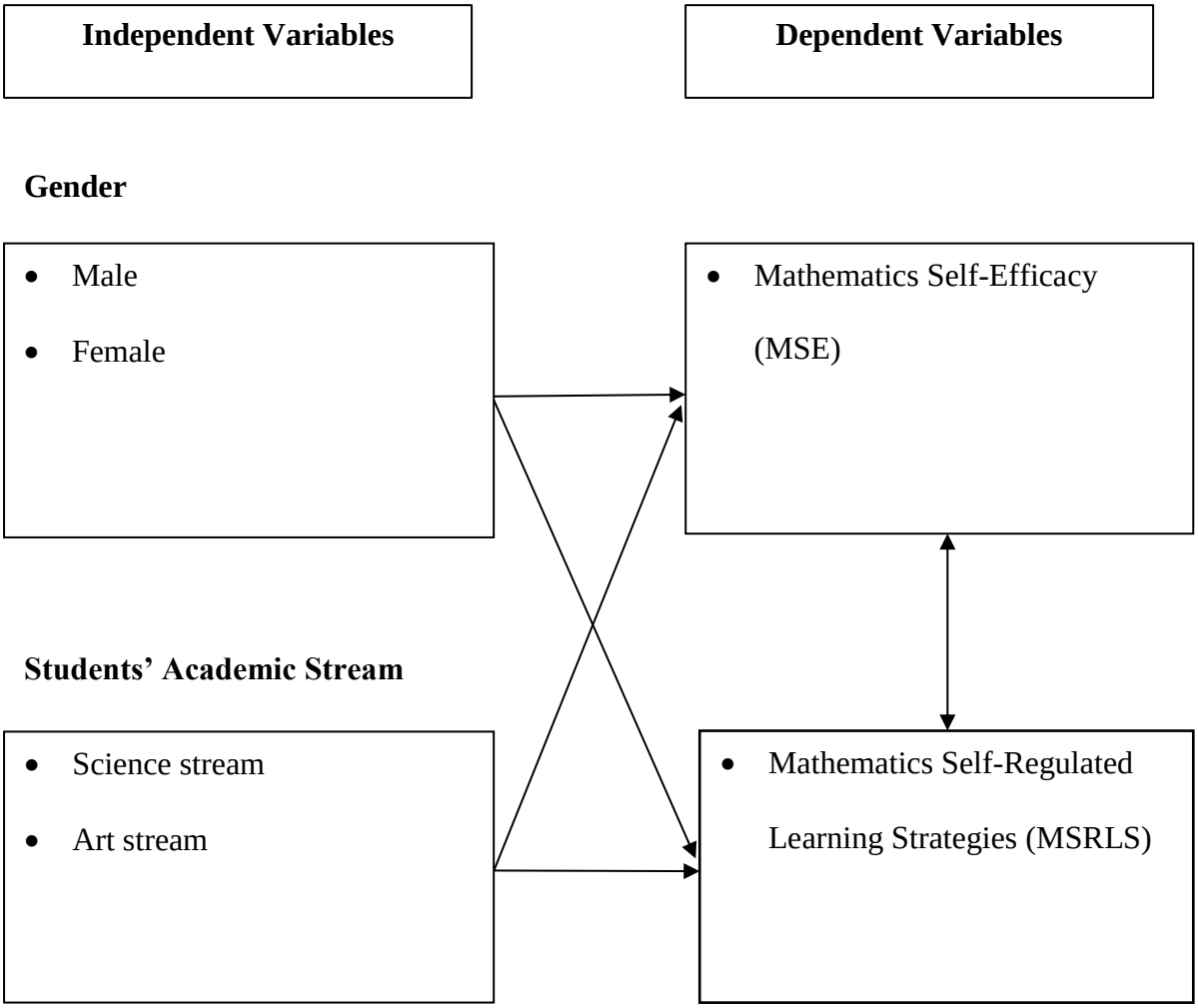

Figure 1.1. Research framework guiding the study

1.7 Definitions of Terms

For the purpose of this study, the following definitions of terms were used.

1.7.1 Mathematics Self-Efficacy (MSE)

According to Clutts (2010, p. 13), MSE is defined as "a situational assessment of an individual's confidence in her or his ability to successfully accomplish a specific mathematical task".

For the purpose of the present study, MSE was defined as Form Four secondary school students' judgments of their capabilities towards completing variety of tasks, ranging from concepts understanding to problem solving. Therefore, MSE in this study focused on how students believed in their abilities to meet the mathematics learning objectives.

1.7.2 Mathematics Self-Regulated Learning Strategies (MSRLS)

According to Cheng (2011), MSRLS refers to a process in which learners think, feel and act on their own initiative in order to achieve specific learning goals.

Significantly for this study, Form Four secondary school students implemented strategies by which they chose, used, monitored and adjusted learning strategies and employed the strategies in order to achieve learning goals during a mathematics lesson. The process involved: (a) learning motivation, (b) action control, (c) goal setting and; (d) learning strategies.

1.7.3 Academic Stream

According to Zittleman and Sadker (2006), academic stream is defined as separation of students based on their abilities into classes within a school. Thus, students are assigned to classes based on their overall achievement.

In this study, academic stream consisted of Form Four secondary school students from both Science stream and Art stream, in which students who scored above a certain cut-off points in PMR exams were assigned into the Science stream and those who scored below the cut-off points were assigned into the Art stream.

1.8 Significance of the Study

Research investigating MSE and MSRLS of secondary school students is still lacking in Malaysia. Therefore, the findings of this study would provide an insight on the relationship between MSE and MSRLS of secondary school students. In addition, this study determined whether gender and academic stream influenced MSE and MSRLS.

Besides, this study also suggested guidelines to improve students' mathematics performance by looking at students' MSE and MSRLS. The data collected from this research could be used by the Ministry of Education in preparing guidelines to promote and create policies that can improve mathematics achievement among learners.

Moreover, this study would also help to create awareness among mathematics teachers by tailoring their teaching to enhance MSE and MSRLS among the students. They could make use of the findings of this study to determine students' level of MSE and MSRLS. This would ensure that the Malaysia education system would keep pace with Shanghai, Singapore and Hong Kong which were ranked in the top three highest for mathematics in the global test, PISA 2012.

The findings of the study could also be used as references for future researchers who would like to conduct further investigations on the relationship between MSE and MSRLS among secondary school students. It would provide a basis for understanding of how MSE is related with MSRLS.

1.9 Limitations of the Study

The respondents in this study were Form Four secondary schools students and considering the fact that these students were from only four selected classes (two science classes and two art classes), the result of the study might not be representative of the entire population of Form Four secondary schools students in the country.

Besides that, the research was conducted in only two schools involving Lundu Secondary School and Sematan Secondary School at Lundu district. As the two schools were from the same division, Lundu, they could have similar learning culture and environment. Thus, the result of the study might not accurately reflect the existing conditions of all schools in Malaysia.

Furthermore, the demographic variables of this study were also limited to gender and academic stream which could influence MSE and MSRLS. Other factors such as past learning experiences, academic background and ethnic groups which might bring impact on secondary school students' MSE and MSRLS were not considered in this study. Also, there were limitations in the ratio of male respondents to female respondents in this study. There were more female respondents (128) compared to male respondents (83) for this study. The bias in genders might have influenced on the findings.

In addition, this study only used questionnaires to collect the required data. Other sources of data such as observations, interviews and documents analyses which were excluded in this study might be able to provide additional data that could give better understanding of the problems investigated in the study.

1.10 Summary

This chapter discussed the background of the study, problem statement of the study, research objectives, research questions, research hypotheses and research framework of the study. It concluded with the significance and limitations of the study and defined the conceptual and operational definitions of important terms used in the study. The next chapter discusses the literature review and past research relevant to the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is divided into six main sections. Section 2.1 describes Mathematics Self-Efficacy (MSE) among students including the definitions, measurement of MSE and the findings from the past research. The next section, Section 2.2 gives a brief definition about learners' Mathematics Self-Regulated Learning Strategies (MSRLS), technique to measure students' MSRLS and discusses the studies that have been done on students' MSRLS. Section 2.3 discusses the gender differences between MSE and MSRLS, followed by Section 2.4 which provides the relationship between academic stream and MSE, and relationship between academic stream and MSRLS. Section 2.5 examines the relationship between MSE and MSRLS. Lastly, Section 2.6 summarizes the literature review and how it contributed to the study.

2.1 Mathematics Self-Efficacy (MSE)

MSE has been found to be a better predictor of mathematics performance than mathematics anxiety, mathematics self-concept, prior experience, or perceived usefulness of mathematics and it has a powerful direct effect on mathematics performance (Nuruddin et al., 2008). MSE is defined as an individual's beliefs in his or her abilities in mathematics (May, 2009). In other words, MSE is an individual's confidence towards accomplishments of variety of tasks, ranging from concepts understanding to problem solving. Similarly, MSE can be defined as "individuals' judgments of their capabilities to perform mathematics-related tasks and solve particular mathematical problems" (Nuruddin et al., 2008, p. 7).

According to Clutts (2010, p. 13), MSE is defined as "a situational assessment of an individual's confidence in her or his ability to successfully accomplish a specific mathematical task". Thus, MSE is related to how students believe in their abilities to meet the mathematics learning objectives. While better performance in mathematics gives rise to higher levels of MSE, students with low MSE are more susceptible to underperforming in mathematics (Schunk & Pajares, 2009). Similarly, students who have lower levels of SE are less likely to be motivated in learning or regulate their achievement behaviours (Klassen & Usher, 2010).

Many research suggested that students with higher levels of SE tend to be more motivated to learn than their peers and are more likely to persist longer when faced with challenges (Zeldin, Britner & Pajares, 2008). Although the development of SE is not fully understood, researchers have consistently confirmed Bandura's (1997) four main sources of SE as: (a) vicarious experiences, (b) mastery experiences, (c) physiological states, and (d) social

persuasion, which involve emotional and physiological readiness of the individual to undertake a specific task (Usher & Pajares, 2009). In a study on designing a scale to explore MSE, Usher and Pajares (2009) found that "perceived mastery experience is a powerful source of students' MSE. Students will experience an increase in their efficacy beliefs when they feel that they have mastered the skills and accomplished challenging assignments" (p. 100).

The most common measure for MSE is the MSE Scale (MSES) (Betz & Hackett, 1983). This scale was originally developed to explore gender differences in MSE and how these differences affect students' career choices. Three main domains involved in studying MSE include solving mathematics problems, obtaining good grades in mathematics courses, and using mathematics in everyday tasks.

Other measure for MSE includes the revised version of the MSES, referred to as the MSE Scale-Revised (MSES-R) (May, 2009). The items on the MSES-R were taken from the original MSES, but the mathematical problems were replaced by problems from algebra, arithmetic, and geometry taken from the Mathematics Confidence Scale. It is important for the researchers to consider the multiple factors involved when assessing a student's level of MSE to avoid misjudgements.

Additionally, Spence and Usher (2007) suggested MSE to be among the most significant predictors of mathematics achievement. Clutts (2010) found that SE (along with achievement) predicted mathematics grades while SE (along with outcome expectations) predicted enrolment intentions and academic interests. Similarly, higher levels of mathematics efficacy positively predicted mathematics performance (Fast et al., 2010).

2.2 Mathematics Self-Regulated Learning Strategies (MSRLS)

MSRLS is an academically effective form of learning, through which the learners set goals and make plans before starting to learn, regulate and monitor his or her behaviour, cognition and motivation during the learning process; and reflect on his or her learning process in mathematics (Zimmerman, 2001).

Furthermore, self-regulated learners tend to take on challenging tasks, develop a deep understanding of subject matter, practice their learning, and exert effort will contribute towards academic success (Perry et al., 2006). According to Marchis and Balogh (2010), self-regulated learners analyse the task, solve the problem and evaluate their performance. Some of the important SRLS skills include SE, self-control, self-monitoring, self-reaction, and self-judgment. These skills are pivotal for solving challenging mathematical problems.

Cheng (2011), on the other hand, defines SRLS as a process in which learners think, feel and act on their own initiative in order to achieve specific learning goals. In other words, learners implement strategies by which they choose, use, monitor and adjust learning strategies and employ the strategies to control action in order to achieve learning goals. The process involves (a) goal setting, (b) action control, (c) learning motivation, and (d) learning strategies. These four components are assumed to be the predictive factors for students' performance.

Marchis and Balogh (2010) conducted a study on two hundred and fifty-eight secondary school students ranging from ten to fifteen years old on their MSRLS skills (self-judgement, self-efficacy, self-reaction) and their interest in studying mathematics. The research tool used

was a questionnaire with fifteen items for inquiring learners' SRLS skills measured on a 5 point Likert scale from 1 for strongly disagree to 5 for strongly agree. The results showed that only 34.15% of the students liked mathematics whereas 31.78% of the students disliked mathematics because they failed to see the links between mathematics and their everyday life. Almost half of the students (43.03%) thought that they were not good in mathematics, indicating their MSE beliefs were low. More than half of the students (57.75%) believed that their mathematical grades were strongly correlated with the efforts they put in learning mathematics, indicating their self-judgement levels were high.

Apart from that, Puteh and Ibrahim (2010) investigated MSRLS among Form Four students in solving mathematical problems in Perak, Malaysia. A case study was used to determine the use of MSRLS among the students and how it helped them in solving problems. In addition, students' level of motivation was also measured. Data were collected using the Motivated Learning Strategies Questionnaire-Revised (MSLQ-R), reviewing of written answers of students in tests and interviews. Findings from this research suggested that students' performance in problem-solving was strongly related with MSRLS.

Additionally, Cheng (2011) explored the relationship between students' SRLS and their learning performance. In Cheng's study, SRLS was conceptualised by four variables: goal setting, learning strategies, action control and learning motivation. A total of 6,524 students attending government-aided secondary schools in Hong Kong took part in the questionnaire survey. Multiple regression analysis was applied to explore the relationship among the four variables. The findings revealed that students' learning performances was closely related to the four variables of SRLS. Self-regulated learners optimised their learning strategies through

continuous self-assessment of their learning efficacy. Thus, it is crucial for teachers to develop students' SRLS in order to enhance their learning performance.

Moreover, SRLS has been found to be positively correlated to achievement, with highly self-regulated learners being more motivated to use organisational, planning, and self-monitoring strategies than low self-regulated learners (Pintrich & De Groot, 1990). Conversely, Mousoulides and Philippou (2005) found that SRLS had a moderate negative effect on mathematics achievement.

2.3 Gender, MSE and MSRLS

Researchers have also been interested in gender differences in MSE. Unfortunately, research findings have been inconclusive regarding these differences. Some researchers have found a significant difference in MSE between male and female students, with males demonstrating significantly higher levels of MSE than females (Pajares & Miller, 1994). These researchers suggested that females' lower levels of MSE were a result of commonly held beliefs that mathematics is a male-dominated field or that females are typically not good at mathematics. These beliefs lead female students to think that they could not be good at mathematics, irrespective of their actual abilities. Nevertheless, Nuruddin et al. (2008) and May (2009) found that there were no significant difference for MSE and gender.

On the other hand, Azizi and Pachi (2013) compared SRLS between male and female students in a Bachelor of Science degree programme at University of Mysore, India. The Motivational Strategies for Learning Questionnaire (MSLQ) was given to two hundred and fifty-four students to measure the SRLS and the data were analysed using independent

samples t-test. Findings indicated that there were significant differences between males and females in total SRLS scores. In addition, the mean scores of females were higher compared to males reflecting that females were better than males in using SRLS. Hence, this finding concurred with Saad, Boroomand, and Abbasnasab's (2012) findings on the effect of gender on the use of SRLS.

Moreover, Bezzina (2010) conducted a study to investigate gender differences in SRLS and in mathematics performance in Malta. A representative sample of four hundred students (aged fourteen to fifteen) from Maltese mixed-ability schools undertook a mathematics examination and responded to a SRLS questionnaire. Results showed that females performed significantly better than males, and this difference was mainly due to the weaker performance of low-achieving male students. While all SRLS components produced a significant main effect on performance, male students claimed to be more intrinsically motivated and self-efficacious while females reported greater use of SRLS.

2.4 Academic stream, MSE and MSRLS

MSE helps to predict students' career choices and college major (Lent & Brown, 2006), and it is also linked with key motivation constructs such as achievement goal orientation, anxiety, self-concept and value. Students with high SE monitor their work time more effectively, solve problems with higher efficiency, and tend to persist longer compared with students with lower SE. Similarly, they work harder, monitor their progress more frequently, and engage in more SRLS that contribute towards academic success (Schunk & Pajares, 2005). Liu et al. (2006) conducted a study that implemented a computer-enhanced problem-based learning

environment to investigate the relationships among students' SE, attitude towards science and achievement. They found SE to be a statistically significant predictor of achievement.

Moreover, a study had been carried out to investigate the learning styles and SRLS for Computer Science students (Alharbi, Paul, Henskens, & Hannaford, 2011). The study included an analysis of the SRLS used by students, and it found out that metacognitive strategies, which were the least used by the students, were significantly correlated with many of the other strategies. This suggests that students are not aware of important self-regulated learning strategies.

2.5 MSE and MSRLS

Several studies have been conducted to investigate the relationship between MSE and MSRLS. Abdullah et al. (2006) conducted a study to identify the relationships between SRLS and selected motivational beliefs, namely, SE, control beliefs, and anxiety among Malaysian students. A total of three hundred and twenty-two students from two secondary schools were involved in this research: 260 students from Sekolah Menengah Sains (SMS) Muar, Johor, and 62 students were from SMS Muzaffar Shah, Malacca. The Learning Strategies Subscale was used to measure students' SRLS whereas their SE, anxiety, and control beliefs were measured by the Motivation Subscale. Both of these subscales were taken from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Gracia, & McKeachie, 1991, cited in Abdullah et al., 2006) and the results showed that SE ($r=0.56$, $p<0.01$) and control beliefs ($r=0.33$, $p<0.01$) were positively and significantly related to SRLS. The strength of the correlation between SE and SRLS was large.

In addition, Bouffard-Bouchard et al. (1991) investigated the influence of SE on SRLS during a verbal concept formation task involving forty-five juniors high-school and forty-four seniors with average or above average cognitive ability. SE was measured by asking the students to state whether they believed they would be able to solve four problems of varying difficulty. For instance, if the students responded "Yes", they also had to indicate the corresponding level of difficulty for each problem. While students worked on the problems, certain criteria were observed to operationalise SRLS and performance. Findings indicated that SE had a significant influence on the occurrence of various aspects of SRLS. To illustrate, students with high SE were better at monitoring their working time, more persistent, and better at solving conceptual problems than students with low SE of equal ability. Earlier research suggested that SE has a stronger effect on academic performance than other motivational variables, such as SRLS (Kitsantas & Zimmerman, 2009). Research has also indicated that SE has significant influence on SRLS processes, such as self-monitoring, self-judgment and self-reaction (Al-Harthy & Was, 2010).

2.6 Summary

This chapter covered some of the literature on the subject of MSE, MSRLS, differences in MSE and MSRLS based on demographic or independent variables (gender and academic stream) and the relationship between MSE and MSRLS. The demographic variables investigated in this study were formulated based on the literature review to enable the researcher to gain a deeper understanding on the relationship between MSE and MSRLS among secondary school students.

MSE is important for teaching and learning of mathematics in school. MSE is considered as one of the most significant predictors of mathematics achievement (Spence & Usher, 2007). Students with higher MSE tend to persist longer on difficult mathematical problems than those having lower MSE (Hoffman & Schraw, 2009). Likewise, MSRLS is important for teaching and learning of mathematics in school. Self-regulated learners optimised their learning strategies through continuous self-assessment of their learning efficacy (Cheng, 2011).

In addition, previous findings indicated that MSE and MSRLS are strongly correlated (Bouffard-Bouchard et al., 1991; Abdullah et al., 2006; Al-Harthy & Was, 2010). The researchers found that SE had a significant influence on the occurrence of various aspects of SRLS. For instance, students with high MSE are more persistent and better at solving conceptual problems than students with low SE of equal ability.

On the other hand, there exists inconsistency with respect to the findings of difference between MSE and gender. Earlier findings indicated that there is significant difference between MSE and gender with males demonstrating significantly higher levels of MSE than females (Pajares & Miller, 1994). However, the recent findings showed that there was no significant difference in MSE between gender (May, 2009; Nuruddin et al., 2008).

Additionally, researchers found that there was a significant difference in MSRLS for gender, with females demonstrating higher SRLS compared to males (Azizi & Pachi, 2013; Bezzina, 2010). Teachers can tailor their teaching by assisting students to set up specific and feasible learning goals, guiding them to choose appropriate learning strategies, helping them learn to

accurately self-monitor the learning process, and promoting positive attitudes towards learning outcomes to narrow the gap between females and males in MSRLS.

To conclude, this chapter has addressed a number of significant issues which show the importance of MSE and MSRLS for teaching and learning of mathematics in school. Thus, it is important for teachers to develop students' MSE and MSRLS in order to enhance their learning performance in mathematics. However, as there are insufficient findings to show the difference in MSE and MSRLS between academic streams, more research is needed to study the differences in this field.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter consists of nine sections. Section 3.1 discusses the research design used in this study. Section 3.2 describes the research samples of the study. Section 3.3 provides the description of the instruments and materials used in the research. This is followed by Section 3.4, which explains the pilot study. Section 3.5 provides the data collection procedures of the study. Section 3.6 gives an overall view of the data analysis procedures. Section 3.7 discusses the ethical issues in the study. Section 3.8 explains the threat to the internal and external validity. Section 3.9 provides the summary of the chapter.

3.1 Research Design

This study was conducted using a *Cross-Sectional Survey* research design to identify the relationship between Mathematics Self-Efficacy (MSE) and Mathematics Self-Regulated Learning Strategies (MSRLS) among secondary school students. Gender (male and female) and academic stream (Science stream and Art stream) were the demographic and independent variables in this study whereas the dependent variables of the study were MSE and MSRLS respectively.

In addition, data was collected using simple random sampling by identifying the studied population or the targeted secondary schools that reflected the research problem. Besides that, the desired data was collected at just one point in a time-frame and the time used to collect all of the information may range from a day to a few weeks (Fraenkel & Wallen, 1993).

Cross-Sectional Survey with correlational research was used in this study to determine the extent to which the variables gender, academic stream, MSE and MSRLS were related.

Furthermore, this study used comparative research design to compare two or more groups on one variable. It was used to determine whether there were significant differences in MSE and MSRLS based on both gender and academic stream for Form Four secondary school students.

3.2 Research Samples

The respondents for this study were 211 students from Form Four Science and Art classes at two secondary schools, Lundu Secondary School and Sematan Secondary School in Lundu,

Sarawak. Four classes were selected from each school and each class consisted of students with different demographical backgrounds (gender, race, academic stream and academic achievement). In terms of similarity in the demographical background, all the Form Four Mathematics classes in the two schools were taught using Bahasa Malaysia and the students used the same mathematics text books when they learned the mathematics topics in class.

3.3 Research Instrument

Data in this study was collected using a survey questionnaire. The questionnaire consisted of three main sections: Section A *(Students' background),* Section B *(Students' Mathematics Self-Efficacy)* and Section *C (Students' Mathematics Self-Regulated Learning Strategies).*

Section A gathered information on the students' demographics such as gender, race, age, academic stream and second semester mathematics test results.

Section B measured *Students' Mathematics Self-Efficacy* and was adapted from May's (2009) study which assessed students' confidence in their abilities to accomplish various mathematical tasks. All the 11-items in this section used a five-point Likert scale from 1=*'Strongly Disagree'* to 5=*'Strongly Agree'*. For each of the items, the students had to choose the responses from Strongly Disagree, Disagree, Not Sure or Neutral, Agree, and Strongly Agree.

Section C measured *Students' Mathematics Self-Regulated Learning Strategies* and was adapted from the instrument used in Liu and Lin's (2010) study. Likewise, all the 19-items in

this section used a five-point Likert scale from 1=*'Strongly Disagree'* to 5=*'Strongly Agree'.* The questionnaire used is shown in Appendix A and B.

3.4 Pilot Study

For this study, a pilot study was conducted on the 8th to 10th October 2014. The rationale of doing the pilot study was to determine the reliability of the research instrument (questionnaire) and to improve them before conducting the actual research. A total of 31 Form Four secondary school students were chosen from a class in Lundu Secondary School, Sarawak to participate in this pilot study. The pilot test was conducted to test the reliability of the questionnaire which was then computed using the Cronbach's Alpha Coefficients to measure the consistency of the research instrument (Fraenkel & Wallen, 1993). Fraenkel and Wallen (1993) suggested that the alpha values should be at least 0.70 and preferably higher for research purposes.

3.4.1 Pilot Study for the Questionnaire

Based on the result shown in Table 3.1, the Sections B and C of the questionnaire have acceptable level of reliability, ranging from 0.785 – 0.807 as suggested by Fraenkel and Wallen (1993).

Table 3.1

Reliability of the questionnaire in the pilot study

Research Instruments	No of Questions	Cronbach's Alpha Coefficients
a) Section B (Students' MSE)	11	0.807
b) Section C (Students' MSRLS)	19	0.785

3.5 Data Collection Procedures

Permission was obtained from the EPRD (Educational Planning and Policy Research Division, Ministry of Education), the Director of Sarawak Education Department, the Principal of Lundu Secondary School and also the Principal of Sematan Secondary School for approval.

The respondents for this study were identified at the beginning of the research. They were briefed by the researcher before answering the questionnaire. In addition, the researcher personally administered the questionnaire to the respondents on the 15th October 2014 and collected the questionnaire on the 20th October 2014. The total number of sets of questionnaires was counted to ensure that all the questionnaires had been collected back from the respondents.

3.6 Data Analysis

Data obtained from the study were coded, computed and analysed using the Statistical Packages for the Social Science (SPSS) version 20. For this study, the research questions were tested using the following data analysis presented in Table 3.2.

Table 3.2

Data analysis of the study

No	Research Question	Data	Analysis
RQ1	Were there any significant differences in MSE based on demographic variables? • Was there a significant difference in MSE based on gender? • Was there a significant difference in MSE based on academic stream?	Section A & B	Independent samples t-test
RQ2	Were there any significant differences in MSRLS based on demographic variables? • Was there a significant difference in MSRLS based on gender? • Was there a significant difference in MSRLS based on academic stream?	Section A & C	Independent samples t-test

No	Research Question	Data	Analysis
RQ3	Was there a significant relationship between MSE and MSRLS?	Section B & C	Pearson's Moment Correlation Coefficients (r)

Table 3.3 summarized the interpretation of the strength of relationships between variables used in this research based on Fraenkel and Wallen (1993).

Table 3.3

Interpretation of the 'r' value

Pearson's (*r*)	Strength of relationship
0.80 – 1.00	Very strong
0.60 – 0.79	Strong
0.40 – 0.59	Moderate
0.20 – 0.39	Weak
0.00 – 0.19	Negligible to very week

3.7 Ethical Issues

The attitudes of the researcher in terms of honesty and sincerity to all the respondents who might be affected by the research study were the main concern in the research ethics (Gravetter & Forzano, 2003). In a research, ethical issues need to be considered at each step

in the research process. Before conducting the research, the researcher had obtained official permission from the Ministry of Education and also, the state education department. In addition, the researcher approached the principals from both schools to get personal permission to conduct the study. The copies of the permission letters from Ministry of Education and the state education department are shown in Appendix C.

In this study, the respondents were also given the complete information about the study. The researcher had informed the respondents earlier about the main purpose of the study and explained that they were free to withdraw from the study at any time if they felt uncomfortable to continue with the study. Likewise, the respondents were informed to have the rights to know and question any information or the purpose of the study if they were unsure about the study. Furthermore, the respondents were given approximately five to ten minutes to familiarize themselves with the questionnaire so that they were ready to participate in the study.

Additionally, the respondents were reassured on their willingness to participate in the study. They were not forced to participate in the study and they had the rights to leave the study at any time without any consequences. Furthermore, the confidentially of respondents were also ensured during the process of collecting, analysing and reporting of the data. The respondents' details would not be disclosed to any organization for any purpose. Thus, the respondents' information was treated as anonymous if the study is to be published (Gravetter & Forzano, 2003).

3.8 Threats to Validity

Both internal and external validity are essential when determining the quality of a study. A well-designed research study which yields results to reflect the underlying relationship should be free of threats to validity (Gravetter & Forzano, 2003). Thus, the threats to both internal and external validity of the study are discussed in this section.

3.8.1 Threats to Internal Validity

A study fulfils the criterion of internal validity if the study only produces exactly one explanation for the obtained results. If there are other possible explanations; it is considered as a threat to internal validity. For this study, there were two possible sources of threats to the internal validity which were: (a) participant variables and; (b) environment variables.

Participant variables or the characteristics variables of the students might vary from one individual to another. Similarly, the participant variables refer to the students' motivation to participate in the study, in which highly motivated students were assumed to be able to influence other students to be more engrossed in their study and thus, minimize the threat for internal validity (Gravetter & Forzano, 2003).

In contrast, environment variables can be defined as the differences in term of the learning environment of the two secondary schools involved in this study. Both schools that participated in this study have similar learning environments and this could possibly influence the study outcomes which were students' MSE and MSRLS. Besides that, the environment variables of this study also refer to the time of the study. In this study, both

Lundu and Sematan Secondary School were national schools. In addition, both schools had their classes in the morning session. Therefore, it could be assumed that these two sources of threats were minimal.

3.8.2 Threats to External Validity

A threat to external validity refers to any characteristic of the study that limits the generalizability of the results (Gravetter & Forzano, 2003). For this study, there were two possible sources of threats to the external validity which came from: (a) respondents and; (b) features of the study.

The first source of threat to external validity came from the respondents. Since the respondents for this study were selected from just two national schools in a rural setting, the results obtained from this study may not generalize to other schools in different setting (urban and suburban) and states as well. Besides that, volunteers and non-volunteers respondents also might influence the generalization of the result of the study.

The second source came from the features of the study. In this study, the respondents might be aware that they were part of an investigation. Thus, the results of the study might be affected by the fact that a participant knows he or she was being studied (Gravetter & Forzano, 2003). Therefore, the respondents of this study were made to feel comfortable and with minimal disruptions when answering the questionnaires in order to minimize the threat.

3.9 Summary

This chapter provided a comprehensive description on how the research was designed and implemented in the study. It also discussed the data analysis carried out in the study to answer the research questions and hypotheses. The following chapter discusses the findings of the study.

CHAPTER FOUR

FINDINGS

4.0 Introduction

This chapter discusses the findings of the present study and is divided into six main sections. Section 4.1 provides the demographics of the respondents. Section 4.2 discusses the reliability analysis of the research instruments used in this study. Section 4.3 reports the descriptive statistics of MSE and MSRLS. This is then followed by Section 4.4 which deals with the results on first and second research questions, determining the differences in MSE and MSRLS based on the demographic variables. Section 4.5 presents the results on the relationship between MSE and MSRLS (third research question). Lastly, Section 4.6 summarizes the main results of this study.

4.1 Demographics of the Respondents

The respondents of this research consisted of 211 Form Four students from Science and Art classes at Lundu and Sematan Secondary Schools in Lundu District, Sarawak. The respondents' demographic information was obtained using Section A (*Students' background*) of the questionnaire. The respondents' demographic information included the students' gender, race, age, academic stream and Second Semester Mathematics test results in the school. Based on Table 4.1, the samples consisted of 83 (39.3%) male students and 128 (60.7%) female students.

Both schools' students have almost similar cultural background. Majority of the students were Bidayuh (89, 42.2%), followed by Malay students (69, 32.7%), Chinese students (27, 12.8%) and Iban students (24, 11.4%). There were only two (0.9%) Indian students. As for age groups, 209 (99.1%) students were 16 years old whereas only one student (0.5%) each was at the age of 17 and 18 respectively. The next demographic item was academic stream. There were 106 (50.2%) students in science stream and 105 (49.8%) students from the arts stream. The last demographic item was the final semester Mathematics test results with the majority of the students (88, 41.7%) obtaining grade F. This was followed by 30 (14.2%) students who obtained grade D, 29 (13.7%) students with grade C, 27 (12.8%) students with grade E, 22 (10.4%) students with grade A and 15 (7.1%) students obtained grade B.

Table 4.1

Demographic of the respondents

Demographic Variables		**N**	**%**
Gender	Male	83	39.3
	Female	128	60.7
Race	Malay	69	32.7
	Chinese	27	12.8
	Iban	24	11.4
	Bidayuh	89	42.2
	Indian	2	0.9
Age	16 years old	209	99.1
	17 years old	1	0.5
	18 years old	1	0.5
Academic Stream	Science	106	50.2
	Art	105	49.8
Second Semester Mathematics Test Results	A (75-100)	22	10.4
	B (65-74)	15	7.1
	C (50-64)	29	13.7
	D (45-49)	30	14.2
	E (40-44)	27	12.8
	F (0-39)	88	41.7
Total		211	100.0

4.2 Reliability Analysis of the Research Instruments

This study sought to find the relationship between Mathematics Self-Efficacy (MSE) and Mathematics Self-Regulated Learning Strategies (MSRLS) among secondary schools students. Therefore, two research instruments used in this study were the students' MSE and MSRLS.

Based on the actual study's results shown in Table 4.2, the Cronbach's Alpha Coefficients for Section B (Students' MSE) and Section C (Students' MSRLS) were 0.897 and 0.901 respectively. It was concluded that these two research instruments had high reliability as both Cronbach's Alpha values were greater than 0.7 (Fraenkel & Wallen, 1993).

In addition, the results of the reliability analysis for the three aspects of students' MSRLS in Section C are shown in Table 4.2. The Cronbach's Alpha Coefficients for the three aspects in this section ranged from 0.788 for *Metacognitive Strategies* to 0.802 for *Cognitive Strategies* indicating acceptable level of reliability.

Table 4.2
Reliability of the questionnaire in the actual study

Research Instruments	**No of Questions**	**Cronbach's Alpha Coefficients**
a) Section B (Students' MSE)	11	0.897
b) Section C (Students' MSRLS)	19	0.901
Value	6	0.790
Cognitive Strategies	6	0.802
Metacognitive Strategies	7	0.788

4.3 Descriptive Statistics for Students' MSE and MSRLS

4.3.1 Descriptive Statistics for Students' MSE

In Section B of the questionnaire, the respondents were asked about their MSE. Section B consisted of 11 items with five-point Likert scale from "1 = Strongly Disagree" to "5 = Strongly Agree". The means, standard deviations, frequencies and percentages of MSE are summarized in Table 4.3.

The overall mean and standard deviation of the 211 Form Four Secondary School students' responses to 11 items in the administration of Students' MSE questionnaire were 3.35 and 0.618 respectively. Thus, this study revealed that majority of the students had moderate self-efficacy in their abilities to meet the mathematics learning objectives.

Referring to the students' responses in Table 4.3, item 1 which was "I believe I can learn well in mathematics" was the highest contributor to the overall mean of 3.35. Secondary school students generally believed that they were able to learn well in mathematics (Mean = 3.74, Std. dev. = 0.875). There were 101 students (47.9%) who agreed and 37 students (17.5%) strongly agreed that they believed they could learn well in mathematics. A total of 58 students (27.5%) were neutral in their responses to item 1. Eleven students (5.2%) disagreed with the statement and only four students (1.9%) strongly disagreed that they believed they could learn well in mathematics.

Item 2 which was "I believe I will be able to use mathematics in my future career when needed" was the second highest contributor to the overall mean of students' MSE. Generally,

Form Four secondary school students believed that they would be able to use mathematics in their future career when needed (Mean = 3.67, Std. dev. = 0.973). A total of 87 students (41.2%) agreed that they would be able to use mathematics in their future career followed by 41 students (19.4%) that strongly agreed with the statement. Sixty-two students were not sure with the statement whereas 14 students (6.6%) disagreed that they would be able to use mathematics in their future career when needed. Only seven students (3.3%) strongly disagreed with the statement.

Additionally, item 3 which was "I feel confident when using mathematics outside of school" was the third highest contributor to the overall mean of students' MSE. Students generally felt confident when using mathematics outside of school (Mean = 3.51, Std. dev. = 0.907). There were 88 students (41.7%) agreed and 25 students (11.8%) strongly agreed that they felt confident when using mathematics outside of school. Seventy-three students (34.6%) were unsure about the same statement. Twenty students (9.5%) disagreed that they felt confident when using mathematics outside the school whereas only five students (2.4%) strongly disagreed with the statement.

Out of these eleven items, item 11 showed the lowest mean (Mean = 2.92, Std. dev. = 0.883). Item 11 referred to the statement "I believe I can think like a mathematician". There were 42 (19.9%) students who agreed that they believed they could think like a mathematician. Only five students (2.4%) strongly agreed with the statement. One hundred and twelve students (53.1%) responded neutrally to this statement. Thirty-five students (16.6%) disagreed that they believed they could think like a mathematician whereas 17 students (8.1%) strongly disagreed with the statement.

Item 10 which was “I believe I am the kind of person who is good at mathematics” ranked the second lowest mean for the students’ MSE (Mean = 2.92, Std. dev. = 0.883). There were 42 students (19.9%) who agreed that they believed they were good at mathematics followed by eight (3.8%) students that strongly agreed with the statement. Another116 students (55.0%) were not sure whether they were good at mathematics. There were 33 students (15.6%) who disagreed that they were good at mathematics. Only 12 students (5.7%) strongly disagreed with the statement.

Furthermore, item 9 which was “I feel confident when taking a mathematics test” had the third lowest mean for students’ MSE (Mean = 2.92, Std. dev. = 0.883). As can be seen from Table 4.3, there were 55 students (26.1%) who agreed that they felt confident when taking a mathematics test whereas only 13 students (6.2%) strongly agreed that they were confident when sitting for the test. Majority of the respondents which consisted of 104 Form Four secondary school students (49.3%) were unsure about the same statement. In addition, 32 students (15.2%) felt that they lacked of confidence when taking a mathematics test. Seven students (3.3%) strongly disagreed that they felt confident when taking a mathematics test.

Table 4.3

Descriptive Statistics for Students' MSE

	MSE	Response					Mean	Std. dev
		SD	D	N	A	SA		
1.	I believe I can learn well in mathematics.	4 (1.9%)	11 (5.2%)	58 (27.5%)	101 (47.9%)	37 (17.5%)	3.74	0.875
2.	I believe I will be able to use mathematics in my future career when needed.	7 (3.3%)	14 (6.6%)	62 (29.4%)	87 (41.2%)	41 (19.4%)	3.67	0.973
3.	I feel confident when using mathematics outside of school.	5 (2.4%)	20 (9.5%)	73 (34.6%)	88 (41.7%)	25 (11.8%)	3.51	0.907
4.	I believe I can do well on a mathematics test	2 (0.9%)	19 (9.0%)	88 (41.7%)	76 (36.0%)	26 (12.3%)	3.50	0.858
5.	I believe I can complete all my mathematics homework.	7 (3.3%)	16 (7.6%)	93 (44.1%)	73 (34.6%)	22 (10.4%)	3.41	0.897
6.	I believe I can understand the content in my mathematics subject.	7 (3.3%)	11 (5.2%)	101 (47.9%)	80 (37.9%)	12 (5.7%)	3.37	0.809
7.	I believe I am the type of person who can do mathematics.	7 (3.3%)	25 (11.8%)	93 (44.1%)	74 (35.1%)	12 (5.7%)	3.28	0.869
8.	I feel confident enough to ask questions in my mathematics class.	7 (3.3%)	19 (9.0%)	114 (54.0%)	52 (24.6%)	19 (9.0%)	3.27	0.872

	MSE	Response					Mean	Std. dev
		SD	D	N	A	SA		
9.	I feel confident when taking a mathematics test.	7 (3.3%)	32 (15.2%)	104 (49.3%)	55 (26.1%)	13 (6.2%)	3.17	0.876
10.	I believe I am the kind of person who is good at mathematics.	12 (5.7%)	33 (15.6%)	116 (55.0%)	42 (19.9%)	8 (3.8%)	3.00	0.859
11.	I believe I can think like a mathematician.	17 (8.1%)	35 (16.6%)	112 (53.1%)	42 (19.9%)	5 (2.4%)	2.92	0.883
	Overall						3.35	0.618

Note. SD = Strongly Disagree, D = Disagree, N = Not Sure/Neutral, A = Agree, SA = Strongly Agree, Std. dev = Standard Deviation.

4.3.2 Descriptive Statistics for Students' MSRLS

In Section C of the questionnaire, the respondents were asked about their MSRLS in terms of *Value, Cognitive Strategies and Metacognitive Strategies*. The means, standard deviations, frequencies and percentages of these aspects are summarized in Table 4.4 to Table 4.6.

The overall mean and standard deviation for the 211 Form Four Secondary School students' responses to 19 items in the administration of Students' MSRLS questionnaire was 3.62 and 0.541 respectively. Results of this study showed that majority of the students had moderate MSRLS in terms of "value" (Mean = 3.87, Std. dev. = 0.607, refer to Table 4.4), "cognitive strategies" (Mean = 3.44, Std. dev. = 0.621, refer to Table 4.5) and "metacognitive strategies" (Mean = 3.56, Std. dev. = 0.584, refer to Table 4.6).

Referring to the students' responses in Table 4.4, item 1 which was "I hope I can get higher grade in mathematics than any other classmates" was the highest contributor to the overall mean of 3.87 for students' MSRLS in term of *Value*. Form Four secondary school students generally hoped that they could get higher grade in mathematics than any other classmates. (Mean = 4.04, Std. dev. = 0.948). There was similar number of students who agreed and strongly agreed with the statement which consisted of 79 (37.4%) students. A total of 39 students (18.5%) were neutral in their responses to item 1. Eleven students (5.2%) disagreed with the statement and only three students (1.4%) strongly disagreed that they could get better grade in mathematics than other classmates.

Additionally, item 2 showed the second highest mean (Mean = 3.97, Std. dev. = 0.783). Item 2 referred to the statement "Learning mathematics can improve my thinking logic". Majority of the Form Four secondary school students agreed that learning mathematics could improve their thinking logic which consisted of 122 students (57.8%), followed by 47 students (22.3%) who strongly agreed with the statement. Thirty-two students (15.2%) were unsure whether learning mathematics could enhance thinking logic whereas eight students (3.8%) disagreed with the statement. Only two students (0.9%) strongly disagreed that learning mathematics could help them to think logically.

Out of these six items, item 6 which was "I want to get other people's recognition so I want higher scores in mathematics class" showed the lowest mean (Mean = 3.66, Std. dev. = 0.866) for students' MSRLS in term of *Value*. There were 90 students (42.7%) who agreed that they wanted higher scores in mathematics class in order to get other people's recognition followed by 33 students (15.6%) who strongly agreed with the statement. There were 76 students who responded neutrally to this statement. Only seven students (3.3%) disagreed and

five students (2.4%) strongly disagreed that they wanted to get other people's recognition therefore they wanted higher scores in mathematics class.

Moreover, Item 5 which was "In mathematics class, I would like to have some challenging materials and they will make me learn more" ranked the second lowest mean for students' MSRLS (Mean = 3.67, Std. dev. = 0.885). There were 97 students (46.0%) who agreed that they would like to have some challenging materials in mathematics class which would make them learn more followed by 33 students (15.6%) that strongly agreed with the statement. Another 65 students (30.8%) were unsure about the same statement. Only 11 students (5.2%) disagreed and five students (2.4%) strongly disagreed with the statement.

Table 4.4

Descriptive Statistics for Students' MSRLS: Value

	Value	Response					Mean	Std. dev
		SD	D	N	A	SA		
1.	I hope I can get higher grade in mathematics than any other classmates.	3 (1.4%)	11 (5.2%)	39 (18.5%)	79 (37.4%)	79 (37.4%)	4.04	0.948
2.	Learning mathematics can improve my thinking logic.	2 (0.9%)	8 (3.8%)	32 (15.2%)	122 (57.8%)	47 (22.3%)	3.97	0.783
3.	What I learn in the mathematics class can be apply in my daily life.	2 (0.9%)	7 (3.3%)	54 (25.6%)	85 (40.3%)	63 (29.9%)	3.95	0.879
4.	I feel the learning materials used in mathematics class are useful.	5 (2.4%)	5 (2.4%)	37 (17.5%)	115 (54.5%)	49 (23.2%)	3.94	0.846
5.	In mathematics class, I would like to have some challenging materials and they will make me learn more.	5 (2.4%)	11 (5.2%)	65 (30.8%)	97 (46.0%)	33 (15.6%)	3.67	0.885
6.	I want to get other people's recognition so I want higher scores in mathematics class.	5 (2.4%)	7 (3.3%)	76 (36.0%)	90 (42.7%)	33 (15.6%)	3.66	0.866
	Overall						3.87	0.607

Responses to *Cognitive Strategies* are shown in Table 4.5. Item 1 which was "In studying mathematics, I will combine my own known knowledge with the learning materials" was the highest contributor to the overall mean of 3.44 for students' MSRLS in term of *Cognitive Strategies*. In general, Form Four secondary school would combine their own known knowledge with the learning materials in studying mathematics (Mean = 3.63, Std. dev. = 0.766). There were 94 students (44.5%) who agreed that they would combine their own knowledge with the learning materials whereas 25 students (11.8%) strongly agreed with the statement. Out of 211 students' participants, 82 students (38.9%) were unsure about the same statement. Only nine students (4.3%) disagreed and one student (0.5%) strongly disagreed that they would combine their own knowledge with the learning materials when studying mathematics.

Additionally, item 2 which was "In studying mathematics, I will read through the class notes and mark up the important parts" (Mean = 3.55, Std. dev. = 0.873) ranked the second highest contributor to the overall mean of *Cognitive Strategies*. Majority of the students agreed that they would read through the class notes and marked up the important parts in studying mathematics which comprised of 95 students (45.0%) out of the total 211 respondents followed by 24 students (11.4%) who strongly agreed with the same statement. However, there were 68 students (32.2%) who were neutral in their responses to item 2. There were 21 students (10.0%) who disagreed that they would read through the class notes and marked up the important parts in studying mathematics and only three students (1.4%) strongly disagreed with the statement.

Conversely, out of these six items, item 6 which was “In studying mathematics, I will repeatedly practice similar question types” had the lowest mean (Mean = 3.25, Std. dev. = 0.939) for *Cognitive Strategies.* There were 69 students (32.7%) who agreed that they would repeatedly practice similar question types whereas 15 students (7.1%) strongly agreed with the statement. Majority of the Form Four students, which consisted of 91 students (43.1%), were unsure about the same statement. There were 25 students (11.8%) who disagreed and 11 students (5.2%) who strongly disagreed with the same statement.

Furthermore, item 5 which was “I memorize the important formula in a mathematics class” ranked the second lowest contributor (Mean = 3.30, Std. dev. = 0.841) to the overall mean of *Cognitive Strategies.* There were 69 students (32.7%) who agreed that they memorized the important formula in a mathematics class followed by 14 students (6.6%) who strongly agreed with the statement. Majority of the students which comprised of 100 students (47.4%) responded neutrally to this statement. Twenty-three students (10.9%) disagreed that they memorized the important formula in a mathematics class and only five students (2.4%) strongly disagreed with the statement.

Table 4.5

Descriptive Statistics for Students' MSRLS: Cognitive Strategies

	Cognitive Strategies	Response					Mean	Std. dev
		SD	D	N	A	SA		
1.	In studying mathematics, I will combine my own known knowledge with the learning materials.	1 (0.5%)	9 (4.3%)	82 (38.9%)	94 (44.5%)	25 (11.8%)	3.63	0.766
2.	In studying mathematics, I will read through the class notes and mark up the important parts.	3 (1.4%)	21 (10.0%)	68 (32.2%)	95 (45.0%)	24 (11.4%)	3.55	0.873
3.	In studying mathematics, I will go over the formula and important concepts by myself.	6 (2.8%)	17 (8.1%)	85 (40.3%)	81 (38.4%)	22 (10.4%)	3.46	0.890
4.	I will link the class notes to textbook examples to improve my understanding.	7 (3.3%)	20 (9.5%)	78 (37.0%)	81 (38.4%)	25 (11.8%)	3.46	0.937
5.	I memorize the important formula in a mathematics class.	5 (2.4%)	23 (10.9%)	100 (47.4%)	69 (32.7%)	14 (6.6%)	3.30	0.841
6.	In studying mathematics, I will repeatedly practice similar question types.	11 (5.2%)	25 (11.8%)	91 (43.1%)	69 (32.7%)	15 (7.1%)	3.25	0.939
	Overall						3.44	0.621

Referring to the students' responses in Table 4.6, item 1 which was "I will check my answer again after I finish the mathematics question" was the highest contributor to the overall mean of 3.56 for students' MSRLS in term of *Metacognitive Strategies*. In general, Form Four secondary school would check their answer again after they finished the mathematics question (Mean = 3.97, Std. dev. = 0.968). There were 90 students (42.7%) who agreed that they would check their answer again whereas 68 students (32.2%) strongly agreed with the statement. Out of 211 students' participants, 36 students (17.1%) were neutral in their responses to item 1. Only twelve students (5.7%) disagreed and five students (2.4%) strongly disagreed that they would check their answer again after completing the mathematics question.

Furthermore, item 2 showed the second highest mean (Mean = 3.69, Std. dev. = 0.871). Item 2 referred to the statement "If I feel confused about the mathematics class materials, I will go over to find out where the problem is". Majority of the Form Four secondary school students agreed that they would go over to find out where the problem was if they felt confused about the mathematics class materials (103 students, 48.8%). There were 31 students (14.7%) who strongly agreed followed by 63 students (29.9%) who responded neutrally to this statement. Only eight students (3.8%) disagreed and six students (2.8%) strongly disagreed that they would seek for solution is if they felt confused about the learning materials.

In contrast, out of these six items, item 6 which was "I usually question what I heard or what I earn in mathematics class, and judge if these information is persuasive" contributed the lowest mean (Mean = 3.38, Std. dev. = 0.768) to the overall mean of *Cognitive Strategies.* Seventy-five students (35.5%) agreed that they usually questioned what they heard or what they earned in a mathematics class and judge if the information was persuasive whereas only

13 students (6.2%) strongly agreed with the statement. Majority of the students which comprising of one hundred and seven students (50.7%) were unsure about the same statement. Only four students (1.9%) strongly disagreed and 12 students (5.7%) disagreed that they usually questioned during a mathematics lesson.

In addition, the second lowest mean was item 5 (Mean = 3.43, Std. dev. = 0.883). The statement was "I will combine my own idea into the mathematics class learning". Out of 211 respondents, 74 students (35.1%) agreed and 22 students (10.4%) strongly agreed that they would combine their own ideas into the mathematics class learning. Ninety-three students (44.1%) responded neutrally to this statement. Only six students (2.8%) strongly disagreed followed by 16 students (7.6%) who disagreed that they would combine their own ideas into the mathematics class learning.

Table 4.6

Descriptive Statistics for Students' MSRLS: Metacognitive Strategies

	Metacognitive Strategies	Response					Mean	Std. dev
		SD	D	N	A	SA		
1.	I will check my answer again after I finish the mathematics question.	5 (2.4%)	12 (5.7%)	36 (17.1%)	90 (42.7%)	68 (32.2%)	3.97	0.968
2.	If I feel confused about the mathematics class materials, I will go over to find out where the problem is.	6 (2.8%)	8 (3.8%)	63 (29.9%)	103 (48.8%)	31 (14.7%)	3.69	0.871
3.	In studying mathematics, I will set up my own target and follow the agenda I make.	6 (2.8%)	13 (6.2%)	71 (33.6%)	82 (38.9%)	39 (18.5%)	3.64	0.948
4.	In mathematics class, I will try to find out other efficient way to solve problem when I think of some idea or solutions.	4 (1.9%)	16 (7.6%)	76 (36.0%)	92 (43.6%)	23 (10.9%)	3.54	0.857
5.	I will combine my own idea into the mathematics class learning.	6 (2.8%)	16 (7.6%)	93 (44.1%)	74 (35.1%)	22 (10.4%)	3.43	0.883

	Metacognitive Strategies	Response SD	D	N	A	SA	Mean	Std. dev
6.	I usually question what I heard or what I earn in mathematics class, and judge if these information is persuasive.	4 (1.9%)	12 (5.7%)	107 (50.7%)	75 (35.5%)	13 (6.2%)	3.38	0.768
7.	I will reorganize and clarify the confused points after a mathematics lesson.	7 (3.3%)	19 (9.0%)	112 (53.1%)	58 (27.5%)	15 (7.1%)	3.26	0.847
	Overall						3.56	0.584

4.4 Differences in MSE and MSRLS based on Demographic Variables

An independent sample t-test was carried out to determine the significant differences in MSE based on gender. For the hypothesis testing, the independent variable was gender, while the dependent variable was MSE. The result as shown in Table 4.7 indicated that there was no significant difference in MSE between male and female students (t (209) =1.015, p = 0.311).

Table 4.7

Differences in MSE based on gender

Gender	n	Mean	Std. dev	t	df	*p*-value
Male	83	3.40	0.648	1.015	209	0.311
Female	128	3.31	0.598			

Likewise, an independent sample t-test was carried out to determine the significant differences in MSE based on academic stream. For the hypothesis testing, the independent variable was academic stream, while the dependent variable was MSE. The result as shown in Table 4.8 indicated that students' MSE did not differ between science and art streams (t (189.475) = 0.802, p = 0.424).

Table 4.8

Differences in MSE based on academic stream

Academic stream	n	Mean	Std. dev	t	df	*p*-value
Science	106	3.38	0.713	0.802	189.475	0.424
Art	105	3.32	0.506			

4.4.2 Significant Differences in MSRLS based on Demographic Variables

In addition, an independent sample t-test was carried out to determine the significant differences in MSRLS based on gender. For the hypothesis testing, the independent variable was gender, while the dependent variable was MSRLS. The result as shown in Table 4.9 indicated that there was no significant difference in MSRLS between male and female students (t (209) = -0.404, p = 0.687).

Table 4.9

Differences in MSRLS based on gender

Gender	n	Mean	Std. dev	t	df	*p*-value
Male	83	3.60	0.566	-0.404	209	0.687
Female	128	3.63	0.526			

Likewise, an independent sample t-test was carried out to determine the significant differences in MSRLS based on academic stream. For the hypothesis testing, the independent variable was academic stream, while the dependent variable was MSRLS. The result indicated that there was significant difference in MSRLS between science and art streams (t (209) = 2.997, p = 0.003, refer to Table 4.10). By comparing the mean, it was found that the students in science stream (Mean = 3.73, Std. dev. = 0.575) had higher MSRLS scores compared to the students in art stream (Mean = 3.52, Std. dev. = 0.483).

Table 4.10

Differences in MSRLS based on academic stream

Academic Stream	n	Mean	Std. dev	t	df	*p*-value
Science	106	3.73	0.575	2.997	209	0.003
Art	105	3.51	0.483			

4.5 Relationships between MSE and MSRLS

Based on the Pearson's Moment Correlation Coefficients analyses, students' MSE was significantly correlated with their MSRLS. Furthermore, the results indicated that the relationship between MSE and MSRLS was a positive and strong relationship ($r = 0.742$, $p < 0.0005$, refer to Table 4.11). Thus, if students' MSE increased, their MSRLS would also increase.

Table 4.11

Relationship between Students' MSE and MSRLS

	MSE	
	r	*p*-value
MSRLS	0.742	0.000

Subsequently, Pearson's Moment Correlation Coefficients analyses were carried out to determine the relationships between MSE and various aspects of MSRLS. These results are shown in Table 4.12. There were significant positive and strong relationships between MSE and *Value* ($r = 0.684$, $p < 0.0005$), MSE and *Cognitive Strategies* ($r = 0.647$, $p < 0.0005$), and MSE and *Metacognitive Strategies* ($r = 0.668$, $p < 0.0005$). Thus, if the students MSE increased, their *Value, Cognitive Strategies,* and *Metacognitive Strategies* would also increase.

Table 4.12

Relationships between Students' MSE and various aspects of MSRLS

	MSE	
MSRLS	*r*	*p*-value
Value	0.684	0.000
Cognitive Strategies	0.647	0.000
Metacognitive Strategies	0.668	0.000

4.6 Summary

This chapter had presented the findings of the study based on the research objective, research questions, and research hypotheses stated in chapter one. The following chapter discusses the findings of the study in relatives to the literature reviews and provided some implications resulting from the findings of the study.

CHAPTER FIVE

DISCUSSIONS AND CONCLUSIONS

5.0 Introduction

This chapter is divided into seven main sections. Section 5.1 presents the summary of the study. This is then followed by Section 5.2, which discusses the summary of the findings. Section 5.3 provides the discussions of the research findings reported in the previous chapter. This is then followed by Section 5.4 which lists the implications for practice. Section 5.5 presents the implications for future research. Lastly, Section 5.6 provides the conclusion of the study.

5.1 Summary of the Study

The main purpose of this study was to determine the relationship between MSE and MSRLS among secondary school students. In addition, this study also explored the differences in MSE and MSRLS based on demographic variables (gender and academic stream).

A *Cross-Sectional Survey* research design was used in this study to identify the relationship between MSE and MSRLS. The research instrument used was a survey questionnaire which consisted of three sections: Section A *(Students' background),* Section B *(Students' Mathematics Self-Efficacy)* and Section *C (Students' Mathematics Self-Regulated Learning Strategies).*

Section A of the survey questionnaire gathered demographic information from the students namely on their gender, race, age, academic stream and second semester mathematics test results. Section B of the questionnaire measured the *Students' Mathematics Self-Efficacy* and the items in this section was adapted from the instrument used in May's (2009) study. The final section, Section C determined the *Students' Mathematics Self-Regulated Learning Strategies* and the items was based on the instrument used in Liu and Lin's (2010) study. This section was further divided into three sub-scales comprising of *Value, Cognitive Strategies* and *Metacognitive Strategies.*

A pilot test was carried out before the actual study was conducted to determine the reliability of the questionnaire. Thirty-one Form Four Secondary School students at Lundu Secondary School, Lundu, Sarawak were involved in this pilot study. The actual study was conducted with 211 Form Four Secondary School students from Lundu and Sematan Secondary

Schools, Lundu, Sarawak, The researcher personally administered the questionnaires to the students on the 15th October 2014 and collected the questionnaires on the 20th October 2014. The data analysis was carried out based on the research questions of the study. The data analyses were done using statistical software, Statistical Package for Social Sciences (SPSS) Version 20. In order to answer Research Question (RQ) 1 and RQ2, independent samples t-tests were conducted and for the RQ3, the Pearson's Moment Correlation Coefficients was used to determine the existence of a relationship between the MSE and MSRLS.

5.2 Summary of the Findings

This section summarizes the research findings reported in the previous chapter. The discussions are divided into six sub sections, 5.2.1 to 5.2.6.

5.2.1 MSE

Based on the descriptive statistics findings from the previous chapter, it was found that majority of the secondary school students had moderate MSE in their abilities to meet the mathematics learning objectives. Students had highest efficacy in term of beliefs to learn well in mathematics. Conversely, students had lowest efficacy in term of beliefs to think like a mathematician.

5.2.2 MSRLS

Based on the descriptive statistics findings from the previous chapter, it was found that students generally had moderate MSRLS in terms of *Value*, *Cognitive Strategies* and

Metacognitive Strategies. In addition, students had highest MSRLS in terms of *Value* followed by *Metacognitive Strategies* whereas *Cognitive Strategies* was the lowest MSRLS.

Value

In term of *Value,* it was found that students generally hoped that they could get higher grade in mathematics than any other classmates which contributed to the highest MSRLS. In contrast, students had lowest MSRLS in which they wanted to get other people' recognition so they wanted higher scores in mathematics.

Cognitive Strategies

In term of Cognitive Strategies, it was found that students generally would combine their own knowledge with the learning materials while studying mathematics which contributed to the highest MSRLS. However, students had the lowest MSRLS in which they would repeatedly practice similar type of questions while studying mathematics.

Metacognitive Strategies

In term of Metacognitive Strategies, it was found that students would check their answer again after they finished the mathematics questions which contributed to the highest MSRLS. Nevertheless, students generally had the lowest MSRLS in which they would reorganize and clarify the confused points after a mathematics lesson.

5.2.3 Differences in MSE based on gender and academic stream

For the first Research Question (RQ1), it was found that there was no significant difference in MSE between male and female students. Likewise, it was found that students' MSE did not differ between science and art streams.

5.2.4 Differences in MSRLS based on gender and academic stream

For the second Research Question (RQ2), it was found that there was no significant difference in MSRLS between male and female students. However, findings indicated that there was significant difference in MSRLS between science and art streams. It was found that students in science stream had higher MSRLS scores as compared to students in art stream.

5.2.5 Relationship between MSE and MSRLS

For the third Research Question (RQ3), the findings based on the Pearson's Moment Correlation Coefficients indicated that students' MSE was correlated with MSRLS. It was found that the relationship between MSE and MSRLS was significant, positive and strong.

5.2.6 Reliability

Research instruments used in this study were students' MSE and students' MSRLS. It was found that these two research instruments had high reliability as both Cronbach's Alpha values were greater than 0.7 (Fraenkel & Wallen, 1993). It was concluded that these two instruments had good internal consistencies within the items.

5.3 Discussions of the Findings

The following section discusses the findings of the study.

5.3.1 Differences in MSE based on Gender

The findings in this study indicated that there was no significant difference in MSE between male and female students. Although male students had higher means then females, the mean differences were not significant. Thus, the results of the present study implied that gender did not influence the students' MSE.

This finding was supported by results reported in past studies by Nuruddin et al. (2008) and May (2009). This finding, however, contradicted with results reported by Pajares and Miller (1994). In their study, the researchers found that there was a significant difference in MSE between genders, with male students demonstrating higher levels of MSE than females. Pajares and Miller (1994) further suggested that females' lower levels of MSE were a result of common beliefs that mathematics is a male-dominated field or that females are typically not good at mathematics. These perceptions lead female students to think that they should not be good at mathematics, irrespective of their actual abilities. Zagame (2011) likewise found out that females reported lower MSE levels than male students.

The lack of differences in MSE between genders in this study could be due to time and cultural context. In Malaysian context, female students have equal access and opportunity to succeed in mathematics and science-based subjects (Ministry of Education, 2012) and in fact at the present time, there are far more female students than male students who enrolled in the

public universities with females' percentage has increased beyond sixty percent (Ministry of Higher Education, 2010). Additionally, research showed that Malaysian females performed better than males in mathematics in public examinations including PMR and SPM (Jelas, Yunus, Dahan, & Redzuan, 2001). Concurring with this, it was found that females outperformed males in mathematics and science-based subjects (Dahlan, Noor, Azian, Mustafa, Muzlia, Said Hashim & Zulkifli, 2010). This suggests that females are catching up in traditionally male dominated subject such as mathematics and in fact, both male and female students can do equally well in mathematics which resulted in lack of differences in this study.

5.3.2 Differences in MSE based on Academic Stream

The findings showed that there was no significant difference in MSE between science and art stream. Although male students had higher means then females, the mean differences were not significant. Thus, the results of the present study implied that academic stream did not affect MSE. There was a lack of studies found in the literature pertaining to differences in MSE based on academic stream among secondary school students. Thus, the finding from this study could be used as references for future research.

Nevertheless, study related to differences in MSE based on college students' major and career choices was done by Brown and Lent (2006). In their study, they found that MSE helped to predict students' college major and career choices and it was linked to key motivation constructs such as self-concept, achievement goal orientation, anxiety, and value. Students with high SE monitored their work time more effectively, solved problems with higher efficiency, and tended to persist longer compared with students with lower SE. Similarly, it

was further reported by Schunk and Pajares (2005) that students with SE worked harder, evaluated their progress more frequently, and engaged in more self-regulatory strategies that contributed towards academic success. Furthermore, Liu et al. (2006) conducted a study that implemented a computer-enhanced problem-based learning environment to investigate the relationships among students' SE, attitude towards science and achievement. They found SE to be a statistically significant predictor of achievement.

5.3.3 Differences in MSRLS based on Gender

The findings reported in this study indicated that there was no significant difference in MSRLS between male and female students. Although female students had slightly higher means then males, the mean differences were not significant. Thus, the results of the present study implied that gender did not influence MSRLS.

The finding of no gender difference in MSRLS was in agreement with previous research done by Yukselturk and Bulut (2009). In their study, they reported that there was no significant difference in SRLS with respect to gender. Nevertheless, this finding was contradictory with the results reported by Azizi and Pachi (2013), in a study of comparing SRLS between male and female students in a Bachelor of Science degree programme. Azizi and Pachi (2013) reported significant differences between male and female in total SRLS scores, with females having higher scores reflecting better use of SRLS. Likewise, Saad et al. (2012) also reported similar gender effect on the use of SRLS with females outperformed male students in the use of SRLS. Bezzina (2010) also reported that there was difference in MSRLS based on gender. In her study, Bezzina investigated gender differences in mathematics performance and in SRLS, and found that females performed significantly better than males, and this difference

was attributed to the weaker performance of low-achieving male students. Female students also reported greater use of SRLS as compared to male students.

Thus, in general, the findings in this study contradicted the findings of past studies reported in the literature. The lack of difference in MSRLS between genders in this study, similarly, could be due to time and cultural context. According to Wanless, McClelland, Lan, Son, Cameron, Morrison and Sung (2013), girls had higher levels of SRLS than boys in United States. Nevertheless, the study reported that there were no significant gender differences in any Asian societies. These findings suggested that although commonly held beliefs that female students tend to be more self-regulated than male students, this might not be the case for Asian students. Furthermore, Wanless et al. (2013) suggested that it is possible that male students in the Asian countries were able to self-regulate as well as girls when they were in a quiet space (the direct assessment) which resulted in lack of differences in this study.

5.3.4 Differences in MSRLS based on Academic Stream

There was a significant difference in MSRLS between science and art stream. In addition, it was found that students in science stream had higher MSRLS scores as compared to students in art stream.

There was a lack of studies found in the literature pertaining to differences in MSRLS based on academic stream among secondary school students. Therefore, the finding from this study could be references for future research in this area. Nevertheless, a study had been carried out to investigate the learning styles and SRLS for computer science students (Alharbi et al., 2011). The study included an analysis of the SRLS used by students, and it was reported that

metacognitive strategies, which were the least used by the students, were significantly correlated with organizational, elaboration and critical thinking strategies, indicating that students who used more metacognitive learning strategies were more likely to be aware of the cognitive strategies as well. Thus, students are unaware of important SRLS in which they might benefit from educational interventions focusing on these strategies. The study showed that science students had higher MSRLS compared to art students could be due to several factors such as science students are more independent learners and more motivated to learn than art students. Concurring with this, Shekhar and Devi's (2012) study reported that science stream students had significantly higher achievement motivation compared to arts stream students. Similarly, Liu and Zhu (2009) found that motivation to pursue success of science students is stronger than that of art students.

In the Malaysian context, the difference may be related to university entrance examination system, course arrangement and social expectations in which science students face higher pressures to excel in university entrance examination to gain entry into preferred courses such as medicine, dentistry, architecture, engineering and accounting. Additionally, past studies reported that science stream students were more independent learners than arts stream students (Yim, 2009).

5.3.5 Relationship between MSE and MSRLS

Consistent with the literature (e.g., Abdullah et al., 2006; Al-Harthy & Was, 2010; Bouffard-Bouchard at al., 1991), this study reported that students' MSE was correlated with their MSRLS. Findings from the present study indicated a significant, positive and strong relationship between MSE and MSRLS.

In his study, Abdullah et al. (2006) indicated that the correlation between SE and SRLS was strong, positive and significant. Similarly, Bouffard-Bouchard et al. (1991) reported that SE was correlated with SRLS, and SE had a significant influence on various aspects of SRLS. Students with high SE levels were better at monitoring their working time, better at solving conceptual problems and persisted longer than inefficacious students with similar abilities. Likewise, Al-Harthy and Was (2010) concluded that SE had significant influence on SRLS processes comprising of goal setting, self-observation, self-reaction and evaluation of one's performance.

5.4 Implications for Practice

The literature review indicated that MSE is vital in the teaching and learning of mathematics. Since MSE has been found to be among the most significant predictors of mathematics performance, it is highly recommended that teachers should help to assess students' MSE levels as students with low MSE are more are more susceptible of underperforming in mathematics. Thus, appropriate measures should be taken to increase students' MSE levels as students with high MSE tend to persist longer and more motivated than students who are less efficacious. For instance, teachers should focus on primary factors that determine MSE such as vicarious experience, mastery experience, verbal persuasion, physiological and emotional states. Additionally, teachers should give remedial classes to students with low MSE in order to increase their mathematics performance. Likewise, teachers can organize workshop or seminar talk to enhance students' MSE level by inviting veteran speakers who are mathematics experts. Moreover, School Improvement Specialist Coaches (SISC), or better known as expert teachers who are assigned to coach underperforming schools, should give proper guidelines by offering class modelling and supportive feedback for teachers in order to

increase teachers' effectiveness in teaching mathematics. Thus, as teachers effectiveness increase, students' MSE levels will increase as well. Besides, Ministry of Education should design interventions that could increase students' MSE. This is important as higher level of MSE will result in better performance in mathematics.

Likewise, the literature review also showed that MSRLS is an academically effective form of learning. Teachers can tailor their teaching by assisting students to set up specific and feasible learning goals, guiding them to choose appropriate learning strategies, helping them learn to accurately self-monitor the learning process, and promoting positive attitudes towards learning outcomes to enhance MSRLS among students. One of the best ways is to implement regular and on-going "lesson study" sessions among the mathematics teachers. This is a process in which teachers work together to plan, observe, analyse and refine classroom lessons in order to achieve a specific learning goal. Their focus throughout this process is on improving student thinking and making their lessons more effective. For instance, teachers will function as facilitators to stimulate students' cognitive and metacognitive thinking skills by conducting microteachings activities in classrooms. Thus, it helps to improve effectiveness of teaching skills and allows sharing among teachers regarding students' learning strategies in mathematics. Ultimately, this will enhance students' MSRLS as "lesson study" allows students to self-monitor their learning process and promote positive values while learning mathematics with teachers' guidance.

Furthermore, teachers should be given more opportunities to develop their teaching and pedagogical skills in mathematics and also, practise the skills in the classrooms by attending relevant courses. For instance, school management should encourage mathematics teaches to attend intervention programmes or workshops in order to increase MSRLS among students.

For instance, by attending educational intervention programme such as ‘i-Think’ programme, it reveals ways to develop students’ higher order and critical thinking skills and therefore, helps to enhance MSRLS among students.

However, the levels of MSE and MSRLS among the students are only at the moderate level. It was also noted that there was a significant, positive and strong relationship between MSE and MSRLS. If students’ MSE increase, it is expected that their MSRLS would increase as well. Therefore, teachers can tailor their teaching by giving remedial classes to students with low MSE or organize workshops to increase their MSE levels. Similarly, education board could implement “lesson study” for all the secondary schools in the country in which educators can work together to assist students in setting up learning goals, helping them to choose suitable learning strategies, assisting them to self-monitor the learning process so as to increase MSRLS among students

MSE did not differ based on gender and academic stream whereas MSRLS did not differ based on gender but science stream students has higher MSRLS than art stream.

There exists positive correlation between MSE and MSRLS. Since present study reported that students’ MSE and MSRLS are at moderate level, there is a need to increase MSE and MSRLS levels. Teachers should be aware of the importance of MSE and MSRLS which function as predictors for academic achievement and they should diversify their teaching styles and strategies in order to develop students’ MSE and MSRLS. For instance, teachers could design an educational intervention for mathematics lesson in order to develop students’ SE and SRL skills. Students are encouraged to justify their mathematical reasoning and self-monitor their learning processes while solving mathematical problems with the assistance of

teachers. Rewards or compliments will be given for students who are able to achieve the learning goals to boost up their confidence levels in mathematics and hence, it helps to enhance their MSE levels. Additionally, teacher should promote collaborative learning among students in order to increase their MSRLS and provides informational feedback to enhance metacognitive awareness of their own learning. And these efforts should be targeted at arts students more than science students irrespective of gender since arts stream students had lower levels of MSRLS and are less motivated compared to science students.

5.5 Implications for Future Research

The limitations of the findings provided several possible recommendations for future research. Firstly, this study was limited by small sample size as it only involves two secondary schools in rural areas. Thus, future research should include more secondary schools and take into account various types of schools such as urban-rural and school size. Likewise, MSE and MSRLS should be tested for other secondary school levels besides focusing on Form Four students. This will enable the results to be generalized to all secondary schools students in Malaysia.

Additionally, future research should improve the ratio between male and female respondents as the number of male students who took part in the study was less than forty per cent of the sample size used. This might create gender bias that could influence the result of the study.

Furthermore, the data collected can be done qualitatively by including observations, interviews and qualitative analyses to further validate the results obtained from the questionnaires. Future research could consider using open-ended questions in the research

instruments and extend the duration of the study by using ‘pre’ and ‘post’ tests for MSE and MSRLS respectively in order to explore the study in greater depth.

Moreover, other factors that could impact on MSE and MSRLS should also be investigated. For example, demographic variables such as races, ages, academic performances and ethnic groups could be considered for future research since the present study only took into consideration gender and academic stream. Variables such as mathematics anxiety and mathematics beliefs can also be added into the existing independent variables for future research.

5.6 Conclusions

This research investigated the relationship between MSE and MSRLS among secondary school students. In addition, this research also looked at differences in these variables based on the respondents’ characteristics of gender and academic stream.

The findings of this research indicated moderate levels of MSE and MSRLS among students, and students in art stream had lower MSRLS scores than students in science stream. This points to a need for the Ministry of Education and teachers to be aware of these differences and design proper interventions to narrow the disparities in MSRLS based on academic stream. It is hoped that the findings of this study will generate further interest and research in the area of MSE and MSRLS among secondary school students.

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APPENDIX A: QUESTIONNAIRE

Class: _____

Title of Study:

RELATIONSHIP BETWEEN MATHEMATICS SELF-EFFICACY AND MATHEMATICS SELF-REGULATED LEARNING STRATEGIES AMONG SECONDARY SCHOOL STUDENTS

This study is conducted to investigate the relationship between Mathematics Self-Efficacy and Mathematics Self-Regulated Learning Strategies among secondary school students.

The research instrument consists of three sections: Section A *(Students' Background)* is concerning the background of a student. Section B *(Students' Mathematics Self-Efficacy)* is about student's confidence towards accomplishments of a variety of tasks, ranging from understanding of concepts to problem solving in mathematics while Section C *(Students' Mathematics Self-Regulated Learning Strategies)* is concerning academically effective form of learning, through which student sets the goals; monitors and regulates his or her cognition, motivation and behaviour during the learning process, and reflect on his or her learning process.

Your participation in this study is expected to be able to highlight the relationship between Mathematics Self-Efficacy and Mathematics Self-Regulated Learning Strategies among secondary school students. There is no right or wrong answer. Your answers and identity will be kept anonymous. Your cooperation and sincerity in responding to this questionnaire is highly appreciated. Completion of this questionnaire indicates your agreement to take part in this study.

Researcher: *Chung San San (UNIMAS)*

SECTION A: STUDENTS' BACKGROUND

The following questions are concerning the background of you as a student.

Please enter a **tick (√)** or **write** when appropriate in the boxes or spaces provided.

1. Gender

☐	Male
☐	Female

2. Race

☐	Malay
☐	Chinese
☐	Iban
☐	Bidayuh
☐	Others *(Please specify)* : _____

3. Age

☐	16 years old
☐	17 years old
☐	Others *(Please specify)* : _____

4. Academic Stream

☐	Science Stream
☐	Art Stream

5. Second Semester Mathematics Test Results

☐	A (75 – 100)
☐	B (65 – 74)
☐	C (50 – 64)
☐	D (45 – 49)
☐	E (40 – 44)
☐	F (0 – 39)

SECTION B: STUDENTS' MATHEMATICS SELF-EFFICACY

Statements in this section are concerning students' Mathematics Self-Efficacy (adapted from May (2009)).

Using the scale provided, please indicate the extent to which you **agree** or **disagree** with each of the following statements. (Please **circle** one for each)

1	2	3	4	5
Strongly Disagree	Disagree	Neutral/ Not sure	Agree	Strongly Agree

		Strongly Disagree				Strongly Agree
1	I feel confident enough to ask questions in my mathematics class.	1	2	3	4	5
2	I believe I can do well on a mathematics test	1	2	3	4	5
3.	I believe I can complete all my mathematics homework.	1	2	3	4	5
4.	I believe I am the kind of person who is good at mathematics.	1	2	3	4	5
5.	I believe I will be able to use mathematics in my future career when needed.	1	2	3	4	5
6.	I believe I can understand the content in my mathematics subject.	1	2	3	4	5
7.	I believe I can learn well in mathematics.	1	2	3	4	5
8.	I feel confident when taking a mathematics test.	1	2	3	4	5
9.	I believe I am the type of person who can do mathematics.	1	2	3	4	5
10.	I believe I can think like a mathematician.	1	2	3	4	5
11.	I feel confident when using mathematics outside of school.	1	2	3	4	5

SECTION C: STUDENTS' MATHEMATICS SELF-REGULATED LEARNING STRATEGIES

Statements in this section are concerning students' Mathematics Self-Regulated Learning Strategies (adapted from Liu and Lin (2010)).

Using the scale provided, please indicate the extent to which you **agree** or **disagree** with each of the following statements. (Please **circle** one for each)

1	2	3	4	5
Strongly Disagree	Disagree	Neutral/ Not sure	Agree	Strongly Agree

		Strongly Disagree				Strongly Agree
1.	In mathematics class, I would like to have some challenging materials and they will make me learn more.	1	2	3	4	5
2.	Learning mathematics can improve my thinking logic.	1	2	3	4	5
3.	I hope I can get higher grade in mathematics than any other classmates.	1	2	3	4	5
4.	I want to get other people's recognition so I want higher scores in mathematics class.	1	2	3	4	5
5.	I feel the learning materials used in mathematics class are useful.	1	2	3	4	5
6.	What I learn in the mathematics class can be apply in my daily life.	1	2	3	4	5
7.	I memorize the important formula in a mathematics class	1	2	3	4	5
8.	In studying mathematics, I will repeatedly practice similar question types.	1	2	3	4	5
9.	I will link the class notes to textbook examples to improve my understanding.	1	2	3	4	5

		Strongly Disagree				Strongly Agree
10.	In studying mathematics, I will combine my own known knowledge with the learning materials.	1	2	3	4	5
11.	In studying mathematics, I will read through the class notes and mark up the important parts.	1	2	3	4	5
12.	In studying mathematics, I will go over the formula and important concepts by myself.	1	2	3	4	5
13.	I usually question what I heard or what I earn in mathematics class, and judge if these information is persuasive.	1	2	3	4	5
14.	I will combine my own idea into the mathematics class learning.	1	2	3	4	5
15.	In mathematics class, I will try to find out other efficient way to solve problem when I think of some idea or solutions.	1	2	3	4	5
16.	If I feel confused about the mathematics class materials, I will go over to find out where the problem is.	1	2	3	4	5
17.	In studying mathematics, I will set up my own target and follow the agenda I make.	1	2	3	4	5
18.	I will reorganize and clarify the confused points after a mathematics lesson	1	2	3	4	5
19.	I will check my answer again after I finish the mathematics question.	1	2	3	4	5

END OF THE QUESTIONNAIRE

Thank you for your co-operation. Your time and effort are much appreciated.

APPENDIX B

SCALES AND ITEM ANALYSIS
(Students' Questionnaire)

SECTION C: STUDENTS' MATHEMATICS SELF-REGULATED LEARNING STRATEGIES

	Value
Item 1 Item 2 Item 3 Item 4 Item 5 Item 6	Intrinsic Goal Orientation : • In mathematics class, I would like to have some challenging materials and they will make me learn more. • Learning mathematics can improve my thinking logics. Extrinsic Goal Orientation : • I hope I can get higher grade in mathematics than any other classmates. • I want to get other people's recognition so I want higher scores in mathematics class. Task Value : • I feel the learning materials used in mathematics class are useful. • What I learn in the mathematics class can be apply in my daily life.
	Cognitive Strategies
Item 7 Item 8 Item 9 Item 10 Item 11 Item 12	Rehearsal : • I memorize the important formula in a mathematics class • In studying mathematics, I will repeatedly practice similar question types. Elaboration : • I will link the class notes to textbook examples to improve my understanding. • In studying mathematics, I will combine my own known knowledge with the learning materials. Organization : • In studying mathematics, I will read through the class notes and mark up the important parts. • In studying mathematics, I will go over the formula and important concepts by myself.
	Metacognitive Strategies
Item 13 Item 14 Item 15	Critical Thinking : • I usually question what I heard or what I earn in mathematics class, and judge if these information is persuasive. • I will combine my own idea into the mathematics class learning. • In mathematics class, I will try to find out other efficient way to solve problem when I think of some idea or solutions.

Item 16 Item 17 Item 18 Item 19	Self-Regulation : • If I feel confused about the mathematics class materials, I will go over to find out where the problem is. • In studying mathematics, I will set up my own target and follow the agenda I make. • I will reorganize and clarify the confused points after a mathematics lesson. • I will check my answer again after I finish the mathematics question.

APPENDIX C: LETTER OF PERMISSIONS

Appendix C1: Copy of the permission letter to the State Education Department (Page 1)

Chung San San,
No. 1326, Lorong Song 3A,
Jalan Song, Tabuan Height,
93350 Kuching, Sarawak.
Emel: sansan_chung@yahoo.co.uk
Telefon: 012-8816768

Pengarah,
Jabatan Pendidikan Negeri Sarawak,
Jalan Diplomatik,
Off Jalan Bako,
Petra Jaya,
93050 Kuching, Sarawak.
(up: Encik Kuswady Bin Chil, Unit Latihan dan Kemajuan Staf) 30 September 2014.

Tuan,

MEMOHON KEBENARAN MENGGUNAKAN SAMPEL KAJIAN

Sukacita menarik perhatian tuan kepada perkara di atas.

2. Untuk makluman, permohonan saya untuk menjalankan kajian bertajuk : ***"Relationship Between Mathematics Self-Efficacy And Mathematics Self-Regulated Learning Strategies Among Secondary School Students"*** telahpun diluluskan oleh Bahagian Perancangan dan Penyelidikan Dasar Pendidikan, Kementerian Pelajaran Malaysia melalui surat bil : **KP(BPPDP)603/5/JLD.09 (53)** bertarikh **11 September 2014** *(disertakan salinan surat tersebut untuk rujukan tuan).*

3. Dengan ini, saya ingin memohon kebenaran dari pihak tuan untuk menggunakan sampel kajian (murid-murid Tingkatan Empat) di sekolah-sekolah berikut :

(a) Sekolah Menengah Kebangsaan Lundu
(b) Sekolah Menengah Kebangsaan Sematan

Appendix C1: Copy of the permission letter to the State Education Department (Page 2)

3. Kerjasama dan kelulusan bertulis daripada pihak tuan adalah diharapkan dan dihargai.

Sekian, terima kasih.

"**BERKHIDMAT UNTUK NEGARA**"

Yang benar,

(**CHUNG SAN SAN**)
No. KP: 861201-52-5490
Master of Science (Learning Sciences),
Fakulti Sains Kognitif dan Pembangunan Manusia,
Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak.

s.k.

(i) Prof. Madya Dr. Philip Nuli Anding
Timbalan Dekan Fakulti Sains Kognitif dan Pembangunan Manusia,
Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak.

(ii) Prof. Dr. Hong Kian Sam
Penyelia,
Fakulti Sains Kognitif dan Pembangunan Manusia,
Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak.

Appendix C2: Copy of the permission letter from the Ministry of Education (Page 1)

BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
KEMENTERIAN PENDIDIKAN MALAYSIA
ARAS 1-4, BLOK E-8
KOMPLEKS KERAJAAN PARCEL E
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62604 PUTRAJAYA.

Telefon : 03-88846591
Faks : 03-88846579

Ruj. Kami : KP(BPPDP)603/5/JLD.09 (53)
Tarikh : 11 September 2014

Chung San San
1326 Lorong Song 3A
Jalan Song Tabuan Height
93350 Kuching
Sarawak

Tuan/Puan,

Kelulusan Untuk Menjalankan Kajian Di Sekolah, Institut Pendidikan Guru, Jabatan Pendidikan Negeri Dan Bahagian-Bahagian Di Bawah Kementerian Pendidikan Malaysia

Adalah saya dengan hormatnya diarah memaklumkan bahawa permohonan tuan /puan untuk menjalankan kajian bertajuk:

"Relationship Between Mathematics Self-Efficacy and Mathematics Self-Regulated Learning Strategies Among Secondary School Students" diluluskan.

2. Kelulusan ini adalah berdasarkan kepada cadangan penyelidikan dan instrumen kajian yang tuan/puan kemukakan ke Bahagian ini. **Kebenaran bagi menggunakan sampel kajian perlu diperolehi dari Ketua Bahagian/Pengarah Pendidikan Negeri yang berkenaan.**

3. Sila tuan/puan kemukakan ke Bahagian ini senaskah laporan akhir kajian/laporan dalam bentuk elektronik berformat Pdf di dalam CD bersama naskah *hardcopy* setelah selesai kelak. Tuan/Puan juga diingatkan supaya mendapat kebenaran terlebih dahulu daripada Bahagian ini sekiranya sebahagian atau sepenuhnya dapatan kajian tersebut hendak dibentangkan di mana-mana forum atau seminar atau diumumkan kepada media massa.

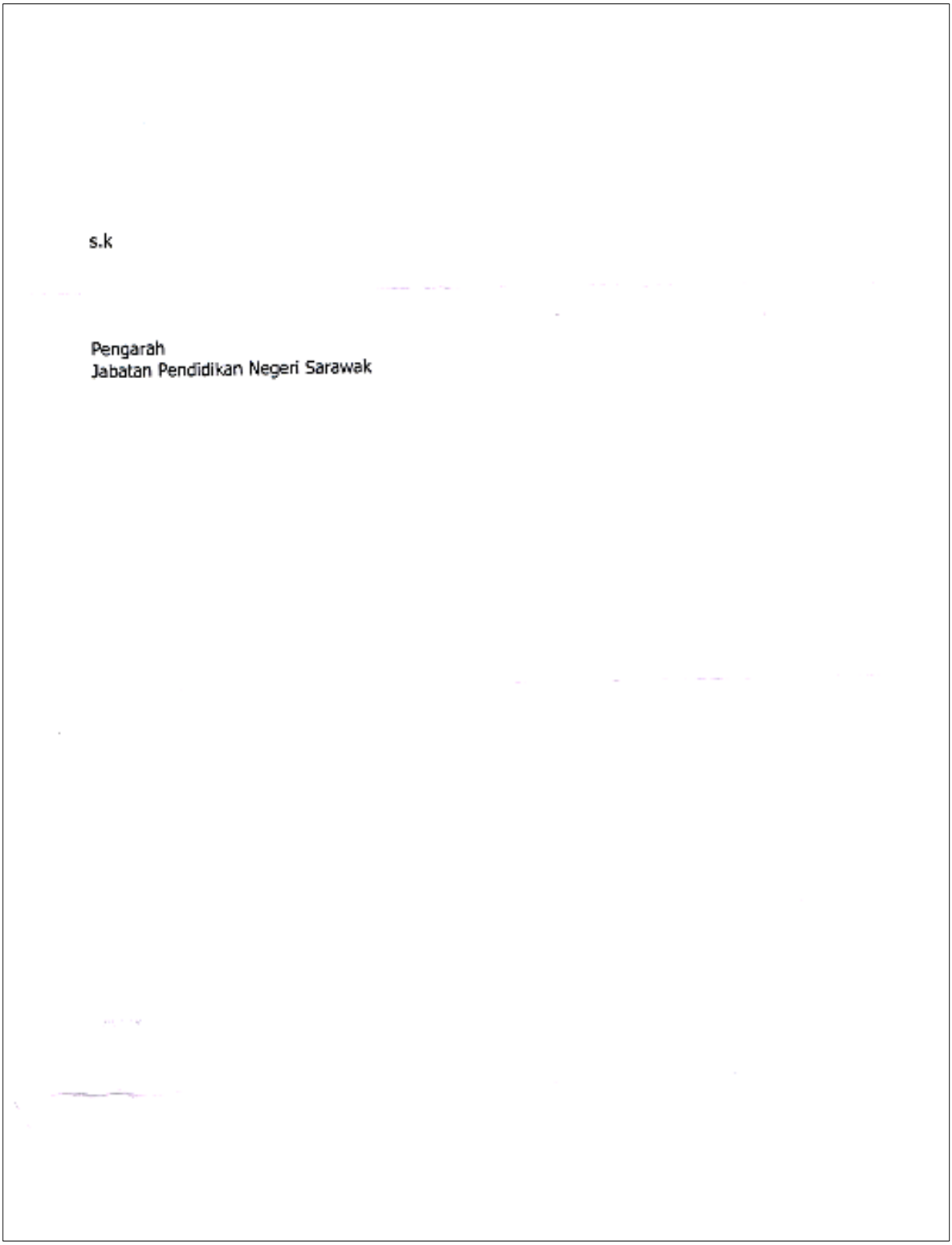
Sekian untuk makluman dan tindakan tuan/puan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DR. HJ. ZABANI BIN DARUS)
Ketua Sektor
Sektor Penyelidikan dan Penilaian
b.p. Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pendidikan Malaysia

Appendix C2: Copy of the permission letter from the Ministry of Education (Page 2)



s.k

Pengarah
Jabatan Pendidikan Negeri Sarawak

Appendix C3: Copy of the permission letter from the State Education Department

(Page 1)

JABATAN PENDIDIKAN NEGERI SARAWAK
JABATAN PELAJARAN NEGERI SARAWAK
JALAN DIPLOMATIK
OFF JALAN BAKO
PETRA JAYA
93050 KUCHING
SARAWAK

Telefon : 082-473424 / 473445
Faks : 082-473428
(Unit Latihan & Kemajuan Staf)

Ruj Kami : JPS(W)SK2P/(Lat)153/08/02/05/Jld. 48(46)
Tarikh : 3 Oktober 2014

Chung San San

No 1326, Lorong Song 3A
Jalan Song, Tabuan Height
93350 Kuching
Sarawak

Puan,

KEBENARAN UNTUK MENJALANKAN KAJIAN DI SEKOLAH-SEKOLAH, INSTITUT-INSTITUT PERGURUAN, JABATAN-JABATAN PENDIDIKAN DAN BAHAGIAN-BAHAGIAN DI BAWAH KEMENTERIAN PENDIDIKAN MALAYSIA

Dengan hormatnya saya merujuk kepada perkara di atas.

2 Sukacita dimaklumkan bahawa pada dasarnya Jabatan Pendidikan Negeri Sarawak tiada sebarang halangan untuk membenarkan puan menjalankan kajian bertajuk :

" Relationship Between Mathematics Self-Efficacy and Mathematics Self-Regulated Learning Strategies Among Secondary School Students "

3. Sukacita diingatkan bahawa sepanjang tempoh kajian tersebut, puan adalah tertakluk kepada peraturan yang sedang berkuatkuasa dan menjalankan kajian seperti tajuk yang diluluskan oleh Bahagian Perancangan dan Penyelidikan Dasar Pendidikan, Kementerian Pendidikan Malaysia bil. KP(BPPDP)603/5/JLD.09(53) bertarikh 11 September 2014.

4. Jabatan ini memohon agar sesalinan laporan kajian dihantar ke Unit Latihan Dan Kemajuan Staf, Jabatan Pendidikan Negeri Sarawak sebaik sahaja selesai untuk tujuan rekod dan rujukan. Dengan surat ini, Pegawai berkenaan adalah dimohon untuk memberi bantuan dan kerjasama yang sewajarnya bagi menjayakan kajian tersebut.

Sekian, terima kasih.

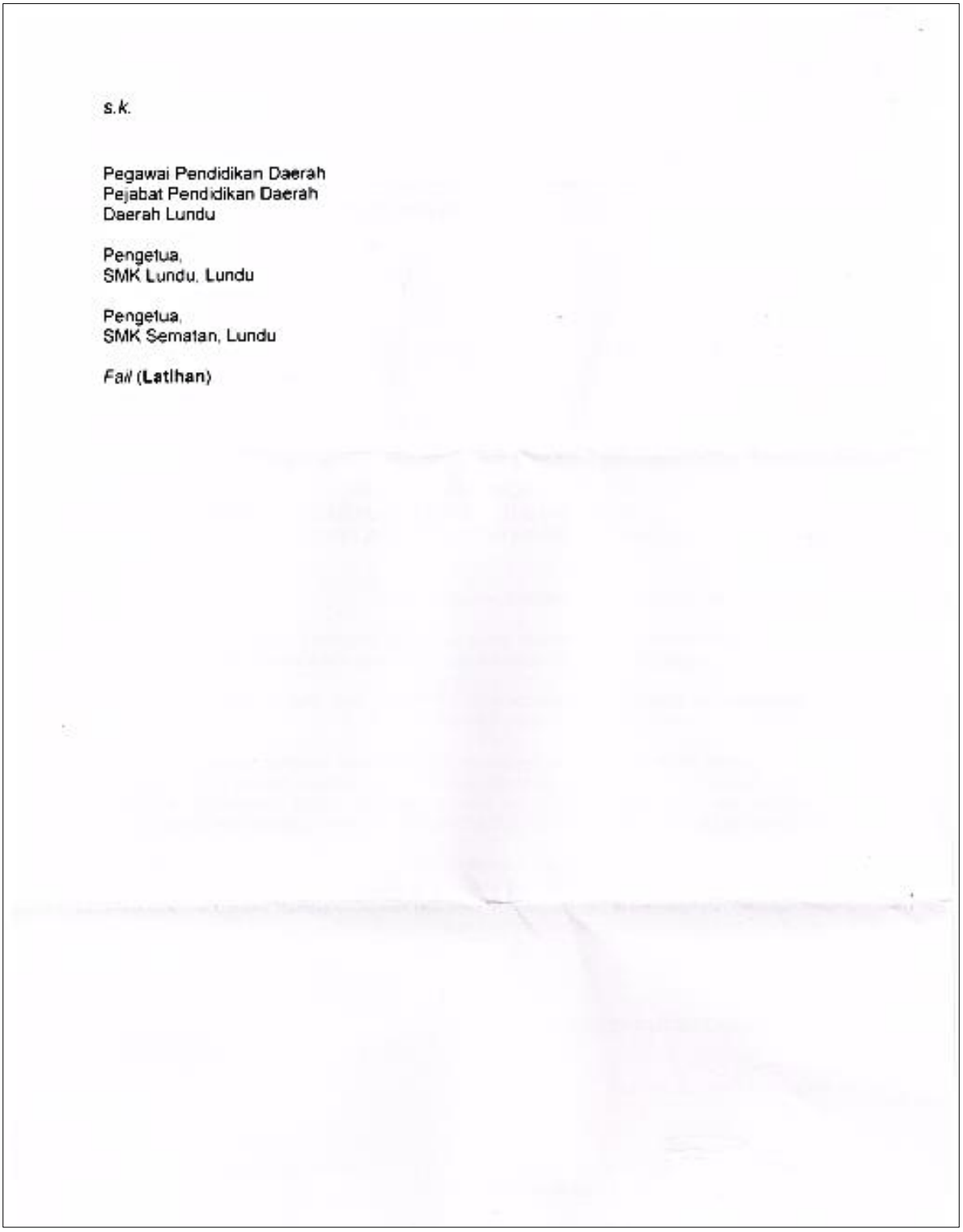
"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

[KUSWADY BIN CHIL]
Sektor Khidmat Pengurusan Dan Pembangunan
b.p Pengarah Pendidikan
Sarawak.

Appendix C3: Copy of the permission letter from the State Education Department

(Page 2)



s.k.

Pegawai Pendidikan Daerah
Pejabat Pendidikan Daerah
Daerah Lundu

Pengetua,
SMK Lundu, Lundu

Pengetua,
SMK Sematan, Lundu

Fail (**Latihan**)

Appendix C4: Copy of the permission letter from the Faculty of Cognitive Science and Human Development, UNIMAS

Fakulti Sains Kognitif dan Pembangunan Manusia
Faculty of Cognitive Sciences and Human Development

UNIMAS/NC-16.02/03-07/02/13 (1)

20 Ogos 2014

Pengarah
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan
Kementerian Pelajaran Malaysia
Aras 1-4, Blok E8,
Kompleks Kerajaan Parcel E
Pusat Pentadbiran Kerajaan Persekutuan
62604 PUTRAJAYA.

Tuan,

Permohonan Menjalankan Kajian/Soal Selidik Untuk Kerja Kursus

Adalah dimaklumkan bahawa pelajar yang tersebut di bawah adalah merupakan pelajar Program Sarjana Sains (Sains Pembelajaran), Fakulti Sains Kognitif dan Pembangunan Manusia, Universiti Malaysia Sarawak (UNIMAS), dengan ini memohon untuk menjalankan kajian/soal selidik di organisasi tuan. Kajian/soal selidik yang akan dijalankan ini adalah sebahagian dari syarat tugasan kumpulan bagi kerja kursus KML 6066 Kertas Penyelidikan, bagi semester 2 sesi 2013/2014.

Maklumat lanjut pelajar dan tajuk kajian adalah seperti berikut :

Tajuk Kajian	:	*Mathematics Self-Efficacy and Mathematics Self-Regulated Learning Strategies Among Secondary School Students.*
Nama Pelajar	:	Chung San San [13030224]
Pensyarah/ Penyelia	:	**Prof Dr Hong Kian Sam** *hksam@fcs.unimas.my* +6 082 – 583687

Sehubungan itu, sukacita kiranya pihak tuan dapat memberikan kerjasama kepada pelajar yang terlibat bagi membolehkan mereka mendapatkan makumat yang diperlukan. Pihak UNIMAS/FSKPM menjamin bahawa segala maklumat yang diperolehi hanya digunakan untuk tujuan akademik semata-mata dan dijamin akan kerahsiaannya.

Di atas segala kerjasama yang diberikan, kami dahului dengan ucapan terima kasih.

Sekian.

Yang benar,

Mohd Hafizan b Hashim
Penyelaras Program Sarjana Sains (Sains Pembelajaran)

s.k. - Fail Peribadi Pelajar

MSC-Status