# EFFECTS OF SOLICITED, FORMATIVE, AND SUMMATIVE TEACHER FEEDBACK ON SELF-REGULATED LEARNING OF UNDERGRADUATES IN A MALAYSIAN PRIVATE UNIVERSITY

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**KUALA LUMPUR**

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## ABSTRACT

Developing self-regulated learners is one of the mandates of modern education. Though, a general trend of decreasing students‟ self-regulation from primary to secondary school has been recorded internationally, and university students do not report having optimal self-regulated learning. Teacher feedback is shown to be an inherent catalyst of students‟ self-regulated learning. However, the role of more tailored, targeted feedback towards specific challenges faced by students and the temporal location of feedback in facilitating students‟ self-regulated learning are still under-researched. As such, the current study aimed to examine the role of solicited teacher feedback, and formative and summative teacher feedback in facilitating students‟ self-regulated learning. A randomized pretest-posttest control group experimental design was employed in this study. A total of 157 psychology undergraduates from a Malaysian private university received either solicited, formative, and summative teacher feedback; solicited and summative only teacher feedback; unsolicited, formative, and summative teacher feedback; unsolicited and summative only teacher feedback; or no teacher feedback (control) over the course of an academic semester. The students‟ self-regulated learning was measured using the Motivated Strategies for Learning Questionnaire (MSLQ). The results revealed that participants in the solicited teacher feedback condition reported significantly greater levels of metacognitive and behavioral components of self-regulated learning as compared to participants in the unsolicited teacher feedback condition, after controlling for pre-manipulation level of self-regulated learning. However, there was no significant difference in the motivational component of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of

self-regulated learning. There was no significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning. Finally, there was no significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. The findings of the study attest to the importance of solicited teacher feedback in enhancing students‟ self-regulated learning and provide unique insights on the role of teacher feedback in cultivating students‟ self-regulated learning in Malaysian private university context.

**KESAN MAKLUM BALAS GURU MELALUI PERMINTAAN, FORMATIF, DAN SUMATIF TERHADAP PEMBELAJARAN PENGATURAN KENDIRI PELAJAR DI SEBUAH UNIVERSITI SWASTA DI MALAYSIA**

## ABSTRAK

Pembentukan pembelajaran pengaturan kendiri merupakan salah satu mandat pendidikan pada akhir-akhir ini. Walau bagaimanapun, pengurangan pembelajaran pengaturan kendiri pelajar dari sekolah rendah ke sekolah menengah telah direkodkan di peringkat antarabangsa dan didapati bahawa pelajar universiti tidak melaporkan pembelajaran pengaturan kendiri yang optimum. Maklum balas guru merupakan pemangkin kepada pembelajaran pengaturan kendiri pelajar. Didapati bahawa kajian tentang peranan maklum balas yang lebih disesuaikan dan disasarkan pada cabaran-cabaran khusus yang dihadapi oleh pelajar dan masa maklum balas dalam mempermudahkan pembelajaran pengaturan kendiri pelajar masih tidak mencukupi. Oleh itu, kajian ini bertujuan untuk mengkaji peranan maklum balas guru melalui permintaan, dan maklum balas guru formatif dan sumatif dalam mempermudahkan pembelajaran pengaturan kendiri pelajar. Reka bentuk eksperimen kumpulan kawalan rawak pra dan pasca kajian telah digunakan dalam kajian ini. Seramai 157 orang pelajar psikologi dari sebuah universiti swasta di Malaysia menerima 1) maklum balas guru melalui permintaan, formatif, dan sumatif; 2) maklum balas guru melalui permintaan dan sumatif; 3) maklum balas guru tidak melalui permintaan, formatif dan sumatif; 4) maklum balas guru tidak melalui permintaan dan summatif; atau 5) tiada maklum balas guru (kawalan) sepanjang semester akademik. Pembelajaran pengaturan kendiri pelajar telah diukur dengan menggunakan *Motivated Strategies for Learning Questionnaire (MSLQ)*. Hasil kajian menunjukkan bahawa peserta kumpulan maklum balas guru melalui

permintaan melaporkan tahap metakognitif dan tingkah laku pembelajaran pengaturan kendiri yang lebih tinggi daripada peserta kumpulan maklum balas guru tidak melalui permintaan, setelah mengawal tahap pembelajaran pengaturan kendiri pra kajian. Walau bagaimanapun, tidak terdapat perbezaan yang signifikan dalam komponen motivasi pembelajaran pengaturan kendiri antara pelajar yang diberi maklum balas guru melalui permintaan dan pelajar yang diberi maklum balas guru tidak melalui permintaan, selepas mengawal tahap pembelajaran pengaturan kendiri pra kajian. Juga, tidak terdapat perbezaan yang signifikan dalam pembelajaran pengaturan kendiri antara pelajar yang diberi maklum balas guru formatif dan sumatif, dan pelajar yang diberi hanya maklum balas guru sumatif selepas mengawal tahap pembelajaran pengaturan kendiri pra kajian. Akhir sekali, tidak terdapat kesan interaksi yang signifikan dari jenis maklum balas (melalui permintaan dan tidak melalui permintaan) dan masa maklum balas (formatif dan sumatif, dan sumatif sahaja) pada pembelajaran pengaturan kendiri pelajar, selepas mengawal tahap pembelajaran pengaturan kendiri pra kajian. Penemuan kajian ini membuktikan kepentingan maklum balas guru melalui permintaan dalam meningkatkan pembelajaran pengaturan kendiri pelajar dan memberi pandangan yang unik mengenai peranan maklum balas guru dalam memupuk pembelajaran pengaturan kendiri pelajar dalam konteks universiti swasta di Malaysia.

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# CHAPTER 1

# INTRODUCTION

## 1.1 Background of the Study

Lifelong learning is universally emphasized as the demand of the modern society. This emphasis is seen through various ingenuities such as the World Initiative on Lifelong Learning developed by a large coalition of multinational businesses, educationalists, and international organizations like United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Organization for Economic Co-operation and Development (OECD; Longworth & Davies, 1996; Stewart & Ball, 1995). The Education Ministry of Malaysia has also recognized the importance of lifelong learning and has incorporated it in its process of reviewing the 2007-2020 National Higher Education Strategic Plan (Ministry of Higher Education, 2011). As such, an essential aim of today‟s education including higher education is to develop self-regulated learners who are actively engaged in their own learning process during and after schooling, and throughout one‟s life. Likewise, Gardner (1964) argues that "the ultimate goal of the education system is shift to the individual the burden of pursuing [their] own education" (p. 21).

Self-regulated learning refers to the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1986). Promotion of self-regulated learning is hoped to address one of the greatest challenges that teachers face today, which is how to help students learn intentionally, autonomously, and effectively (Panadero & Alonso-Tapia, 2014). Interventions to enhance self-regulated learning are especially needed for private university students given their lower levels of self-regulated learning

compared to their public university counterparts. More than three decades of research on ways to promote self-regulated learning in students has shown that external feedback such as teacher feedback to be an inherent catalyst of students‟ self-regulated learning (Butler & Winne, 1995). Thus, this study is an attempt to investigate the effectiveness of a teacher feedback intervention that is aimed to enhance self-regulated learning among Malaysian private university undergraduates.

## 1.2 Rationale of the Study

The significance of self-regulation in academics is well recognized in educational psychology literature (Paris & Paris, 2001; Schunk & Ertmer, 2000). Specifically, a considerable amount of research has shown self-regulation to be one of the most powerful predictors of academic motivation and achievement regardless of students‟ gender, ethnicity, socioeconomic status, and academic areas (Boekaerts, Pintrich, & Zeidner, 2000; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Kitsantas, Dabbagh, Hiller, & Mandell, 2015; Pintrich, 2003). Students who are trained in self-regulation processes such as goal setting, self-monitoring, and self-reflection during their learning display greater levels of motivation and achievement (Boekaerts, Pintrich, & Zeidner, 2000; Pintrich, 2003; Schunk, 1996; Wood, Bandura, & Bailey, 1990; Zimmerman & Martinez-Pons, 1990). Furthermore, a meta-analysis by Dignath and Büttner (2008) which included 84 studies and 357 effect sizes on the association between self-regulated learning and academic achievement of primary and secondary school students revealed a large average effect size of 0.69, again demonstrating to the importance of self-regulated learning for academic achievement.

Feedback also plays an important role in students‟ academic achievement. Hattie and Timperley‟s (2007) review of 12 meta-analyses which included 196

studies and 6, 972 effect sizes on the influences of feedback on achievement reported an average effect size of 0.79, twice the typical effect of schooling of 0.40. This large effect size suggests that feedback is one of the most powerful influences of students‟ learning and achievement. Furthermore, feedback is essential to be investigated in the context of self-regulated learning as series of research has demonstrated that students‟ self-regulated learning can be enhanced through social guidance and feedback (Schunk & Swartz, 1993a).

Teacher feedback, especially solicited teacher feedback in which students explicitly request for teachers‟ feedback in areas the former find challenging, can be helpful in developing students‟ self-regulated learning. Solicited feedback would encourage students to better monitor their work and seek appropriate feedback from their teachers. Following an extensive analysis, Butler and Winne (1995) suggest that external feedback on students‟ domain understandings help them generating monitoring information, especially about cues that students can use to regulate learning. That is, the students will be able to gauge their progress relative to their goals and generate feedback that guides further action. Self-regulated learning researchers have proposed that teachers‟ feedback helps students in determining the accuracy of their self-monitoring (Schunk, 2000; Zimmerman, Bonner, & Kovach, 1996). Such teacher feedback would aid the self-judgmental subfunction proposed by Bandura (1986) by providing evaluative information as well. Existing research on the effect of teacher feedback on students‟ self-regulated learning has focused predominantly on top-down, unsolicited teacher feedback. That is, feedback is seen as a process of one-way information transmission dominated by teachers (Nicol & Macfarlane-Dick, 2006). As the practice of solicited feedback will provide further

opportunity for students to be more active participants in their own learning, the effect of solicited teacher feedback is worth investigating next.

In addition, Bangert-Drowns, Kulik, Kulik, and Morgan (1991) posits that feedback facilitates self-regulated learning by empowering active learners with strategically useful information. The value of teacher feedback in facilitating students‟ self-regulated learning can be further enhanced if the feedback provided is formative rather than summative as the former provides more opportunity for students to engage in cyclical feedback loop. That is, students get an opportunity to check progress, monitor the effectiveness of learning strategies, and adjust ineffective strategies in time, especially before the completion of an academic task (Cleary & Zimmerman, 2004). Formative feedback process also informs teaching practice, gives teachers information for instructional decisions, and gives students scaffolded assistance for learning or task improvement (Brookhart, 2008). The literature on the association between feedback and self-regulated learning is extensive for summative feedback, but not for formative feedback (Black & Wiliam, 2009). As such, examining the effect of formative teacher feedback on students‟ self-regulated learning would be fruitful.

Moreover, it is critical to explore ways to enhance self-regulated learning of university students particularly, as most of the university students‟ learning happens outside of the classroom (Hofer, Yu, & Pintrich, 1998). The university students need to learn to be motivationally, metacognitively, and behaviorally active participants in their own learning process in order to excel in their academic courses. Ning and Downing (2015) claim that in contrast to primary and secondary education, university education demands students to be more proactive, self-disciplined, and be able to control their own learning via self-monitoring and self-evaluation. Examining

how effective teacher feedback would help the university students to develop a greater self-regulated learning skill thus becomes imperative.

### 1.3 Statement of Problem

While self-regulated learning is stressed as a mandate of the modern society, there is an international trend of decreasing students‟ self-regulation from primary to secondary school (Caprara et al., 2008; Helle, Laakkonen, Tuijula, & Vermunt, 2013; Mok, Fan, & Pang, 2007; Pajares & Valiante, 2002). This decrease then persists as the students pursue their tertiary education in universities. Likewise, Bembenutty (2008) reported that many university students are not effective self-regulated learners. Dunlosky and Rawson (2012) also claim that students who have difficulty engaging in self-regulated learning are often disadvantaged by inaccurate monitoring. A preliminary survey study was conducted by the researcher involving 120 second-year undergraduates, and their 16 lecturers and 13 tutors (hereafter, teachers) from a Malaysian private university in January – February 2018 to better understand the problem of interest. The students sample consisted of 71.67% of women and 26.67% of men respondents with a mean age of 21 years. The teachers sample consisted of 58.62% of women and 41.38% of men respondents with a mean age of 35.69 years. These teachers had a mean teaching experience of 6.75 years.

The students‟ mean level of self-regulated learning was 4.68 over a highest possible score of 7, revealing that the students‟ level of self-regulated learning is only slightly above average. In addition, on average, the teachers who responded to the same survey reported that the students practice self-regulated learning only sometimes, which is about 50% of the time. As practicing self-regulated learning around an average of 50% is not optimal, there is a pressing need to identify more

effective ways of promoting self-regulated learning among students, especially among students in universities.

Despite a fair amount of research on the powerful influence of teacher feedback on students‟ self-regulated learning, the incorporation of students‟ inputs in the feedback process is relatively under-researched. Even with the emphasis on student-centered learning as the significant pedagogy in contemporary educational institutions, feedback is still seen as a process of information transmission dominated by teachers (Nicol & Macfarlane-Dick, 2006). This one-way transmission of feedback does not give sufficient consideration to challenges faced by students during academic tasks and ultimately denies the opportunity for students to be active participants in their own learning process, which is an integral component of self-regulated learning.

Students from the preliminary survey study reported that on average, their teachers give opportunities for students to communicate the challenges they face while working on an academic task such as assignment and exam only sometimes, which is about 50% of the time. Students further stated that on average, only sometimes do the feedback their teachers give address the specific challenges students faced while working on an academic task. However, teachers from the same study reported that on average, they frequently, which is about 70% of the time, give opportunities for their students to solicit feedback from the teachers and to communicate the challenges the students face while working on an academic task to the teachers. The teachers also reported that on average, they frequently tailor their feedback to the specific challenges the students faced while they are working on an academic task. The teachers further stated that on average, the students solicit feedback from them as they are working on an academic task, only sometimes, which

is about 50% of the time. The apparent discrepancy between how students and teachers perceive the feedback process is noteworthy. Students might not perceive the existing feedback process as student-centered as the teachers do. Tailoring teacher feedback even more to the specific challenges faced by students can be fruitful, yet is understudied. Thus, the effect of more tailored, targeted teacher feedback compared to the traditional top-down feedback on students‟ self-regulated learning needs to be examined.

In addition, the literature on the association between formative feedback and self-regulated learning is still scarce. Based on the preliminary survey study mentioned above, students reported that on average, their teachers provide formative feedback to them only sometimes, about 50% of the time. They further reported that on average, their teachers provide summative feedback to them frequently, which is about 70% of the time. Teachers, on the other hand, reported that on average, they frequently, about 70% of the time provide summative feedback to their students. The teachers also reported to frequently provide formative feedback to their students, on average. Here again, the apparent discrepancy between how students and teachers perceive the feedback process is noteworthy. Furthermore, the value of teacher feedback in facilitating students‟ self-regulated learning might be further enhanced if the feedback provided is formative rather than summative as the former provides more opportunity for students to engage in cyclical feedback loop (Cleary & Zimmerman, 2004).

Although the prominent importance of teacher feedback is recognized in the field of education, in practice however, the quality of feedback is often minimized and sometimes neglected entirely possibly due to the incredible list of responsibilities of teachers which include planning lessons, designing engaging activities, aligning

content to standards, managing classroom environments, supervising extracurricular activities, and reporting grades (Percell, 2017). Similarly, teachers state increasing paperwork, numerous required meetings, additional nonclassroom responsibilities, and the overall teacher workload as reasons for not being able to engage in optimal teaching practice (National Education Association, 2003). Although feedback is essential for an effective learning process, in many instances, feedback is only given after the completion of assignments or other academic tasks, as a way to justify the students‟ final grades (Percell, 2017). Furthermore, Voerman, Meijer, Korthagen, and Simons (2012) report that teachers do not provide adequate learning-enhancing feedback and that frequency of learning-enhancing feedback does not change as a function of teaching experience, gender, or age.

Moreover, private university students are likely to have lower levels of self-regulated learning than public university students. In countries like Malaysia, tertiary education is offered by both public and private universities. The government-funded public institutions admit students into their various university programs based on students‟ merit. As there is a limit as to how many students the public institutions can take in each year, public institutions tend to have more stringent entry requirements. For instance, Taylor‟s University (a Malaysian private university) requires a minimum CGPA of 2.00 and a C in Malaysian Higher School Certificate (*Sijil Tinggi Persekolahan Malaysia; STPM)* Mathematics and Physics / Chemistry to enroll in their Bachelor of Chemical Engineering program (Taylor‟s University, 2018). In contrast, University of Malaya (a Malaysian public university) requires a minimum CGPA of 3.00 and a B in Malaysian Higher School Certificate (*Sijil Tinggi Persekolahan Malaysia; STPM)* Mathematics and Physics / Chemistry to enroll in the same program (University of Malaya, 2017). As such, academically superior

students are generally admitted into the public universities, leaving less academically superior students to obtain their tertiary education in private institutions. Zimmerman and Martinez-Pons (1986) have shown that less academically superior students have lower levels of self-regulated learning than their academically superior counterparts. Their finding is also consistent with an extensive body of research that has established the association between self-regulated learning and academic achievement (Bannert, Reimann, & Sonnenberg, 2014; Muis, Psaradellis, Chevrier, Di Leo, & Lajoie, 2016; Vrugt & Oort, 2008). Thus, finding ways to enhance the self-regulated learning of students in private universities is more vital as they are likely to have lower levels of self-regulated learning than public university students.

A recent study by Foerst, Klug, Jostl, Spiel, and Schober (2017) has shown that although psychology students have quite advanced knowledge of self-regulated learning strategies, they do not always put this knowledge into practice. Virtanen and Nevgi (2010) examined the disciplinary differences among higher education students in self-regulated learning. Consistent with a number of previous studies, the authors found that across the diverse disciples of economic sciences, technology and architecture, behavioral sciences, biosciences and medicine, science, and arts, only minor mean differences emerged on all the sub-dimensions of self-regulated learning, and there was no clear regularity on any discipline‟s favor. While self-regulated learning is crucial for the academic and eventual career success of all university majors, it is especially crucial for students undertaking psychology as their undergraduate major. Psychology is regarded as one of the most dynamic and evolving fields, and thus someone in the field has to have the attitude of lifelong learning – which can be cultivated by enhancing one‟s self-regulated learning – in order to be successful in their career (Davis & Buskist, 2008). Thus, finding more

effective ways to enhance psychology students‟ self-regulated learning becomes essential.

## 1.4 Research Purpose

Given that developing students‟ self-regulated learning is an important mandate of modern education and that many university students are not effective self-regulated learners, it is essential to find more effective ways of promoting the students‟ self-regulated learning. This research aspired to do exactly that. Specifically, the research aimed to study the effect of teacher feedback that is more tailored towards the specific challenges faced by students while working on academic tasks on students‟ self-regulated learning. This type of feedback is in contrast to the traditional top-down feedback process that is dominated by teachers and has minimal involvement of the students; it provides greater opportunities for students to engage in self-regulatory subfunctions such as self-observation and judgmental process proposed by Bandura (1986).

In addition, this research intended to study the effect of formative and summative teacher feedback compared to the more common summative teacher feedback only on students‟ self-regulated learning. Formative teacher feedback offers a superior avenue for students to enhance their self-regulated learning through cyclical feedback loop (Cleary & Zimmerman, 2004). In sum, the purpose of the current research was to examine the role of solicited teacher feedback, and formative and summative teacher feedback in facilitating students‟ self-regulated learning. The purpose of the current research is in line with the universal emphasis on lifelong learning as the demand of the modern society, stressed by international organizations such as UNESCO and OECD (Longworth & Davies, 1996; Stewart & Ball, 1995).

## 1.5 Research Objectives

The objectives of the current research were:

i. To examine if there is a significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning.

ii. To examine if there is a significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning.

iii. To examine if there is a significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

## 1.6 Research Questions

The research questions of the current study were:

i. Is there a significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning?

ii. Is there a significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning?

iii. Is there a significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning?

## 1.7 Research Hypotheses

The hypotheses of the current study were:

Ho1: There is no significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning.

Ha1: There is a significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning.

Ho2: There is no significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning.

Ha2: There is a significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning.

Ho3: There is no significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only)

on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

Ha3: There is a significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

## 1.8 Significance of the Study

The findings from the current research provide an evidence-based effective feedback method for both pre-service and in-service teachers. If there is convincing evidence to support that solicited, and formative and summative teacher feedback are superior to unsolicited and summative only teacher feedback in future replications of the research, then the former can be thought to in-service teachers including lecturers and tutors at higher education institutions as a part of their continuous professional development. These techniques would complement the teachers‟ existing effort in facilitating students‟ self-regulated learning. For pre-service teachers, on the other hand, these techniques can be taught as a part of their teacher training. This incorporation will allow the pre-service teachers to have a more evidence-based feedback method in their teaching practices repertoire. The addition of techniques would also provide greater confidence for teachers in promoting their students‟ self-regulated learning, given the empirical support for the stated feedback method.

This feedback method, in turn, will act as an additional catalyst in enhancing students‟ self-regulated learning, especially university students who are not always effective self-regulated learners. Ultimately, the feedback method will play a nontrivial role in assisting teachers to develop their students as lifelong learners, as stressed by international organizations such as UNESCO and OECD (Longworth &

Davies, 1996; Stewart & Ball, 1995). Students, in turn, would become perform better academically by utilizing their self-regulated learning strategies. Moreover, they would become lifelong learners which would allow them to thrive in their career, especially those who are in a dynamic and evolving field such as psychology students.

Finally, a significant proportion of research in the area of self-regulated learning has utilized samples from North America and Europe. Employing a Malaysian sample in this study provides unique insights on the topic as systematic differences could be expected in teaching and learning practices and processes between countries from different regions of the world. More locally, the findings shed light on self-regulated learning of Malaysian university students as most previous research conducted on the topic of self-regulated learning has relied on secondary boarding school students as samples.

## 1.9 Scope of the Study

This research was conducted at a private university in Malaysia. One hundred and seventy-five university students, and their respective lecturers and tutors were involved in this study. As the majority of university learning takes place outside of the classroom, it is paramount for university students to be self-regulated learners to succeed in their courses (Hofer, Yu, & Pintrich, 1998). As such, this study was delimited to university students and their respective teachers. The study examined the effects of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning in the context of private university psychology course. The research examined the two facets of feedback mentioned as they are potentially important yet under-researched variables. Students undertaking a psychology course were selected as the

sample of the current study as the practice of lifelong learning is expected to a greater extent from psychology graduates. Psychology course also constitutes a fair amount of writing which will allow a better investigation of solicited and formative teacher feedback. The study was conducted as part of the students‟ psychology course over a period of eight weeks. The study was conducted for a duration of eight weeks in order to adequately capture any changes in students‟ self-regulated learning, following teacher feedback.

## 1.10 Limitations of the Study

While this research sheds light on the effects of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, and ultimately provided a more effective way of facilitating self-regulated learning among students, it has some limitations. As only one private university students were included in the study, the generalizability of the findings to all private universities in Malaysia or beyond might be limited as there could be systematic variations between these groups of students. Individual factors such as students‟ gender, ethnicity, and socioeconomic status were not fully controlled during sampling as sampling was limited by the student demographics of the chosen private university. In addition, measured students‟ self-regulated learning could be limited to the subject of psychology as self-regulated learning tend to be domain-specific (Bandura, 1986). The effectiveness of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, summative only) on students‟ self-regulated learning might vary according to chosen subjects, but studying students‟ self-regulated learning in the context of multiple subjects was beyond the scope of this research. In addition, this study only focused on solicitation of feedback by the students and giving of the different forms of feedback by the

teachers. The study did not involve monitoring the students‟ behaviors in relation to addressing the given feedback as it would have gone beyond the scope of the current study. Furthermore, although reasonable to notice any significant changes in students‟ self-regulated learning, a period of eight weeks might not be optimal to fully capture the long-term changes in students‟ self-regulated learning. Despite its limitations, guided by proper research methodology, this program of research still has reasonable theoretical and practical implications in regards to students‟ self-regulated learning.

## 1.11 Operational Definitions

### 1.11.1 Solicited Teacher Feedback

Teacher feedback is defined as the information that is communicated to students about their present state of learning and performance, and how they match to the relevant goals and standards (Nicol & Macfarlane-Dick, 2006). Solicited teacher feedback refers to feedback provided by teachers following students‟ solicitation or explicit request for teachers‟ feedback in areas the students find challenging. In this study, solicited teacher feedback refers to the feedback provided by teachers based on the three requests for feedback made (on the feedback request forms) by the student participants while they were working on their academic tasks such as lecture and assignment.

### 1.11.2 Unsolicited Teacher Feedback

Unsolicited teacher feedback refers to feedback provided by teachers through a traditional, top-down approach without any solicitation or explicit request for teachers‟ feedback by the students. In this study, unsolicited teacher feedback refers to the comparable feedback provided by teachers as the ones given to the student participants who made an explicit request for feedback (solicited feedback). That is,

feedback that was given based on the three most commonly made requests for feedback by the participants in the solicited feedback condition. It is important to note that unsolicited teacher feedback did not involve any direct request for feedback by the students from the teachers.

### 1.11.3 Formative Teacher Feedback

Formative teacher feedback refers to information communicated by teachers to their students to modify the students‟ thoughts or behaviors with the ultimate goal of improving students‟ learning (Shute, 2008). This form of feedback is provided while the students are still working on an academic task. In this study, formative teacher feedback refers to the feedback given by teachers while the students were working on the academic task of assignment. This feedback was given to students two times while the students were working on the academic task.

### 1.11.4 Summative Teacher Feedback

Summative teacher feedback refers to information about final achievement and accomplishment that is communicated by teachers to their students (Nitko & Brookhart, 2011). This form of feedback is provided once the students complete a given academic task. In this study, summative teacher feedback refers to the feedback given by teachers once the students have completed an academic task such as lecture and assignment.

### 1.11.5 Self-Regulated Learning

Self-regulated learning refers to the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process. Metacognitively active students plan, set goals, organize, self-monitor, and self-evaluate at various stages of their learning process. Motivationally active students have high self-efficacy, self-attribution, and intrinsic task interest, and

are autonomous. Behaviorally active students select, structure, and create environments that are conducive for learning. They also seek advice and information, self-instruct, and self-reinforce (Zimmerman, 1990).

In this study, self-regulated learning refers to student participants‟ scores on the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993). Specifically, metacognitive, motivational, and behavioral components of self-regulated learning were assessed by Cognitive-Metacognitive, Motivation, and Resource Management sections of the MSLQ respectively.

### 1.11.6 Undergraduates in Malaysian Private University

Undergraduates are students who are pursuing their undergraduate studies in universities after completing their secondary and pre-university education. These students are generally 19 to 23 years old. These students are enrolled in a variety of majors such as engineering, business, education, and psychology. English is used as the primary medium of instruction for these students. In this study, undergraduates refer to students who were enrolled in undergraduate studies at a private university in Malaysia. These students were first-year Psychology majors and were generally 20 years old.

## 1.12 Summary

Developing self-regulated learners is one of the mandates of modern education. Though, a general trend of decreasing students‟ perceived self-regulation from primary to secondary school has been recorded internationally and university students do not report having optimal self-regulated learning. Teacher feedback is shown to be an inherent catalyst of students‟ self-regulated learning. However, the role of more tailored, targeted feedback (towards specific challenges faced by

students) and temporal location of feedback in facilitating students‟ self-regulated learning are still under-researched. As such, the current study aimed to examine the role of solicited teacher feedback, and formative and summative teacher feedback in facilitating students‟ self-regulated learning. The findings of the current study offer an evidence-based effective feedback method for both pre-service and in-service teachers in facilitating students‟ self-regulated learning. This chapter has also discussed the delimitation, limitation, and operational definitions of variables of the study.

In the next chapter, a review of the related theories and models together with the theoretical framework of the study will be presented. This will be followed by the overviews of self-regulated learning and teacher feedback. Furthermore, essential past studies on teacher feedback and self-regulated learning will be reviewed, and the conceptual framework of the study will be presented.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

In this chapter, the related theories and models will be reviewed. Specifically, Bandura‟s Social Cognitive Theory, Zimmerman‟s Cyclical Phase Model of Self-Regulated Learning, and Butler and Winne‟s Model of Feedback and Self-Regulated Learning will be discussed and related to the variables of interest. A theoretical framework of the study will also be presented. This will be followed by the overviews of self-regulated learning and teacher feedback. For both variables, definitions and essential elements of the constructs will be discussed. Then, a review of essential past studies on teacher feedback and self-regulated learning, and the conceptual framework of the study will be presented. The chapter will end with a summary.

## 2.2 Related Theories and Models

### 2.2.1 Bandura's Social Cognitive Theory

Albert Bandura‟s publication of *Social Foundation of Thought and Action: A Social Cognitive Theory* in 1986 pioneered the research on self-regulation. According to Bandura (1986), self-regulation operates through a set of subfunctions including self-observation, judgmental process, and self-reaction. During self-observation subprocess, people selectively attend to relevant performance dimensions such as the quality, rate, quantity, originality, sociability, morality, and deviancy. Bandura (1986) posits that successful self-regulation partially depends on regularity, temporal proximity, and accuracy of self-monitoring. Self-observation provides the necessary information for setting realistic standards of performance and

for evaluating behavioral changes. Self-monitoring also facilitates the understanding of conditions for certain patterns of behaviors via a self-diagnostic device. The judgmental subfunction involves evaluating one‟s performance against their personal standards. According to Bandura (1986), these standards are developed through direct tuition, evaluative reactions or feedback to one‟s behavior by significant persons such as teachers, and exposure to self-evaluative standards modeled by others. Self-judgments are influenced by the importance and informativeness of the standards. The final subprocess, self-reaction refers to responding evaluatively to one‟s behavior based on how the behavior measured up to one‟s personal standards. This self-evaluation provides both the direction and motivation for behaviors.

Social cognitive theory considers self-regulatory functions as contributors to the triadic system of reciprocal causality rather than as independent behavioral regulators. Self-regulatory processes are influenced by environmental and behavioral events in a reciprocal fashion. Bandura (1986) further posits that as people influence the environment by their self-regulated behaviors, the environment too influences people‟s self-regulation in at least three major ways. Specifically, the environment contributes to the development of self-regulatory subfunctions, offers partial support for the adherence to internal standards, and assists in selective activation and disengagement of self-regulatory processes. Social cognitive theory also proposes self-efficacy as a key factor affecting self-regulated learning, evidenced by correlations between self-efficacy and primary aspects of self-regulated learning such as self-monitoring and use of learning strategies (Bandura, 1986; Zimmerman, 1989).

### 2.2.2 Zimmerman's Cyclical Phase Model of Self-Regulated Learning

Zimmerman (2000) proposed a cyclical model of self-regulated learning based on Social Cognitive Theory. The model was later revised in Zimmerman and

Campillo (2003) and Zimmerman and Moylan (2009). Zimmerman proposes that students‟ learning processes and the accompanying motivational beliefs are governed by three self-regulatory phases namely, forethought, performance, and self-reflection. The forethought phase is comprised of two processes, which are task analysis and self-motivation beliefs. Task analysis refers to students‟ efforts to fragment a learning task into its key components and establish learning strategies. Goal setting and strategic planning take place in this process. Students set goals based on the assessment criteria and performance level, that is the level of "perfection" that students intend to achieve. Strategic planning refers to selecting an action plan and choosing appropriate strategies to succeed in a learning task. The other aspect of the forethought phase, self-motivation beliefs, refers to personal factors that generate and maintain students‟ motivation to perform a learning task. These personal factors include self-efficacy, outcome expectations, task value, interest, and goal orientation. In essence, task analysis and self-motivation beliefs processes direct and energize the performance phase respectively (Zimmerman & Moylan, 2009).

In the performance phase, two major processes take place. These are self-observation, which refers to the process of comparing the students‟ performance against the expert model, and self-control, which refers to use of specific strategies to maintain concentration and interest in a learning task. The former process involves metacognitive monitoring and self-recording. The latter process involves strategies of metacognitive nature such as task strategies, self-instruction, imagery, time management, environmental structuring, and help-seeking, and strategies of motivational nature including interest incentives and self-consequences (Zimmerman & Moylan, 2009).

Finally, the self-reflection phase composed of two major processes: self-judgment and self-reaction. Self-judgment refers to the process in which students evaluate their work. This involves self-evaluation based on assessment criteria and performance level set in the forethought phase, and causal attribution for the students‟ outcomes. Self-reaction, on the other hand, refers to the students‟ reactions to their self-judgments. These reactions include self-satisfaction and the associated affect as well as adaptive or defensive decisions about performing the learning task again in the future (Zimmerman & Moylan, 2009).

As Zimmerman‟s Cyclical Phase Model of Self-Regulated Learning was developed based on Bandura‟s Social Cognitive Theory, there are some similarities between the two. Zimmerman maintained Bandura‟s subfunctions including self-observation, judgmental process, and self-reaction in his model. Specifically, self-observation is part of the performance phase while judgment and self-reaction are part of the self-reflection phase. However, the inclusion of a preparatory phase called the forethought phase with components such as task analysis and self-motivation is a unique aspect of Zimmerman‟s model.

### 2.2.3 Butler and Winne's Model of Feedback and Self-Regulated Learning

In general, self-regulation is seen as a recursive flow of information. Butler and Winne (1995) state that learners who are self-regulated first draw upon existing knowledge and beliefs to interpret a current learning task‟s properties and requirements. They then set goals based on their interpretations, after which they approach the goals by applying their chosen tactics and strategies that generate certain products or outcomes. These products could be cognitive, emotional, or behavioral products. The learners generate internal feedback by monitoring these

processes of engagement and the gradually updated products. This internal feedback offers an avenue for the learners to reinterpret their learning task and their engagement with the task, which in turn determines their ensuing engagement. Specifically, the learners might alter their engagement by setting new goals or modifying existing goals, reexamining their tactics and strategies and selecting more effective approaches, adapting available skills, and create new procedures. In the presence of external feedback such as teacher feedback, additional information confirms, adds to, or conflicts with the learners‟ task interpretations and the path of learning. Butler and Winne (1995) further states that students, based on monitoring of task engagement, alter their knowledge and beliefs, and ultimately influence subsequent self-regulation.

Butler and Winne (1995) also argue that feedback would be useful in guiding learners to determine conditions under which they should monitor. They claim that feedback can facilitate monitoring by synchronizing the amount of information provided via feedback with the qualities of the learners‟ knowledge about the task and the associated strategies. Feedback may also assist in learners‟ development of positive motivational beliefs and use of action control strategies, which, in turn, may support learners‟ engagement in self-regulation. Some of the reasons for learners‟ difficulty in monitoring are learners‟ misperception of learning task condition which leads to inappropriate criteria setting to evaluate performance, failure to recognize the associations between learning task conditions and performance, sense of being overly challenged cognitively while monitoring, and a lack of motivation to monitor and modify performance accordingly (Butler & Winne, 1995). The authors posit that feedback can facilitate monitoring by providing valuable information to improve learners‟ task analysis, goal setting, and strategies selection and implementation.

## 2.3 Theoretical Framework of the Study

Figure 2.1 depicts the theoretical framework of the study. It is proposed that both type of teacher feedback (solicited and unsolicited) and timing of teacher feedback (formative and summative, and summative only) have effects on students‟ self-regulated learning. Specifically, consistent with both Bandura‟s (1986) Social Cognitive Theory and Zimmerman‟s (2000) Cyclical Phase Model of Self-Regulated Learning, solicited teacher feedback encourages more self-observation or monitoring, and facilitates the self-judgment process in the students. Formative and summative teacher feedback also have a similar facilitating effect on students‟ self-observation and self-judgment processes. These enhanced self-observation and self-judgment processes, in turn, lead to greater self-regulated learning in students. Such superior self-observation and self-judgment processes are not expected to be seen in students who are given unsolicited teacher feedback. In addition, as postulated by Butler and Winne‟s (1995) Model of Feedback and Self-Regulated Learning, formative and summative teacher feedback leads to greater self-regulated learning in students than summative teacher feedback only. This is because the former is claimed to engage students in cyclical feedback loop which is essential in enhancing one‟s self-regulated learning.

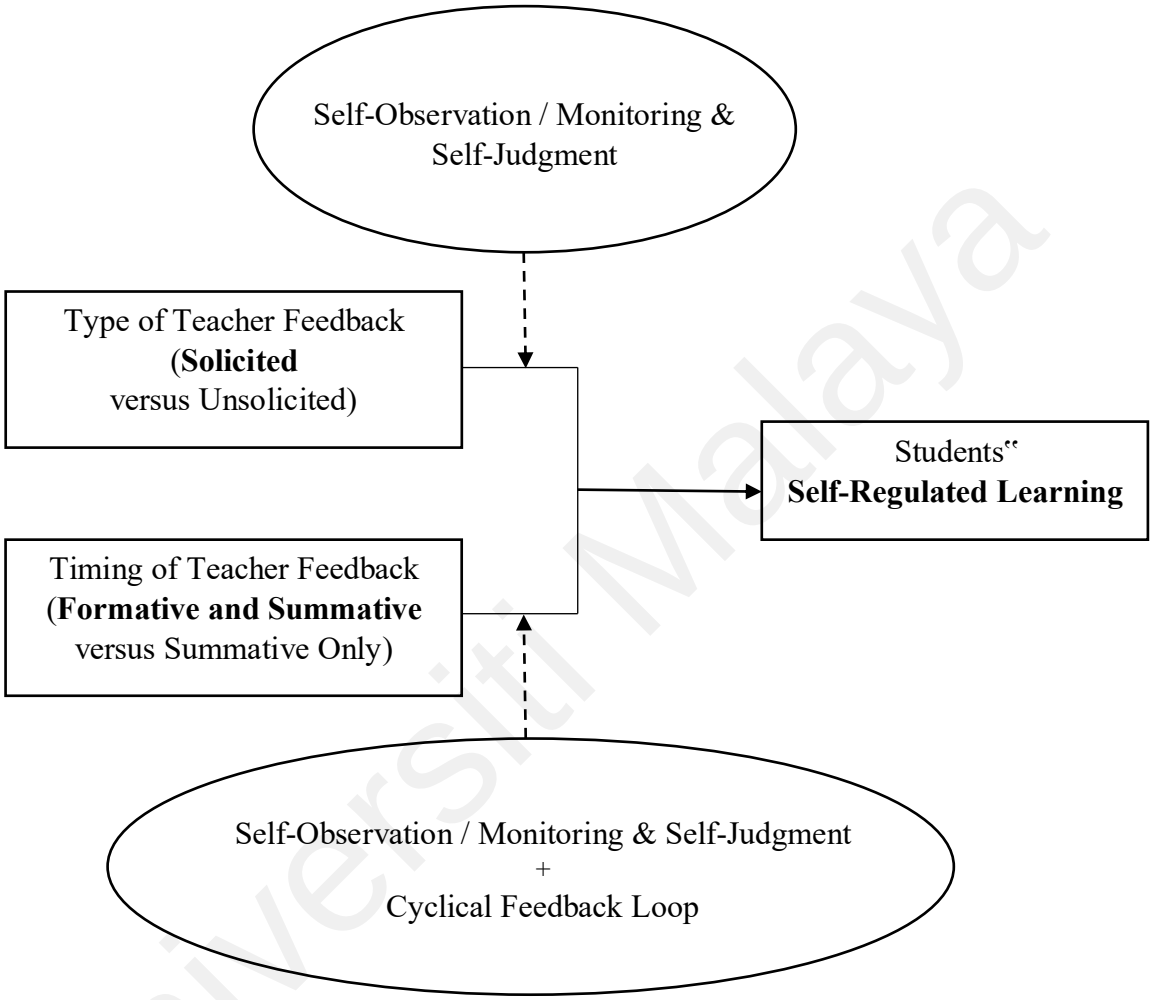


*Figure 2.1.* Theoretical Framework of the Study

## 2.4 Overview of Self-Regulated Learning

### 2.4.1 Definition of Self-Regulated Learning

A symposium at the American Educational Research Association annual meeting in 1986 served as a significant moment in research on self-regulated learning. Essentially, the symposium attempted to integrate processes such as learning strategies, metacognitive monitoring, self-concept perceptions, volitional strategies, and self-control under a single construct (Zimmerman, 1986). An inclusive definition of self-regulated learning was conceived as a product of the 1986 symposium, that is, the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1986). Notably, students‟ proactive use of specific processes in improving their learning is emphasized in this definition.

Metacognitively active students plan, set goals, organize, self-monitor, and self-evaluate at various stages of their learning process. Motivationally active students have high self-efficacy, self-attribution, and intrinsic task interest, and are autonomous. Behaviorally active students select, structure, and create environments that are conducive for learning. They also seek advice and information, self-instruct, and self-reinforce (Zimmerman, 1990). In essence, students who are self-regulated select and utilize self-regulated learning strategies to obtain desired academic outcomes based on feedback about their learning effectiveness (Zimmerman, 1990). As such, self-regulated learning is a deliberate, judgmental, and adaptive process (Butler & Winne, 1995).

Another prominent scholar in self-regulated learning research, Pintrich (2000) defines self-regulated learning as “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their

cognition, motivation, and behavior, guided and constrained by their goals and contextual features in their environment" (p. 453). Although definitions of self-regulated learning differ on the basis of researchers' theoretical orientations, there are three features that are common to these definitions. The three features are students' use of self-regulated learning strategies, students' receptivity towards self-oriented feedback about learning effectiveness, and students' interdependent motivational processes (Zimmerman, 1990). In this study, self-regulated learning is conceived as the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process (Zimmerman, 1986).

### 2.4.2 Self-Regulated Learning and Academic Achievement

An extensive body of research has established the association between self-regulated learning and academic achievement (Bannert, Reimann, & Sonnenberg, 2014; Muis, Psaradellis, Chevrier, Di Leo, & Lajoie, 2016; Vrugt & Oort, 2008). Students who are self-regulated often view learning as a systematic and controllable process, and assume greater responsibility for their academic performance (Zimmerman & Martinez-Pons, 1986, 1990). Zimmerman and Martinez-Pons (1986) studied students' use of self-regulated learning strategies including goal setting and planning, organizing and transforming, seeking information, rehearsing and memorizing, environmental structuring, seeking social assistance, self-consequences, keeping records and monitoring, reviewing records, and self-evaluation. They found that in contrast to the low-achievement track counterparts, high-achievement track students employ these self-regulated learning strategies to a greater extent. Self-regulated learning strategies were also found to predict students' achievement track with more than 90% accuracy, highlighting the importance of self-regulated learning for academic achievement. Zimmerman and Martinez-Pons (1986) further reported

that students‟ use of self-regulated learning strategies made a unique contribution to their academic achievement apart from their general ability.

Self-regulated learners are also usually interested in the topic at hand, well prepared for class, and actively participate in class by asking questions and contributing ideas or insights during class discussions (Zimmerman & Paulsen, 1995). Self-regulation has also been found to decrease academic procrastination by increasing students‟ perceived control, self-efficacy, and motivation (Klassen, Krawchuk, & Rajani, 2008; Steel, 2007). Self-regulation is also associated with grit (Duckworth, Peterson, Matthews, & Kelly, 2007). Consequently, self-regulated learners report having more mastery goals than performance goals (Zimmerman, 2000). Furthermore, Lau and Ho (2016) reported a significant positive association between students‟ self-regulated learning and Programme of International Student Assessment (PISA) reading performance, with motivation as the most important self-regulated learning component that explains reading performance. Self-regulation has also been found to play a crucial role in determining the level of motivation and engagement in online courses (Sun & Rueda, 2012).

Scholars have also demonstrated that students who are trained in self-regulation processes such as goal setting, self-monitoring, and self-reflection during their learning display greater levels of motivation and achievement (Boekaerts, Pintrich, & Zeidner, 2000; Pintrich, 2003; Schunk, 1996; Wood, Bandura, & Bailey, 1990; Zimmerman & Martinez-Pons, 1990). Students‟ inability to self-regulate learning processes, on the other hand, is associated with academic learning difficulties and low motivation (Bembenutty, Cleary, & Kitsantas, 2013; Zimmerman & Schunk, 2008). Furthermore, Boekaerts et al. (2000) regard self-regulated learning as a process that can help in explaining the differences in academic achievement of

students. Following a recent meta-analysis, Dent and Koenka (2016) concluded that elements of self-regulated learning including cognitive and metacognitive strategies are significantly associated with academic performance. They further reported that the overall correlation was stronger for metacognitive strategies than cognitive strategies. The authors elaborate that while cognitive strategies help students learn, metacognitive strategies ensure that students actually learn through the planning of academic tasks, self-monitoring to identify discrepancies between a goal and task performance, and self-control to resolve any identified discrepancies. In essence, from planning an academic task to persisting in the face of obstacles, self-regulated learning encompasses numerous strong predictors of academic achievement (Dent & Koenka, 2016).

Pintrich (1995) opine that teachers can assist in developing self-regulated learners by structuring their subjects and practicing instructional methods that aid the self-regulation process. That is, self-regulated learning skills can be taught. Specifically, teachers can provide feedback to students to help the latter in determining whether their self-monitoring is accurate or not (Schunk, 2000; Zimmerman, Bonner, & Kovach, 1996). Furthermore, feedback can be conceived as a powerful tool to positively influence internal self-regulation processes and ultimately lead to an increase in performance (Wollenschlager, Hattie, Machts, Moller, & Harms, 2016). Thus, it is to teacher feedback we turn next.

## 2.5 Overview of Teacher Feedback

### 2.5.1 Definition of Teacher Feedback

Although there is little consensus on the definition of feedback and elements of good feedback, some researchers have attempted to identify the central elements of feedback definitions via decades of research. Nicol and Macfarlane-Dick (2006),

for instance, define feedback as information that is communicated to students about their present state of learning and performance, and how they match to the relevant goals and standards. Hattie and Timperley (2007) conceptualize feedback as information that is provided by agents such as teachers, peers, parents, books, self, and experience concerning aspects of one‟s performance or understanding. This information might help in evaluating the accuracy of an outcome, clarifying ideas, and providing encouragement for future tasks. In essence, feedback is a "consequence" of performance.

van de Ridder, Stokking, McGaghie, and ten Cate (2008) define feedback as specific information about the comparison between a learner‟s observed performance and a standard which is given with the intention of improving the learner‟s performance. More recently, Eriksson, Björklund Boistrup, Thornberg (2017) define teacher feedback as "a set of strategies teachers use to evaluate and act upon their students‟ actions and achievements" (p. 316). In this study, a synthesis of these definitions was adopted. Specifically, teacher feedback is defined as information communicated by teachers to the students about the latter‟s present state of learning and performance and how they match to the relevant goals and standards, with the ultimate aim of improving the students‟ performance.

### 2.5.2 Elements of Good Feedback

Hattie and Timperley (2007) echo that merely providing feedback to students is not sufficient, rather the nature of feedback, the timing of feedback, and how the feedback is received by students, or even better, sought by students, need to be considered. They claim that the central goal of feedback is to reduce the discrepancies between the learners‟ current understandings and performance, and the relevant goals or standards. They propose that effective feedback must answer three

key questions asked either by a student or a teacher. The three questions are: “What are the goals? (Where am I going?),” “What progress is being made toward the goal? (How am I going?),” and “What activities need to be undertaken to make better progress? (Where to next?).” These questions resemble the feed up, feed back, and feed forward dimensions of feedback. The authors further postulate that feedback can be directed at four different levels including feedback about a task (FT), feedback about the processing of a task (FP), feedback about self-regulation (FR), and feedback about self as a person (FS) in order to influence the effectiveness of feedback.

FT provides verification information on whether a work is correct or incorrect, while FP offers comments on the process used to complete a task. FR is aimed at a student‟s self-regulation level such as self-evaluation and confidence to continue engaging on a task. Finally, FS is personal and self-focused, but not usually related to task performance. Hattie and Timperley (2007) postulate that FP and FR are most powerful in enhancing student learning. This is followed by FT, but only when the feedback information can be used in improving strategic processing or self-regulation for subsequent learning tasks. They further claim that although used too frequently in classrooms, FS is least effective in enhancing student learning. Chen (2014) asserts that FT, FP, and FR signify three cognitive foci in a hierarchical order, starting from local to global errors, from surface to deep learning, from easy to difficult strategies, from immediate to long-term performance, and from tangible to abstract advancement, while FS has no pedagogical effect.

However, more recently, Voerman, Korthagen, Meijer, and Simons (2014) provided a more nuanced view of FS. They contend that FS can have a crucial positive impact on students‟ experience of themselves and help them in enhancing

their learning. They acknowledge that non-specific FS such as “good girl!” or “good boy!” is unnecessary, but call for greater use of specific FS which targets students‟ character strengths. The authors argue that the latter type of FS will help in creating a positive view of a student‟s own capacity for learning.

Price, Handley, Millar, and O'Donovan (2010) propose five roles of feedback including correction, reinforcement, forensic diagnosis, benchmarking, and longitudinal development (feed-forward). Hattie and Timperley (2007) argue that effective teaching does not only constitute teaching information to students, but also encompass evaluating and assessing the students‟ understanding of the taught information with the goal of matching the next teaching lesson to the current understanding of the students. They claim that students often want to know how they are going in regard to the set goals even though they might not always welcome the answers. In addition, the authors argue that teachers often answer the question of “Where to next?” with more information, more tasks, and more expectations. This practice eventually leads students to learn that the unchanging answer to that question is “more.” Yet, effective answers to the question by the teachers will lead to greater possibilities for students‟ learning. These effective answers may include more information on the aspects of the task that is understood versus not, increased strategies and processes to work on a task, and enhanced challenges in regard to the task at hand. Hattie and Timperley (2007) posit that such answers will have some of the most powerful influence on students‟ learning. However, giving such feedback might be a challenge to most teachers as traditionally teachers consider feedback as a top-down, one-way transmission of information and do not necessarily consider the specific challenges faced by students while working on a learning task.

Nicol and Macfarlane-Dick (2006) outline seven principles of good feedback practice to facilitate students‟ self-regulated learning. They claim that good feedback practice (1) helps clarify what good performance is (goals, criteria, expected standards), (2) facilitates the development of self-assessment (reflection) in learning, (3) delivers high-quality information to students about their learning, (4) encourages teacher and peer dialogue around learning, (5) encourages positive motivational beliefs and self-esteem, (6) provides opportunities to close the gap between current and desired performance, and (7) provides information to teachers that can be used to help shape teaching. Similarly, Percell (2017) claim that good feedback has to be process-oriented, personal, informal, and genuine, with the ultimate aim of improving students‟ quality of work and ensuring their growth.

Van der Schaaf, Baartman, Prins, Oosterbaan, and Schaap (2013) propose that effective teacher feedback is one that stimulates students‟ reflective thinking and that feedback dialogues stimulate such thinking. Reflective thinking is a purposeful form of thinking that allows students to be aware of their learning and subsequent performance within a context (Lee, 2005). In their quasi-experimental study, Van der Schaaf et al. (2013) found that the more students interact during feedback dialogues, the greater is their reflective thinking, exemplified by their thinking activities such as orienting, explaining, concluding, and judging negatively. However, as feedback dialogues can be time-consuming, and that teachers‟ workload has been increasing in recent years, this strategy might not be very practical.

In an attempt to revisit the feedback literature by adding perspectives based on positive psychology, Voerman, Korthagen, Meijer, and Simons (2014) echo that feedback evokes emotional reactions in students which in turn affect their learning. That is, feedback arouses both positive and negative activating and deactivating

emotions. Teachers are encouraged to use feedback that arouses the activating types of emotions such as pride, hope, and joy while acknowledging that some emotions like anger and anxiety can have both activating and deactivating effects. Ideally, feedback should evoke activating emotions and create expansive emotional spaces, and these can be accomplished by increasing the frequency of positive feedback over negative feedback. The authors argue that even non-specific feedback such as praise can contribute positively to learning due to the positive emotions it elicits. Furthermore, they call for greater use of progress feedback over discrepancy feedback as the former helps in forming students‟ view of themselves as individuals with a capacity to learn, and thus stimulate their learning.

### 2.5.3 Written Teacher Feedback

Teachers frequently use the strategy of writing comments on students‟ works as it provides an avenue to communicate individually with the students about the students‟ learning and progress. Tunstall and Gipps (1996) suggest that this strategy supports student learning due to the amount of information that can be communicated to students. Nunez, Suarez, Rosario, Vallejo, Cerezo, and Valle (2015) found that teachers‟ feedback is positively associated with the amount of homework completed and quality of homework time management, which in turn predict students‟ academic achievement. However, the way teachers communicate this information will determine the effectiveness of the strategy. Zhou and Chen (2010) conducted an experiment to examine the effect of specific corrections and corresponding marginal explanations (experimental group) over general comments only (control group) on students‟ writing accuracy. They found that students in the experimental condition showed significant improvement while their control group counterparts regressed in writing accuracy over the semester. This finding highlights

the importance of specific teacher feedback in improving students‟ learning. Following a longitudinal study, Hargreaves (2013) report that students find their learning to be frustrated when they receive overly directive feedback. The author further claim that learning is facilitated when teachers‟ feedback has substantial but not burdensome details.

Ruiz-Primo and Li (2013) recommend that as opposed to reducing the comments to a grade, a symbol, or a short phrase, feedback should point out the strengths and weaknesses in students‟ works, provide guidance to improve students‟ learning, and share the criteria for quality work with the students. Sharing a similar sentiment, Hargreaves (2014) states that teachers need to continue being mindful of how the comments they make may play a role in the students‟ immediate and long-term developments of independent learning, proactivity, and critical inquiry.

Students, on the other hand, find written feedback that is personalized to the students‟ specific works and timely as the best form of feedback (Ferguson, 2011). The feedback also needs to be positive, clear, and constructive, in that it needs to focus on the students‟ strengths and guide them towards future development. Students look for positive comments for confidence and motivation purposes. They also expect a clear link between the assessment criteria and feedback given. Feedback also needs to be geared towards future action and improvement as opposed mere statement of where the submitted task was inadequate (Ferguson, 2011).

#### 2.5.3.1 Electronic Feedback

Although electronic feedback such as video feedback is viewed favorably in the recent years, reports have revealed that most students still prefer to meet with their teachers face-to-face rather than receiving video feedback (Warnock, 2008). Similarly, through a survey study aimed to investigate students‟ perceptions

of electronic feedback, Budge (2011) found that young, tech-savvy students still prefer more personal face-to-face and hand-written feedback over electronic feedback. The personal experience and connection that the non-electronic feedback gives are valued highly by students. Electronic feedback, on the other hand, is seen as one way, static, and not alive, and thus students seem to only tolerate electronic feedback as a back-up form of feedback.

### 2.5.4 Timing of Teacher Feedback

In their review, Hattie and Timperley (2007) also emphasize the importance of considering the four levels of feedback (FT, FP, FR, and FS) in the discussion of timing of feedback. They essentially claim that immediate feedback and delayed feedback will be most effective when used with FT and FP respectively. Consistent with Clariana, Wagner, and Roher Murphy‟s (2000) proposition, the authors suggest that delayed feedback provides an avenue for a greater level of processing about a task which is required for difficult tasks. Easy tasks, on the other hand, require no such processing and thus a delay in feedback is both unnecessary and undesirable. This is evidenced by the effect sizes from delayed feedback in Clariana et al.‟s study (2000), which are, -0.06 for easy items, 0.35 for midrange items, and 1.17 for difficult items. In addition, Guasch, Espasa, and Alvarez‟s (2010) study suggest that teachers‟ need to give sufficient time for students to revise their initial work and produce a better work following teacher feedback. In the absence of such time period, students tend to ignore teacher feedback.

#### 2.5.4.1 Formative Teacher Feedback

Following another extensive review of feedback literature, Shute (2008) asserts positive feedback as one that has a positive impact on students‟ learning. The author labeled such positive feedback as formative feedback.

Brookhart (2008) asserts that formative feedback practice gives information for instructional decisions and for improvement to teachers and students respectively. In essence, formative feedback process informs teaching practice, guides instructional decisions, and offers scaffolded assistance to students to improve their work. Budge (2011) regards formative feedback as paramount to students‟ learning as it provides opportunities for them to address aspects of their learning and to be aware of their progress. Formative feedback allows students to apply specific feedback to their academic tasks and learn in the process of doing so. While there is an extensive literature on the topic of feedback, research on teachers‟ attempts to implement changes to conventional feedback practices and its effects on student learning is still scarce (Lee, Mak, & Burns, 2015).

## 2.6 Past Studies Review

### 2.6.1 Teacher Feedback Interventions to Enhance Students' Self-Regulated Learning

Johansen and Tennyson (1983) investigated the effect of adaptive advisement on students‟ perception of learning in a learner-controlled, computer-based instruction using a punctuation rule-learning task. Advisement refers to feedback about one‟s current comprehension levels and advice about ways to further engage in learning. They had three conditions namely, advisement-learner control condition in which the students received an introductory computer-based instruction with an initial assessment followed by a learner-controlled section that involved advisement information, a partial learner-control condition in which the students received an introductory computer-based instruction with an initial assessment followed by a learner-controlled section without advisement information, and a conventional learner-control condition in which the students received continuous instruction with

complete learner control. The authors found that students in the advisement-learner control condition learned the rules better and persisted on the task more by studying the examples than their counterparts in the other two conditions.

Steinberg‟s (1989) literature review on learner control in computer-assisted instruction provides further support for the positive effect of advisement on students‟ self-regulated learning. Advisement is a unique form of feedback in that it offers ways to help students to cognitively engage with the learning tasks as opposed to providing content information alone. Steinberg‟s review reveals that when students are given complete learning control without advisement, they tend to exit the task prematurely, probably due to ineffective monitoring about their progress and strategies to persist in the task. The review further suggests that students are likely to persist and perform better in the task if they are provided with advisement information.

An experimental study by Schunk and Cox (1986) examined the effects of verbalization and effort-attributional feedback on students‟ self-efficacy and skillful performance in the context of subtraction with regrouping operations. The students learned the strategies for and solved the subtraction problems over six sessions. The experimental procedure that the students‟ experienced differed in terms of two dimensions – verbalization and effort feedback. Students either experienced continuous verbalization condition in which the students had to verbalize aloud while solving problems, discontinuous verbalization condition in which the students verbalized during the first half of the training only, or no verbalization condition in which the students did not verbalize while solving problems. Additionally, the students either received effort feedback during the first half of the training, received effort feedback during the second half of the training, or received no effort feedback.

The effort feedback essentially informed the students that they were working hard. The researchers found that continuous verbalization resulted in greater self-efficacy and skillful performance than discontinued or no verbalization. It is vital to note that the effect of verbalization on self-efficacy and skillful performance could have been facilitated by greater monitoring of cognitive engagement by the students. Similarly, effort feedback resulted in greater students‟ self-efficacy and skillful performance than no feedback, again establishing the importance of feedback in enhancing students‟ self-regulated learning.

Balzer, Doherty, and O‟Connor (1989) conducted a comprehensive review of the empirical literature on the effects of cognitive feedback on performance. Cognitive feedback refers to the process of providing a person with (1) task information – information about the relations in the environment, (2) cognitive information – information about the relations perceived by the person, and (3) functional validity information – information about the relations between the environment and the person‟s perception of the environment. The authors‟ review suggests that cognitive feedback might enhance one‟s self-regulated learning by supporting the process of meta-monitoring in them. Similarly, Meyer‟s (1986) review of the empirical literature on teacher feedback to students‟ errors including lack of information errors, motor errors, confused information errors, and rule application errors underscores the importance of teacher feedback in facilitating students‟ cognitive processing (a crucial element of self-regulated learning), and ultimately in correcting students‟ comprehension.

Schunk and Swartz (1993a) conducted two experiments to examine how goal setting and progress feedback affect students‟ self-regulated learning, self-efficacy particularly, and writing achievement. The students received writing strategy

instruction and were given either a process goal of learning the strategy, a product goal of writing paragraphs, or a general goal (instructional control) to guide their self-directed writing practice. Half of the students who were given a process goal of learning the strategy also received verbal teacher feedback on their progress in learning the strategy, about three to four times during each instructional session. Results revealed that students who were given a process goal of learning the strategy and teacher feedback exhibited a greater level of self-regulated learning compared to students in the other three conditions (no teacher feedback). The former students also exhibited greater levels of self-efficacy, strategy use while writing, and writing achievement. The authors further found that the enhanced self-regulated learning as a result of the process goal of learning the strategy with teacher feedback persisted six weeks after the intervention.

In Schunk and Swartz (1993b) study, the authors investigated the effects of goal setting and progress feedback on students‟ self-efficacy and writing achievement. The students were given writing strategy instruction and a goal of learning. Specifically, the students were given either a paragraph goal – to learn to write a specific type of paragraph, a strategy goal – to learn the steps involved in writing different types of paragraphs, or a strategy goal plus progress feedback. The progress feedback informed students on how well they were learning to use their strategies in writing paragraphs. The results revealed that strategy goal with progress feedback resulted in superior perception of self-efficacy and writing performance compared to the other two conditions. The authors claim that performance feedback help students to better assess their skills and link the strategies with the desired outcomes.

More recently, through two experimental studies, Llorens, Vidal-Abarca, and Cerdan (2016) examined the effects of formative feedback on students‟ transfer of self-regulation of task-oriented reading strategies. The students were instructed to read and answer multiple-choice comprehension questions while receiving consistent feedback about their performance and strategic decisions. They then were requested to perform the same task without receiving any feedback. The authors found that students were able to transfer self-regulated learning strategies to a superior extent when they were given formative feedback compared to when they were not. Collectively, these studies reinforce the importance of feedback in facilitating students‟ self-regulated learning. However, these studies have focused on traditional top-down unsolicited teacher feedback as opposed to solicited teacher feedback.

### 2.6.2 Alternative Interventions to Enhance Students' Self-Regulated Learning

Another line of research on enhancing students‟ self-regulated learning has focused on formal instructional interventions. Formal instructional interventions such as Learning to Learn courses (Hofer & Yu, 2003) and Student Success courses (Wolters & Hoops, 2015) are utilized to enhance students‟ self-regulated learning in many tertiary institutions. Hofer and Yu (2003) examined the effectiveness of a semester-long „Learning to Learn‟ undergraduate course that teaches a wide range of cognitive and motivational strategies with the ultimate aim of developing students as self-regulated learners. They found that the course helps students to acquire greater mastery orientation, self-efficacy, valuing of the course, and cognitive strategy; and decreases test anxiety. Similarly, Bednall and Kehoe (2011) reported that teaching students a broad spectrum of study strategies, and encouraging generation of explanations and planning enhance students‟ self-regulated learning.

More recently, Hoops, Yu, Burridge, and Wolters (2015) reported a significant increase in students‟ self-regulated learning following a Student Success course. The authors claimed that the course completion has helped students to make impressive gains in self-regulated learning strategy-use which ultimately increase their likelihood of completing their tertiary studies. Furthermore, the authors proposed that self-regulated learning gains would benefit the students more if such courses are offered towards the start of students‟ undergraduate career. While these Learning to Learn and Student Success courses are shown to be beneficial, integrating self-regulated learning strategy instruction into regular course curriculum may further help students to succeed in demanding university courses by providing them with the tools to self-regulate their learning for a particular course.

Ching (2002) carried out a classroom implementation of strategy and self-regulation instruction to improve English as Second Language (ESL) students‟ self-regulated learning. The researcher found that the implementation has helped students to acquire the knowledge to plan and revise their essays via strategies including self-evaluation, organizing and transforming, seeking information, and seeking social assistance. In addition to improving students‟ self-efficacy and self-determination, the implementation has geared students to respond to negative feedback more positively and seek peer help to identify their mistakes. Similarly, Perels, Gürtler, and Schmitz (2005) showed that training of self-regulatory and problem-solving competence can improve students‟ mathematical problem-solving and self-regulation. The authors suggested that a combination of self-regulatory and problem-solving strategies lead to greater improvement in students‟ self-regulatory competence.

A study examining the Schoolwide Enrichment Model–Reading (SEM-R), an enrichment programme aimed to develop students‟ self-regulation and reading achievement have found that teachers and students‟ personal processes, individual behaviors, and the environment contribute to students‟ use of self-regulated learning strategies in reading (Housand & Reis, 2008). The authors reported that environmental factors such as organization of materials and clear expectations, and teachers‟ use of explicit instruction and modeling of self-regulated learning strategies lead to greater levels of students‟ self-regulated learning. That is, the students read for longer periods of time and respond to higher order thinking questions.

Fernandez and Jamet (2017) conducted an experiment to examine the effect of regular practice testing on students‟ self-regulated learning processes and learning performance. They found that compared to students in the control condition, students in the practice testing condition were significantly less overconfident in their ability to recall information and performed better in posttest. They further found that the use of efficient self-regulated learning processes such as metacognitive monitoring mediated the positive effect of regular practice testing on students‟ enhanced learning performance. Çakıroğlu and Öztürk (2017) conducted a case study to examine the development of self-regulated learning in flipped classroom with problem-based activities. Students showed high task strategies and help-seeking, and moderate environment structuring and monitoring during face-to-face sessions. They showed high environment structuring, moderate task strategies and help-seeking, and low monitoring during home sessions. The students recorded high goal setting, and moderate time management, self-efficacy, and self-evaluation in both face-to-face and home sessions. These findings suggest a possibility of enhancing students‟ self-regulated learning through flipped classroom with problem-based activities.

### 2.6.3 Technology-based Feedback Interventions to Enhance Self-Regulated Learning

The vast majority of recent studies on ways to enhance students‟ self-regulated learning have focused on the critical role of learning technologies (Kitsantas, Dabbagh, Hiller, & Mandell, 2015). In van den Boom, Paas, van Merrienboer, and van Gog (2004) study, for instance, the authors examined the effects of reflection prompts and tutor feedback in a web-based learning environment on the development of students‟ self-regulated learning competence. They found that there was a significant progress in the students‟ self-regulated learning competence as a function of teacher feedback. Similarly, van den Boom, Paas, and van Merrienboer (2007) investigated the effect of elicited reflections paired with teacher feedback on the self-regulated learning of web-based distance education students. Specifically, the authors studied how suggestive feedback, which alerts students of the need for further reflection without being overly directive, affects students‟ self-regulated learning. They found that students who received teacher feedback on the initial reflections displayed a higher development of self-regulated learning than students in the control condition (no teacher feedback). Together, these studies highlight the value of teacher feedback in developing students‟ self-regulated learning, particularly in distance education students who learn in a web-based learning environment.

Nicol (2009) examined ways to develop students‟ self-regulated learning skills using electronic formative feedback and assessment practices through two case studies. Students were given model essays and answers to assignments electronically and these allowed them to self-assess their works against the standards. The course instructors also provided motivational feedback electronically to facilitate the

development of students‟ self-efficacy. The author found that in addition to improving students‟ self-regulated learning, electronic formative feedback and assessment practices improved students‟ level of engagement, intrinsic motivation, final exam performance, and course satisfaction. El Saadawi et al. (2010) tested the positive effect of metacognitive scaffolds on students‟ self-regulated learning in the context of a medical intelligent tutoring system. Specifically, they tested the effect of immediate feedback compared to three control metacognitive scaffolds including coloring book, inspectable student model, and static scaffold (pseudo dialog using pre-stocked questions). The authors found that immediate feedback has a positive effect on students‟ self-regulated learning and learning gains. Removing immediate feedback resulted in a decrease in metacognitive performance and the other three metacognitive scaffolds were not sufficient to prevent such deficit in students‟ self-regulated learning.

Lee, Lim, and Grabowski (2010) examined the effects of generative learning strategy prompts and metacognitive feedback on students‟ self-regulation while learning the human heart system in a computer-based learning environment. The authors‟ Structural Equation Modeling analysis revealed that metacognitive feedback together with generative learning strategy prompts improves undergraduate students‟ self-regulated learning, in addition to improving their learning strategy use and academic achievement. Specifically, generative learning strategy prompts together with metacognitive feedback improves students‟ self-regulated learning and the use of generative strategies such as highlighting and summarizing, which in turn resulted in greater learning performance. In the absence of metacognitive feedback, generative learning strategy prompts improved students‟ use of generative strategies

only, stressing the importance of feedback in facilitating students‟ self-regulated learning.

Labuhn, Zimmerman, and Hasselhorn (2010) investigated the effect of self-evaluative standards (levels: mastery learning standards, social comparison standards, and control) and graphed feedback (levels: individual feedback, social comparison feedback, and control) on students‟ self-regulated learning, calibration accuracy specifically, and mathematics performance. The authors found that self-evaluative standards had no effect on students‟ self-regulated learning and mathematics performance. Feedback, on the other hand, improved students‟ self-regulated learning and mathematics performance. Similarly, Dannefer and Prayson (2013) studied the use of formative feedback and portfolios in a problem-based learning setting to support students‟ self-regulation. The authors concluded that a decrease in students‟ targeted areas for improvement at the end of the problem-based learning session is suggestive of students‟ increased self-regulatory behaviors. However, these technology-based teacher feedback interventions also need to be evaluated against the knowledge that even young, tech-savvy students prefer more personal face-to-face and hand-written feedback over electronic feedback (Budge, 2011).

### 2.6.4 Self-Regulated Learning Research in Malaysia

There is a fair amount of research on self-regulated learning among Malaysian secondary school students. Ng, Bakar, Roslan, Wong, and Rahman (2005a) for instance, explored the predictors of self-regulated learning in Malaysian smart (boarding) schools by conducting a survey study involving 409 students, selected randomly from six smart schools across the nation. The study predictors comprised of environmental factors such as information technology (IT)-integration

and student-teacher interactions, and personal factors such as motivational beliefs, self-regulative knowledge, information literacy, and attitudes towards IT. The authors found that IT-integration, student-teacher interactions, motivational beliefs, and self-regulative knowledge predict self-regulated learning among students in Malaysian smart schools.

Abdullah, Bakar, Roslan, Wong, and Rahman (2006) explored the association between self-regulated learning and motivational beliefs including self-efficacy, control beliefs, and anxiety. Data from 322 Malaysian secondary school students revealed that self-efficacy and control beliefs are positively correlated with self-regulated learning while anxiety is negatively correlated with self-regulated learning. Abdullah (2016) went on to investigate the interaction effects of gender and motivational beliefs (self-efficacy, control beliefs, and anxiety) on self-regulated learning among 322 secondary school students from Information and Communication Technology (ICT)-integrated Malaysian schools. Her correlational study revealed that there is a positive correlation between self-efficacy and self-regulated learning, and control beliefs and self-regulated learning. In contrast, there is a negative correlation between anxiety and self-regulated learning. Following interaction analysis, the researcher found that self-efficacy and self-regulated learning differed according to gender. However, she found that gender differences in self-regulated learning were not due to the differences in control beliefs and anxiety.

Apart from secondary school students sample, self-regulated learning research in Malaysia has also employed university students sample. Kosnin (2007) investigated the association between self-regulated learning and academic achievement among Malaysian undergraduates. She conducted a survey study involving 460 undergraduates and found that self-regulated learning and academic

achievement are positively correlated. Specifically, elements of self-regulated learning such as self-efficacy, test anxiety, resource management strategies, and metacognitive learning strategies were found to be strong predictors of academic achievement. It was also reported that high achievers have superior self-regulated learning than low achievers. Among the high achievers, control of learning belief, self-efficacy, time and study environment, effort regulation, peer learning, and help-seeking were found to predict academic success. In contrast, metacognitive learning strategies, test anxiety, internal attribution of control over learning, and task value predicted the academic achievement of low achievers.

More recently, Yap, Roslan, and Sabouripour (2016) conducted a correlational study to investigate the association between students‟ self-regulated learning and academic procrastination. The researchers recruited 100 undergraduates from a Malaysian public university for the study. The results revealed that elements of self-regulated learning including intrinsic goal orientation, task value, rehearsal, elaboration, metacognitive self-regulation, resource management strategies, organization, and critical thinking are negatively related to academic procrastination. Furthermore, anxiety was found to be positively related to academic procrastination.

The vast majority of self-regulated learning research studies in Malaysia has employed a correlational research design, studying the factors that are associated with self-regulated learning among Malaysian students. However, a few researchers have attempted to focus on interventions to enhance students‟ self-regulated learning. Vighnarajah, Wong, and Bakar (2009) for instance, studied students‟ perception of the practice of self-regulated learning strategies in online community discussion. The authors reported that although students seemed to understand the importance of developing self-regulated learning, they have mixed opinions on whether online

discussion platform facilitates such development. Out of the 50 national secondary school students, 14 of them were in support of the notion that online discussion platform helps in developing self-regulated learning, particularly elements such as rehearsal, elaboration, critical thinking, peer learning, and help-seeking. 26 of them stated that online discussion platform only moderately helps them in practicing self-regulated learning, citing the Internet as an inhibiting factor (a source of distraction). The authors suggest poor practice of effort regulation, and time and study environment strategies for the students‟ ineffective use of the Internet. A total of 10 students opined that didactic classroom environment is better than online discussion platform in developing self-regulated learning strategies.

More recently, Yong and Yeo (2014) developed an intervention to enhance students‟ self-regulated learning in the context of secondary four History. The intervention involved coaching of students in regard to planning, self-monitoring, self-controlling, and self-reflecting on their motivation, cognition, behaviors, and learning environment via 15 60-65-minute sessions. The intervention instruction method comprised of techniques such as direct teaching of strategies, modeling, examples, autonomous practice using strategies, feedback from researcher, self-observation, and self-judgment. The authors reported that students who undergo the intervention showed a greater level of self-regulated learning, exemplified by the level of motivation and learning strategies, than students in the control group during posttest.

Although there is some related research, research studies that focus on teacher feedback are still scarce. Ng, Bakar, Roslan, Wong, and Rahman‟s (2005b) study is an exception. The authors studied the relationship between self-regulated learning and student-teacher instructions. They proposed that student-teacher

interactions in relation to self-regulated learning consist of three components including student-centered learning, feedback provided by teachers, and strategy-instruction. The researchers reported that out of 322 Malaysian secondary boarding school students, 17.4% of students have high self-regulated learning. 69.9% and 12.7% of the students have medium and low levels of self-regulated learning respectively. They further found that student-teacher interactions, specifically student-centered learning and strategy instruction, are positively related to students‟ self-regulated learning. Interestingly, the authors found that there was no significant relationship between feedback provided by teachers and students‟ self-regulated learning. As this was inconsistent with an extensive body of research on self-regulated learning, the authors have called for more studies to examine this relationship. It is also essential to note that Ng et al. (2005b)‟s feedback items focused on unsolicited teacher feedback and the relationship may very well change when solicited teacher feedback is taken into consideration.

In summary, a review of the past studies suggests that there is a fair amount of research that has examined teacher feedback interventions to enhance students‟ self-regulated learning. Although alternative interventions to enhance students‟ self-regulated learning such as Student Success courses are being explored, a good amount of interventions are still centered around teacher feedback, possibly due to the effectiveness of feedback interventions in general. The more recent teacher feedback interventions tend to focus on learning technologies, yet students might not prefer these electronic feedbacks over traditional face-to-face or written feedback as the former is less personal. Furthermore, these feedback interventions have been focusing on unsolicited teacher feedback and the effectiveness of solicited teacher feedback is yet to be explored. The effectiveness of formative and summative teacher

feedback as compared to summative only teacher feedback needs to be researched further as well. Finally, most self-regulated learning research in Malaysia has employed a correlational design and has not focused much on teacher feedback related experimental studies, warranting further research in this area.

## 2.7 Conceptual Framework of the Study

Figure 2.2 depicts the conceptual framework of the study. It is proposed that both type of teacher feedback (solicited and unsolicited) and timing of teacher feedback (formative and summative, and summative only) have an effect on students‟ self-regulated learning. Specifically, solicited teacher feedback leads to greater self-regulated learning in students than unsolicited teacher feedback. In addition, formative and summative teacher feedback leads to greater self-regulated learning in students than summative teacher feedback only.

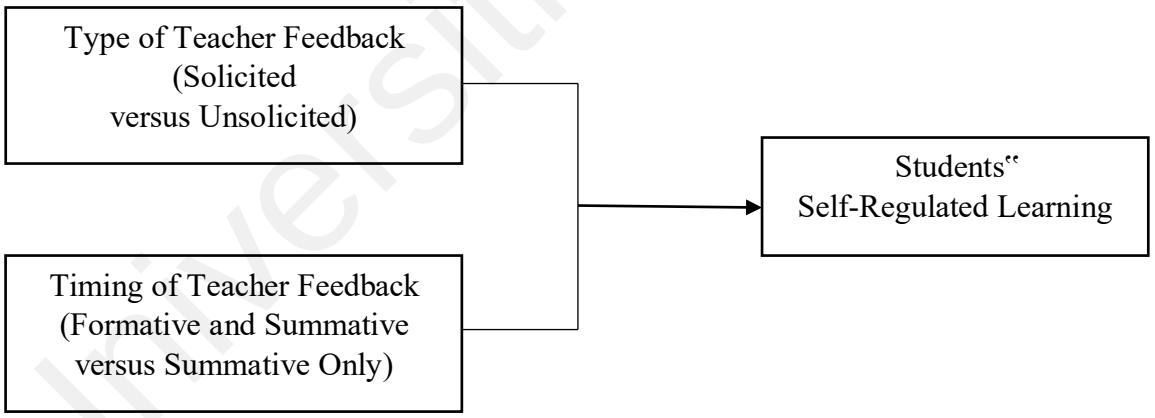


*Figure 2.2.* Conceptual Framework of the Study

## 2.8 Summary

This chapter reviewed the related theories and models namely Bandura‟s Social Cognitive Theory, Zimmerman‟s Cyclical Phase Model of Self-Regulated Learning, and Butler and Winne‟s Model of Feedback and Self-Regulated Learning.

A theoretical framework of the study was presented. Self-regulated learning, defined as the degree to which students are metacognitively, motivationally, and behaviourally active participants in their own learning process, has shown to be crucial for students‟ academic performance. Teacher feedback, defined as information communicated by teachers to the students about the latter‟s present state of learning and performance and how they match to the relevant goals and standards, with the ultimate aim of improving the students‟ performance, is also crucial for students‟ learning and has been implicated to facilitate self-regulated learning. There is also an extensive body of research on ways to enhance students‟ self-regulated learning, although research examining the role of solicited and formative teacher feedback is still scarce. A conceptual framework linking the variables of the study: solicited teacher feedback, formative and summative teacher feedback, and self-regulated learning was also presented.

In Chapter 3, the research design employed in the current study will be introduced. This will be followed by a discussion on the population and sample of the study as well as the sampling method employed. Then, the study instrument will be introduced, and its reliability and validity will be discussed. The pilot testing of the instrument will also be reported. This will be followed by an outline of the intervention and the procedure of the study, a discussion on controlling of threats to internal validity, and a mention of ethical considerations. A discussion on the data analysis will follow right after. The chapter will end with a summary of Chapter 3.

# CHAPTER 3

# METHODOLOGY

## 3.1 Introduction

This chapter will discuss the methodology employed to investigate the effects of solicited teacher feedback, and formative and summative teacher feedback on students‟ self-regulated learning. Firstly, the research design will be introduced. This will be followed by a discussion on the population and sample of the study as well as the sampling method employed. Then, the study instrument will be introduced, and its reliability and validity will be discussed. The pilot testing of the instrument will also be reported. This will be followed by an outline of the intervention and the procedure of the study, a discussion on controlling of threats to internal validity, and a mention of ethical considerations. The chapter will end with a summary of Chapter 3.

## 3.2 Research Design

A quasi-experimental research with a randomized pretest-posttest control group design was employed in this study (refer to Figure 3.1)

| | | | |
|---|---|---|---|
| R | $O_1$ | $X_1$ | $O_2$ |
| R | $O_1$ | $X_2$ | $O_2$ |
| R | $O_1$ | $X_3$ | $O_2$ |
| R | $O_1$ | $X_4$ | $O_2$ |
| R | $O_1$ | C | $O_2$ |

Key:

R = Randomization

$O_1$ = Pretest

$X_1$ = Treatment 1 – Solicited, Formative and Summative Feedback

$X_2$ = Treatment 2 – Solicited, Summative Only Feedback

$X_3$ = Treatment 3 – Unsolicited, Formative and Summative Feedback

$X_4$ = Treatment 4 – Unsolicited, Summative Only Feedback

C = No Treatment

$O_2$ = Posttest

*Figure 3.1*. Randomized Pretest-Posttest Control Group Design

There are two independent variables and one dependent variable in this study. The first independent variable is type of teacher feedback, with solicited teacher feedback and unsolicited teacher feedback as the levels of the independent variable. The second independent variable is timing of feedback, with formative and summative teacher feedback as the first level and summative teacher feedback only as the second level. The fifth condition with no feedback serves as the control condition. The participants were randomly assigned to either the experimental or the control condition. Table 3.1 depicts the five independent conditions to which participants were assigned to in the study. The dependent variable is students‟ self-regulated

learning, with three subcomponents: metacognition, motivation, and behavior. Students‟ self-regulated learning was measured using the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993). The students‟ self-regulated learning was measured once before the implementation of the teacher feedback intervention and another time after the conclusion of the intervention.

Table 3.1

*Five Independent Conditions to Which Participants were Assigned to in the Experiment*

| Condition Feedback | Type of Teacher Feedback | Timing of Teacher |
|---|---|---|
| 1 | Solicited | Formative and Summative |
| 2 | Solicited | Summative Only |
| 3 | Unsolicited | Formative and Summative |
| 4 | Unsolicited | Summative Only |
| 5 | Control – No Feedback | Control – No Feedback |

## 3.3 Population and Sample of the Study

The target population for the study was all Malaysian private university students, particularly students who are majoring in psychology. These students are pursuing their tertiary education in about 20 private universities across the country such as HELP University, Sunway University, Taylor‟s University, and USCI University. The accessible population for the study was all psychology students from one private

university in Malaysia. Due to time and resource constraints, students from only one private university were included in the study. However, the chosen private university has one of the largest and most established psychology programs in Malaysia and Asia. It was the first private university to offer Psychology in Malaysia. Currently located in Shah Alam, Malaysia, the university has over 1000 undergraduates pursuing the Bachelor of Psychology program. The Department of Psychology also has over 35 academic staff. G*Power analysis using an effect size of 0.35 (set slightly lower than the typical effect size in the current research area of 0.40; Hattie & Timperley, 2007), an alpha level of .05, and a power of 0.80 suggested a sample size of 103 for this study. To account for a potential threat of mortality, a total of 175 participants were recruited for this study.

### 3.4 Sampling Method

The participants for this study were recruited via purposive sampling. That is, Year 1 Bachelor of Psychology students who were enrolled in PSY 106 – Introduction to Qualitative Methods (a Year 1 core research module) and PSY 113 – Psychology of Personal and Academic Development (a Year 1 core writing module) were recruited. A total of 135 students who were undertaking PSY 106 course were randomly allocated to the different experimental conditions while a total of 40 students who were undertaking PSY 113 were assigned to the control condition. The researcher also approached the lecturers and tutors of the modules to explain the study and get their permission to work with the researcher to provide teacher feedback to the students throughout the study period.

### 3.5 Instrument of the Study

Students‟ self-regulated learning was measured using the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich, Smith, Garcia, & McKeachie, 1993; refer

to Appendix A). The MSLQ is an 81-item self-report questionnaire developed based on social-cognitive and general cognitive theoretical frameworks. The MSLQ composed of Motivation and Learning Strategies major sections. The Learning Strategies section is further divided into Cognitive-Metacognitive and Resource Management sections. The Cognitive-Metacognitive, Motivation, and Resource Management sections correspond to the three aspects of Zimmerman‟s (1986) conceptualization of self-regulated learning: metacognition, motivation, and behavior (refer to Table 3.2).

Table 3.2

*MSLQ Subscales and Number of Items*

| Sections | Subscales | Number of Items |
|---|---|---|
| *Motivation* | Intrinsic goal orientation | 4 |
| | Extrinsic goal orientation | 4 |
| | Task value | 6 |
| | Self-efficacy | 8 |
| | Control of learning | 4 |
| | Test anxiety | 5 |
| Learning Strategies | | |
| *Cognitive-Metacognitive* | | |
| | Rehearsal | 4 |
| | Elaboration | 6 |
| | Organization | 4 |
| | Critical thinking | 5 |
| | Metacognitive self-regulation | 12 |
| *Resource Management* | | |
| | Time and study environment management | 8 |
| | Effort regulation | 4 |
| | Peer learning | 3 |
| | Help seeking | 4 |

The Motivation section comprises of scales on valuing, expectancy, and affect. The valuing scales include a four-item intrinsic goal orientation subscale that assesses whether a student sees an academic task as an end in itself and whether a student is focused on the mastery of course content, a four-item extrinsic goal orientation subscale that captures a student‟s tendency to engage in academic tasks in order to obtain good grades, rewards, or approval, and a six-item task value subscale that assesses the extent to which a student believes that the course material is interesting and worth learning. The expectancy scales include an eight-item self-efficacy subscale that assesses a student‟s confidence in performing an academic task and a four-item control of learning subscale that captures a student‟s belief that they have control over their level of performance in a class. The affect scale comprises of a five-item test anxiety subscale that assesses a student‟s experience of anxiety and fear while taking tests.

The Cognitive-Metacognitive scales include a four-item rehearsal subscale that assesses the degree to which a student repeats information to oneself, a six-item elaboration subscale that assesses a student‟s capability to summarize information, a four-item organization subscale that assesses the extent to which a student is organizing new information using tables and outlines, a five-item critical thinking subscale that captures the degree to which a student is capable of evaluating new ideas and applying them to novel situation, and a 12-item metacognitive self-regulation scale that assesses a student‟s ability to monitor and adjust their own mental processes as needed. The Resource Management scales include behaviors such as managing time and study environment, effort regulation, peer learning, and help-seeking. The eight-item managing time and study environment subscale assesses a student‟s study skills and use of study time. The four-item effort

regulation subscale measures the extent to which a student is persisting in learning even when the material is boring. The three-item peer leaning subscale captures a student‟s ability to work with others and to use study groups. Finally, the four-item helping seeking subscale assesses the degree to which a student seeks assistance from peers and teachers.

Respondents were to rate themselves on a 7-point Likert-type scale, from 1 (not at all true of me) to 7 (very true of me) on items such as “When studying for this course I try to determine which concepts I don‟t understand well (Cognitive-Metacognitive item),” “It is important for me to learn the course material in this class (Motivation item),” and “I usually study in a place where I can concentrate on my course work (Resource Management item).”

### 3.6 Validity and Reliability of the Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) has demonstrated robust internal reliability evidenced by Cronbach‟s alphas ranging from .52 to .93 (Pintrich, Smith, Garcia, & McKeachie, 1993). In the current study, reliability analysis revealed a robust Cronbach‟s alpha of .95 for the full scale. The Cronbach‟s alphas for the motivational, metacognitive, and behavioral subscales were .91, .91, and .67 respectively. Confirmatory factor analyses have shown that the general theoretical framework and the scales that measure them are valid. That is, the six motivational subscales and the nine learning strategies subscales characterize a coherent conceptual and empirically validated framework for assessing students‟ self-regulated learning. This establishes the factor validity of the MSLQ. The scale has also shown promising predictive validity. Students‟ scores on the scale have been shown to predict students‟ actual academic performance (Pintrich, Smith, Garcia, & McKeachie, 1993). Other researchers such as Bell (2006) and Bembenutty (2007)

have also found impressive relationships between the scores on the MSLQ and students‟ academic achievement. A more recent meta-analytic review using 2158 correlations from 67 independent samples by Crede and Phillips (2011) has shown that the MSLQ has a reasonably reliable measure of constructs and some of these constructs are meaningfully associated with university academic performance. Furthermore, some of these strengths of associations are similar to those observed for traditional predictors of academic performance such as scores on admission tests and prior academic performance.

Duncan and McKeachie (2005) have reported that social desirability response bias did not account for any significant amount of variance in their studies that have employed the MSLQ. The MSLQ has also been utilized to investigate students‟ self-regulated learning across a variety of content areas such as undergraduate statistics (Bandalos, Finney, & Geske, 2003) and undergraduate chemistry (Zusho, Pintrich, & Coppola, 2003), and diverse target population such as Asian undergraduates (Rotgans & Schmidt, 2009) and women undergraduate engineering majors (Vogt, 2003). Consequently, Duncan and McKeachie (2005) regard the MSLQ as an efficient, practical, and ecologically valid measure of students‟ self-regulated learning.

### 3.7 Pilot Testing of the Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) was administered on 120 second year psychology undergraduates from a Malaysian private university. The reliability analysis on the data collected revealed a robust Cronbach‟s alpha of .93 for the full scale. The Cronbach‟s alphas for the motivational, metacognitive, and behavioral subscales were .87, .92, and .59 respectively. These reliability statistics suggested that the MSLQ is a reliable measure to be employed on the sample of the

current study, which is psychology undergraduates from the same Malaysian private university.

## 3.8 Teacher Feedback Intervention

The teacher feedback intervention was implemented on two components of the course, namely lecture and assignment.

### 3.8.1 Teacher Feedback Intervention – Lecture

Table 3.3 provides an outline of the Teacher Feedback Intervention – Lecture procedure.

Table 3.3

*Teacher Feedback Intervention – Lecture Procedure*

| Time period | Intervention procedure |
|---|---|
| Beginning of lecture | - Condition 1 and Condition 2 participants were given Feedback Request Form A1. |
| At the end of lecture | - Condition 1 and Condition 2 participants submitted their Feedback Request Form A1. |
| Three days after lecture | - Condition 1 and Condition 2 participants were given Teacher Feedback A1 – solicited teacher feedback on lecture.<br>- Condition 3 and Condition 4 participants were given Teacher Feedback A1 – unsolicited teacher feedback on lecture.<br>- All participants were told to attend to the teacher feedback. |

At the beginning of Week 2 Lecture, Feedback Request Form A1 (refer to Appendix B) were given to participants in Condition 1 (solicited teacher feedback; formative and summative teacher feedback) and Condition 2 (solicited teacher feedback, summative only teacher feedback). The participants in Condition 1 and Condition 2 were told to think about three requests for teacher feedback as they were listening to the lecture. The participants in Condition 1 and Condition 2 were also requested to submit their Feedback Request Form A1 to the course lecturer, tutor, or researcher at the end of the lecture period. Upon receiving the Feedback Request Form A1, the researcher worked with the course lecturer or tutor to prepare the feedback requested by participants in Condition 1 and Condition 2.

The participants in Condition 1 and Condition 2 were given Teacher Feedback A1 (refer to Appendix C) – teacher feedback on their Week 1 Lecture based on their three requests for feedback – three days after the lecture. The participants in Condition 3 (unsolicited teacher feedback; formative and summative teacher feedback) were also given Teacher Feedback A1 – teacher feedback on their Week 1 Lecture based on three most commonly made requests for feedback by the participants in Condition 1 (solicited teacher feedback; formative and summative teacher feedback). The participants in Condition 4 (unsolicited teacher feedback; summative teacher feedback only) were also given Teacher Feedback A1 – teacher feedback on their Week 1 Lecture based on three most commonly made requests for feedback by the participants in Condition 2 (solicited teacher feedback; summative teacher feedback only). The participants in all four conditions were told to attend to the given teacher feedback and address them as they were completing other continuous assessments and preparing for the final exam of the course. It is essential to note that all feedback in this series of intervention were given individually.

The procedure was repeated for Weeks 3, 4, 5, and 7 Lecture. The Feedback Request Form A1 was replaced by Feedback Request Form A2 (refer to Appendix D), Feedback Request Form A3 (refer to Appendix F), Feedback Request Form A4 (refer to Appendix H), and Feedback Request Form A5 (refer to Appendix J) for Week 3 Lecture, Week 4 Lecture, Week 5 Lecture, and Week 7 Lecture respectively. The Teacher Feedback A1 was replaced by Teacher Feedback A2 (refer to Appendix E), Teacher Feedback A3 (refer to Appendix G), Teacher Feedback A4 (refer to Appendix I), and Teacher Feedback A5 (refer to Appendix K) for Week 3 Lecture, Week 4 Lecture, Week 5 Lecture, and Week 7 Lecture respectively. The intervention was not implemented in Week 6 as regular lecture was canceled for that week.

### 3.8.2 Teacher Feedback Intervention – Assignment

Table 3.4 provides an outline of the Teacher Feedback Intervention – Assignment procedure.

Table 3.4

*Teacher Feedback Intervention – Assignment Procedure*

| Time period | Intervention procedure |
|---|---|
| Four weeks prior to assignment | - All participants were reminded of the upcoming assignment submission and the goals of the assessment.<br>- Condition 1 participants were given Feedback Request Form B1. |
| Two weeks prior to assignment | - Condition 1 participants submitted their Feedback Request Form B1. |

| | |
|---|---|
| Ten days prior to assignment | - Condition 1 participants were given Teacher Feedback B1 – solicited formative teacher feedback on the assignment.<br>- Condition 3 participants were given Teacher Feedback B1 – unsolicited formative teacher feedback on the assignment.<br>- Conditions 1 and 3 participants were told to attend to the formative teacher feedback.<br>- Condition 1 participants were given Feedback Request Form B2. |
| One week prior to assignment | - Condition 1 participants submitted their Feedback Request Form B2. |
| Three days prior to assignment | - Condition 1 participants were given Teacher Feedback B2 – solicited formative teacher feedback on the assignment.<br>- Condition 3 participants were given Teacher Feedback B2 – unsolicited formative teacher feedback on the assignment.<br>- Conditions 1 and 3 participants were told to attend to the formative teacher feedback.<br>- Conditions 1 and 2 participants were told to fill in Feedback Request Form B3 and submit it with the assignment. |
| A week after the assignment | - Conditions 1 and 2 participants were given Teacher Feedback B3 – solicited summative feedback on the assignment.<br>- Conditions 3 and 4 participants were given Teacher Feedback B3 – unsolicited summative teacher feedback on the assignment.<br>- All participants were told to attend to the summative teacher feedback. |

Four weeks prior to participants‟ written assignment due date, all participants were reminded of the upcoming written assignment due date and the goals of the assessment. In addition, Feedback Request Form B1 (refer to Appendix L) was given to participants in Condition 1 (solicited teacher feedback; formative and summative teacher feedback). The participants in Condition 1 were told to think about three requests for teacher feedback as they were working on the written assignment. The participants in Condition 1 were also requested to submit their Feedback Request Form B1 to the course lecturer, tutor, or researcher during the course lecture time two weeks before the written assignment due date. Upon receiving the Feedback Request Form B1, the researcher worked with the course lecturers and tutors to prepare the feedback requested by participants in Condition 1.

Ten days before the written assignment due date, participants in Condition 1 were given Teacher Feedback B1 – formative teacher feedback on their written assignment based on their three requests for feedback (refer to Appendix M). The participants in Condition 3 (unsolicited teacher feedback; formative and summative teacher feedback) were also given Teacher Feedback B1 – formative teacher feedback on their written assignment based on three most commonly made requests for feedback by the participants in Condition 1. Participants in Condition 1 and Condition 3 were told to attend to the given formative teacher feedback and address them as they continued working on the written assignment. At the same time, participants in Condition 1 were told to think about three requests for teacher feedback as they continued working on the written assignment. The participants in Condition 1 were also requested to submit their Feedback Request Form B2 (refer to Appendix N) to the course lecturer, tutor, or researcher during the course lecture time one week before the written assignment due date. Upon receiving Feedback Request

Form B2, the researcher worked with the course lecturers or tutors to prepare the feedback requested by participants in Condition 1.

Three days before the written assignment due date, participants in Condition 1 were given Teacher Feedback B2 – formative teacher feedback on their written assignment based on their three requests for feedback (refer to Appendix O). The participants in Condition 3 (unsolicited teacher feedback; formative and summative teacher feedback) were also given Teacher Feedback B2 – formative teacher feedback on their written assignment based on three most commonly made requests for feedback by the participants in Condition 1. Participants in Condition 1 and Condition 3 were told to attend to the given formative teacher feedback and address them as they continued working and finalizing their written assignment. Three days before the written assignment due date, participants in Condition 1 (solicited teacher feedback; formative and summative teacher feedback) and Condition 2 (solicited teacher feedback; summative teacher feedback only) were told to think about three requests for teacher feedback as they continued working and finalizing their written assignment. These participants were also told to fill in Feedback Request Form B3 (refer to Appendix P) and attach it to their final version of the written assignment that was submitted to the course lecturer or tutor. After the written assignment due date, the Feedback Request Form B3 was the detached from the assignment and the researcher worked with the course lecturers and tutors again to prepare the feedback requested by participants in Condition 1 and Condition 2.

The participants in Condition 1 and Condition 2 were given Teacher Feedback B3 – summative teacher feedback on their written assignment based on their three requests for feedback a week after the written assignment due date, prior to the release of the written assignment grades (refer to Appendix Q). The

participants in Condition 3 (unsolicited teacher feedback; formative and summative teacher feedback) were also given summative teacher feedback on their written assignment based on three most commonly made requests for feedback by the participants in Condition 1 (solicited teacher feedback; formative and summative teacher feedback). The participants in Condition 4 (unsolicited teacher feedback; summative teacher feedback only) were also given summative teacher feedback on their written assignment based on three most commonly made requests for feedback by the participants in Condition 2 (solicited teacher feedback; summative teacher feedback only). The participants in all four conditions were told to attend to the given summative teacher feedback and address them as they were completing other continuous assessments and preparing for the final exam of the course.

Table 3.5 presents the frequency of teacher feedback, sorted by the two course components.

Table 3.5

*Frequency of Teacher Feedback by Course Components*

| Levels of Independent Variables | Frequency by Course Components | | Total Frequency |
|---|---|---|---|
| | Lecture | Assignment | |
| *Type of Teacher Feedback* | | | |
| Solicited Feedback | 5 | 3 | 8 |
| Unsolicited Feedback | 5 | 3 | 8 |
| *Timing of Teacher Feedback* | | | |
| Formative and Summative Feedback | - | 3 | 3 |
| Summative Only Feedback | - | 1 | 1 |

## 3.9 Procedure of the Study

Upon obtaining informed consent, participants were assigned to one of five conditions shown in Table 3.1. Participants were first required to fill in the MSLQ. Next, the participants were requested to provide some demographic information such as age, gender, ethnicity, and monthly household income (as a measure of socioeconomic status). Participants in the experimental conditions (Condition 1 – Condition 4) then went through Teacher Feedback Intervention – Lecture and Teacher Feedback Intervention – Assignment that were described in the earlier section. The two different interventions ran concurrently. Upon the end of the interventions, all participants were required to fill in the MSLQ again. Finally, participants were requested to state and provide details on any self-regulated learning

materials they came across during the duration of the study. The study was conducted for the course of the semester, which was eight weeks.

## 3.10 Validation of Research Protocol

The research protocol of the current study was reviewed and evaluated by a panel of three psychologists (refer to Appendix R). The panel consisted of two educational psychologists and one general psychologist who have at least five years of experience in the field of education. The panel confirmed that the research protocol was adequate to investigate the proposed research.

## 3.11 Control of Threats to Internal Validity

### 3.11.1 Participant Characteristics

Participant characteristics such as gender, ethnicity, socioeconomic status, study major, and initial self-regulated learning might have acted as threats to internal validity in this study. Participants were randomly assigned to the experimental and control conditions to minimize this threat. Demographic information such as gender, ethnicity, and socioeconomic status were also collected and statistically controlled for during data analysis. The analysis, however, showed that these factors did not significantly change the patterns of findings in the study. Participants‟ study major was kept constant across the experimental and control groups. Furthermore, initial self-regulated learning was measured for both experimental and control group participants and was added as a covariate during data analysis.

### 3.11.2 Testing

Pretesting could have affected self-regulated learning postscores. However, there was at least seven weeks of gap between pretest and posttest, and thus the likelihood of participants recalling their responses on pretest questionnaire during their posttest would have been low. Even if a testing effect was present, it would

have been likely to be equal for both experimental and control groups as both participants filled in the questionnaire during pretest and posttest.

### 3.11.3 Attitude of Participants

Attitude of the participants could have affected self-regulated learning postscores as well. As requesting for specific feedback from teachers would have been quite novel for most participants, participants in Condition 1 and Condition 2 (refer to Table 3.1) would have been likely to perceive that they were receiving some sort of special attention and this could have affected the results. However, receiving frequent formative feedback might also been quite novel for most participants. This would have ensured that there was a certain degree of novelty for almost all participants and this would have reduced the feeling that any particular group of participants was getting special attention.

### 3.11.4 Implementation

Implementation was likely been a threat in this study. The threat was tried to be minimized by having the same researcher and teachers to administer the study procedures for both experimental and control groups. Both the researcher and the teachers were reminded to be mindful that they do not unintentionally treat the different groups of participants differently. As the teachers were likely to prefer the traditional method of feedback, that is, unsolicited and summative teacher feedback, the researcher ensured that fairly good feedback was provided for participants in solicited, and formative and summative teacher feedback groups as well by constantly reviewing the feedback provided by the teachers before releasing them to the participants. Furthermore, as feedback for participants in the unsolicited teacher feedback condition were provided based on the top three requests for feedback by the

participants in the solicited teacher feedback condition, it was ensured that participants in the former group received equally good feedback from the teachers.

### 3.11.5 History

Extraneous events were likely to affect the internal validity of this study. For instance, students might have been exposed to articles or workshops on self-regulated learning techniques through the course of this study. As it was not possible to get all participants to experience all relevant extraneous events similarly, relevant information was obtained from participants at the end of the study so that they could be statistically controlled for during data analysis. However, it was found that none of the participants was exposed to any noteworthy articles or workshops on self-regulated learning through the course of this study, suggesting that history was not a major threat in the study.

### 3.11.6 Attrition and Maturation

As participants dropped out through the course of the study, attrition might have affected the results as participants who dropped out might have had a lower score on self-regulated learning. However, attrition affected both the experimental and control groups similarly (similar dropout rate), and thus was not a major threat in this study. Although participants‟ self-regulated learning might have improved throughout the course of the semester even without the intervention, these improvements would have been seen for both experimental and control group participants, and thus maturation was not a threat in this study.

### 3.11.7 Instrumentation, Location, and Regression

As this study used a reliable and valid self-report measure to assess the dependent variable of students‟ self-regulated learning, there were not any major threats due to instrument decay, data collector characteristics, and data collector bias.

The location of implementation and data collection was standardized for both experimental and control groups to reduce any threats due to the study location. Finally, regression was unlikely to affect the experimental and control groups differently in this study as well.

### 3.12 Ethical Consideration

An information letter which outlined the nature and procedure of the study, and participants‟ rights to withdraw from the study at any point was given to potential participants before the beginning of the study. Only potential participants who gave their informed consent were assigned to experimental and control groups in this study. No major physical or psychological harm, discomfort, or danger resulted from participants‟ participation in this study. The questionnaire that was used to measure participants‟ self-regulated learning was generally non-invasive as well. Reasonable safeguards were taken throughout the course of the study to minimize any potential risks and protect the participants from any psychological or physical harm. Steps were also taken to ensure the confidentiality of research data. Participants‟ names were removed from all data collection forms. They were identified by the unique student numbers and their data were not individually identified at any point of the study. The researcher also ensured that no one other than the researcher and their supervisor had access to the data. As assisting with the study inevitably led to an increased workload for the involved lecturer, the researcher thoroughly explained the study protocol to the lecturers and tutors, and obtained their consent before executing the research project. In addition, the students who were in the control group did not receive any teacher feedback for the duration of the study only, they received their teacher feedback after the completion of the study. Above all, the current research

project was sent for a review and approval by HELP University‟s Ethics Review Board before the commencement of the study (refer to Appendix S).

### 3.13 Summary

This chapter has discussed the methodology employed to investigate the effects of solicited teacher feedback, and formative and summative teacher feedback on students‟ self-regulated learning. A randomized pretest-posttest control group experimental design was used in this study. One hundred and seventy-five psychology undergraduates from a Malaysian private university were recruited via purposive sampling for this study. The dependent variable of the study was measured using the MSLQ, and it has been shown to be a valid and reliable measure of self-regulated learning. This chapter also outlined the intervention and the procedure of the study, discussed controls of threats to internal validity, and made a mention of ethical consideration. In the next chapter, Chapter 4 – Findings, results of the study will be reported.

# CHAPTER 4

# FINDINGS

## 4.1 Introduction

This chapter presents the data analysis procedure and findings of the current study. The statistical analyses performed in the current study are explained in the Data Analysis Procedure section. This is followed by the reporting of participants statistics. The assumptions related to the statistical tests are then checked and reported, followed by the reporting of descriptive statistics relevant to the primary dependent variable(s) of the study. Finally, results that answer the primary research questions stated below are reported.

i. Is there a significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning?

ii. Is there a significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning?

iii. Is there a significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

## 4.2 Data Analysis Procedure

There are two independent variables in this study namely, type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative

only). Both of these variables were assessed using a nominal scale of measurement. Students‟ self-regulated learning is the dependent variable in this study and it was measured using an interval scale of measurement. Students‟ self-regulated learning score was computed by taking the mean of the questionnaire items after reverse scoring the negatively worded items. A higher score indicates a greater level of self-regulated learning. Pre-manipulation level of self-regulated learning served as the covariate in the study.

First, data were checked for accurate entry into IBM SPSS Statistics software program. Data were then checked for any significant outliers. This was followed by the checking of participants statistics. Then, the assumptions of ANCOVA were checked and descriptive statistics of the primary dependent variable – students‟ self-regulated learning – were derived. A two-way independent ANCOVA was performed to answer the three research questions of the study.

As ANCOVA analysis revealed non-significant results, a two-way independent Multivariate Analysis of Covariance (MANCOVA) was performed to examine the data in a more nuanced manner. In this additional analysis, each of the three components of self-regulated learning namely motivation, metacognition, and behavior, were entered as the dependent variables. Prior to the analysis, the assumptions of MANCOVA were checked and descriptive statistics related to the three dependent variables were also derived.

## 4.3 Participants Statistics

A total of 175 participants were recruited for the study. Eighteen of the participants (five from Condition 1, four from Condition 2, three from Condition 3, two from Condition 4, and four from Condition 5) dropped out through the course of the study. As such, only data from 157 participants were included in the analysis. Table 4.1

shows the distribution of participants pre and post manipulation across the five study conditions.

Table 4.1

*Distribution of Participants across Study Conditions*

| Condition | Pre-Manipulation (*n*) | Post-Manipulation (*n*) |
|---|---|---|
| Condition 1 | 33 | 28 |
| Condition 2 | 34 | 30 |
| Condition 3 | 34 | 31 |
| Condition 4 | 34 | 32 |
| Condition 5 | 40 | 36 |
| Total | 175 | 157 |

The final sample of the current study consisted of 124 women and 33 men participants with a mean age of 20.22 years old (*SD* = 1.55). 77.7% of participants identified as Chinese, 8.9% as Malay, another 8.9% as Indian, and the remaining 4.5% identified as members of other ethnic groups. 94.3% of the participants were Malaysian local students and the remaining 5.7% were international students.

## 4.4 Assumptions Testing – ANCOVA

ANCOVA was run to test the research questions of the study with type of feedback of feedback and timing of feedback as the independent variables, self-regulated learning as the dependent variable, and pre-manipulation self-regulated learning as the covariate. Primary assumptions of ANCOVA including linearity, normality, homogeneity of variance, homogeneity of regression slopes, independence of the

covariate and treatment effect, and correlation between the covariate and the dependent variable were checked.

### 4.4.1 Linearity

Figure 4.1 shows the scatterplot of students‟ self-regulated learning against pre-manipulation self-regulated learning for type of teacher feedback factor while Figure 4.2 shows the scatterplot of students‟ self-regulated learning against pre-manipulation self-regulated learning for timing of teacher feedback factor. A graphical inspection of the scatterplots depicting the relationship between the scores of the covariate (pre-manipulation self-regulated learning) for all conditions and the dependent variable (students‟ self-regulated learning) appear to suggest a straight-line relationship between the variables. Thus, the assumption of linearity for the current data was met.

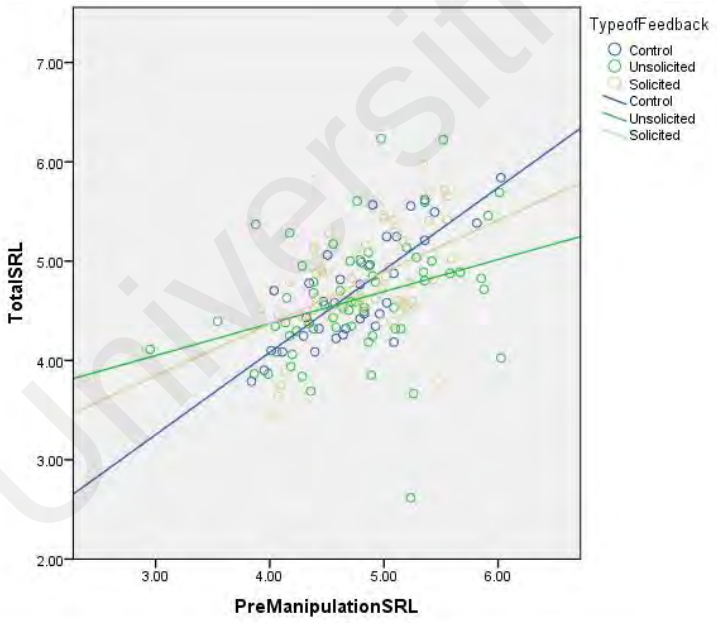


*Figure 4.1*. Scatterplot of Students‟ Self-Regulated Learning against Pre-Manipulation Self-Regulated Learning for Type of Teacher Feedback Factor

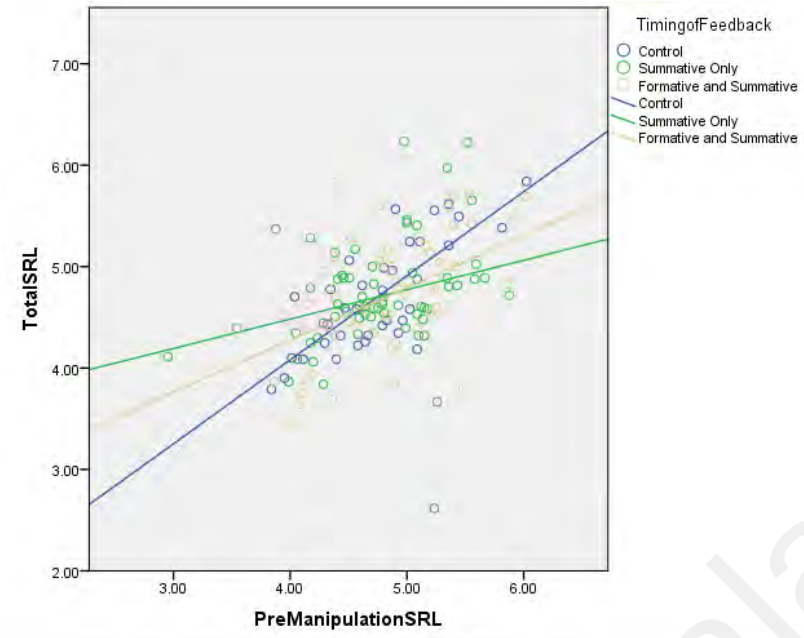


*Figure 4.2*. Scatterplot of Students‟ Self-Regulated Learning against Pre-Manipulation Self-Regulated Learning for Timing of Teacher Feedback Factor

### 4.4.2 Normality

The Kolmogorov-Smirnov test was used to test for the normality of self-regulated learning scores. The scores of unsolicited teacher feedback condition, $D(63) = .070$, $p = .200$; formative and summative teacher feedback condition, $D(59) = .058$, $p = .200$; and the control condition, $D(36) = .117$, $p = .200$, did not deviate significantly from normal. However, the scores of solicited teacher feedback condition, $D(58) = .136$, $p = .010$, and summative only teacher feedback condition, $D(62) = .129$, $p = .012$ were both significantly non-normal.

The central limit theorem proposes that the sampling distribution of the sample mean would approach normality as the sample size increases and a sample size of 30 is often suggested to be sufficient to produce an approximately normal sampling distribution (Hays, 1994). As the sample size of the current study is over

30, it is reasonable to expect that the hypothesis tests in the current study will be robust against the violation of normality.

### 4.4.3 Homogeneity of Variance

The Levene"s test revealed that the variances in self-regulated learning were equal for the solicited teacher feedback, unsolicited teacher feedback, and the control conditions, $F(2, 154) = .656$, $p = .520$. The Levene"s test also showed that the variances in self-regulated learning were equal for the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F(2, 154) = .671$, $p = .513$. Collectively, these results suggest that the assumption of homogeneity of variance is met for the current data set.

### 4.4.4 Homogeneity of Regression Slopes

There was no significant interaction between the type of teacher feedback, the timing of teacher feedback, and the pre-manipulation self-regulated learning scores, suggesting that the assumption of homogeneity of regression slopes for type of teacher feedback and the timing of teacher feedback was met, $F(1, 147) = .013$, $p = .909$. There was no significant interaction between the type of teacher feedback and the pre-manipulation self-regulated learning scores, suggesting that the assumption of homogeneity of regression slopes for type of teacher feedback was met, $F(1, 147) = .746$, $p = .389$. There was no significant interaction between the timing of teacher feedback and the pre-manipulation self-regulated learning scores, suggesting that the assumption of homogeneity of regression slopes for the timing of teacher feedback was met, $F(1, 147) = 1.507$, $p = .222$.

### 4.4.5 Independence of the Covariate and Treatment Effect

A one-way ANOVA showed that there is no difference in pre-manipulation level of self-regulated learning between the solicited teacher feedback, unsolicited

teacher feedback, and the control conditions, $F(2, 154) = .278$, $p = .757$. A one-way ANOVA also showed that there is no difference in pre-manipulation level of self-regulated learning between the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F(2, 154) = .411$, $p = .664$. Together, these results suggest that there was independence of the covariate and treatment effect.

### 4.4.6 Correlation between the Covariate and the Dependent Variable

There was a significant correlation between pre-manipulation self-regulated learning (covariate) and post-intervention self-regulated learning (dependent variable), $r(155) = .455$, $p < .001$, suggesting that the assumption was met.

## 4.5 Findings

The results of hypothesis tests using ANCOVA are reported in this section.

### 4.5.1 Difference in Self-Regulated Learning Between Solicited Teacher Feedback and Unsolicited Teacher Feedback

Table 4.2 shows the means, standard deviations, skewness, and kurtosis of students" self-regulated learning across the type of feedback conditions.

Table 4.2

*Means, Standard Deviations, Skewness, and Kurtosis of Students' Self-Regulated Learning across Type of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited | 4.80 | 4.78 | .52 | -.10 | .31 | .43 | .62 |
| Unsolicited | 4.61 | 4.63 | .61 | .07 | .30 | 1.66 | .60 |
| Control (No Feedback) | 4.71 | 4.72 | .54 | .40 | .39 | -.79 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

ANCOVA revealed that there was no significant difference in self-regulated learning between students who are given solicited teacher feedback ($M_{adj}$ = 4.78, *SD* = .52) and students who are given unsolicited teacher feedback ($M_{adj}$ = 4.63, *SD* = .61), after controlling for pre-manipulation level of self-regulated learning, $F(1, 151) = 2.594$, $p = .109$, partial $\eta^2 = .017$. This suggests that the level of self-regulated learning is similar between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning.

### 4.5.2 Difference in Self-Regulated Learning Between Formative and Summative Teacher Feedback, and Summative Teacher Feedback Only

Table 4.3 shows the means, standard deviations, skewness, and kurtosis of students" self-regulated learning across the timing of feedback conditions.

Table 4.3

*Means, Standard Deviations, Skewness, and Kurtosis of Students' Self-Regulated Learning across Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Formative and Summative | 4.70 | 4.68 | .58 | -.08 | .31 | -.58 | .61 |
| Summative Only | 4.70 | 4.72 | .57 | -.04 | .30 | 3.07 | .60 |
| Control (No Feedback) | 4.71 | 4.72 | .54 | .40 | .39 | -.79 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

ANCOVA revealed that there was no significant difference in self-regulated learning between students who are given formative and summative teacher feedback ($M_{adj}$ = 4.68, *SD* = .58), and students who are given summative teacher feedback only

($M_{adj}$ = 4.72, *SD* = .57), after controlling for pre-manipulation level of self-regulated learning, $F(1, 151) = .150$, $p = .699$, partial $\eta^2 = .001$. This suggests that the level of self-regulated learning is similar between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning.

### 4.5.3 Interaction Effect of Type of Feedback and Timing of Feedback on Self-Regulated Learning

Table 4.4 shows the means, standard deviations, skewness, and kurtosis of students‟ self-regulated learning across the different type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) conditions.

Table 4.4

*Means, Standard Deviations, Skewness, and Kurtosis of Students' Self-Regulated Learning across Type of Feedback and Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited, Formative and Summative | 4.74 | 4.73 | .64 | -.27 | .44 | -.55 | .86 |
| Solicited, Summative Only | 4.85 | 4.82 | .39 | 1.34 | .43 | 1.34 | .83 |
| Unsolicited, Formative and Summative | 4.67 | 4.64 | .53 | .12 | .42 | -.57 | .82 |
| Unsolicited, Summative Only | 4.56 | 4.61 | .68 | .15 | .41 | 2.49 | .81 |
| Control (No Feedback) | 4.71 | 4.72 | .54 | .40 | .39 | -.79 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

ANCOVA revealed that there was no significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning, $F(1, 151) = .425$, $p = .515$, partial $\eta^2 = .003$. This suggests that the level of self-regulated learning is similar across the different combinations of the levels of the independent variables (solicited, unsolicited, formative and summative, and summative only).

## 4.6 Assumptions Testing – MANCOVA

MANCOVA was run to test the research questions of the study with type of feedback of feedback and timing of feedback as the independent variables; motivational, metacognitive, behavioral components of self-regulated learning as the dependent variables, and pre-manipulation self-regulated learning as the covariate. Primary assumptions of MANCOVA including linearity, normality, homogeneity of variance, homogeneity of regression slopes, independence of the covariate and treatment effect, and correlation between the covariate and the dependent variable, homogeneity of covariance matrices, and absence of multicollinearity were checked.

### 4.6.1 Linearity

A graphical inspection of the scatterplots depicting the relationship between the scores of the covariate (pre-manipulation level of self-regulated learning) for all conditions and the dependent variables (motivational, metacognitive, and behavioral components of students‟ self-regulated learning) suggests a straight-line relationship between the variables (refer to Appendix T). Thus, the assumption of linearity for the current data was met.

### 4.6.2 Normality

The Kolmogorov-Smirnov test was used to test for the normality of the motivation, metacognitive, and behavioral components of self-regulated learning scores. The test results are presented in Table 4.5.

Table 4.5

*Kolmogorov-Smirnov Test Results for All Study Conditions*

| Component Result | Condition | Kolmogorov-Smirnov Test |
|---|---|---|
| Motivation | Solicited | $D(58) = .126$, $p = .023$ |
| | Unsolicited | $D(63) = .093$, $p = .200$ |
| | Formative and Summative | $D(59) = .078$, $p = .200$ |
| | Summative Only | $D(62) = .114$, $p = .045$ |
| | Control (No Feedback) | $D(36) = .075$, $p = .200$ |
| Metacognitive | Solicited | $D(58) = .075$, $p = .200$ |
| | Unsolicited | $D(63) = .097$, $p = .200$ |
| | Formative and Summative | $D(59) = .072$, $p = .200$ |
| | Summative Only | $D(62) = .094$, $p = .200$ |
| | Control (No Feedback) | $D(36) = .093$, $p = .200$ |
| Behavioral | Solicited | $D(58) = .097$, $p = .200$ |
| | Unsolicited | $D(63) = .105$, $p = .080$ |
| | Formative and Summative | $D(59) = .076$, $p = .200$ |
| | Summative Only | $D(62) = .123$, $p = .020$ |
| | Control (No Feedback) | $D(36) = .128$, $p = .144$ |

The test results revealed that the motivation component scores of unsolicited teacher feedback condition, formative and summative teacher feedback condition, and the control condition did not deviate significantly from normal. However, the scores of solicited teacher feedback condition and summative only teacher feedback condition were both significantly non-normal. The metacognitive component scores of all five study conditions did not deviate significantly from normal. The behavioral component scores of solicited teacher feedback condition, unsolicited teacher feedback condition, formative and summative teacher feedback condition, and the control condition did not deviate significantly from normal. However, the scores of summative only teacher feedback condition were significantly non-normal. Again, as discussed in the earlier section, as the sample size of the current study is over 30, it is reasonable to expect that the hypothesis tests in the current study will be robust against the violation of normality.

### 4.6.3 Homogeneity of Variance

The Levene‟s test revealed that the variances in the motivation component of self-regulated learning were equal for the solicited teacher feedback, unsolicited teacher feedback, and the control conditions, $F(2, 154) = .090$, $p = .914$. The Levene‟s test also showed that the variances in the motivation component of self-regulated learning were equal for the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F(2, 154) = .563$, $p = .571$.

The Levene‟s test revealed that the variances in the metacognitive component of self-regulated learning were equal for the solicited teacher feedback, unsolicited teacher feedback, and the control conditions, $F(2, 154) = 1.242$, $p = .292$. The Levene‟s test also showed that the variances in the metacognitive component of self-

regulated learning were equal for the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F(2, 154) = .824$, $p = .440$.

The Levene"s test revealed that the variances in the behavioral component of self-regulated learning were equal for the solicited teacher feedback, unsolicited teacher feedback, and the control conditions, $F(2, 154) = .514$, $p = .599$. The Levene"s test also showed that the variances in the behavioral component of self-regulated learning were equal for the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F(2, 154) = .176$, $p = .838$. Collectively, these results suggest that the assumption of homogeneity of variance is met for the current data set.

### 4.6.4 Homogeneity of Regression Slopes

There was no significant interaction between the type of teacher feedback, the timing of teacher feedback, and the pre-manipulation self-regulated learning scores on motivation, $F(1, 147) = .236$, $p = .628$, metacognitive, $F(1, 147) = .544$, $p = .462$, and behavioral $F(1, 147) = .942$, $p = .333$ components of self-regulated learning, suggesting that the assumption of homogeneity of regression slopes for type of teacher feedback and the timing of teacher feedback was met.

There was no significant interaction between the type of teacher feedback and the pre-manipulation self-regulated learning scores on motivation, $F(1, 147) = 1.920$, $p = .168$, metacognitive, $F(1, 147) = .006$, $p = .936$, and behavioral $F(1, 147) = .882$, $p = .349$ components of self-regulated learning, suggesting that the assumption of homogeneity of regression slopes for type of teacher feedback was met.

There was no significant interaction between the timing of teacher feedback and the pre-manipulation self-regulated learning scores on motivation, $F(1, 147) =$

1.615, $p$ = .206, metacognitive, $F$(1, 147) = 1.355, $p$ = .246, and behavioral $F$(1, 147) = .029, $p$ = .865 components of self-regulated learning, suggesting that the assumption of homogeneity of regression slopes for the timing of teacher feedback was met.

### 4.6.5 Independence of the Covariate and Treatment Effect

A one-way ANOVA showed that there is no difference in pre-manipulation level of self-regulated learning between the solicited teacher feedback, unsolicited teacher feedback, and the control conditions, $F$(2, 154) = .278, $p$ = .757. A one-way ANOVA also showed that there is no difference in pre-manipulation level of self-regulated learning between the formative and summative teacher feedback, summative only teacher feedback, and the control conditions, $F$(2, 154) = .411, $p$ = .664. Together, these results suggest that there was independence of the covariate and treatment effect.

### 4.6.6 Correlation between the Covariate and the Dependent Variables

There were significant correlations between pre-manipulation self-regulated learning (covariate) and motivational, $r$(155) = .367, $p$ < .001; metacognitive, $r$(155) = .397, $p$ < .001; and behavioral, $r$(155) = .393, $p$ < .001 components of post-intervention self-regulated learning, suggesting that the assumption was met for the current data set.

### 4.6.7 Homogeneity of Covariance Matrices

The Box‟s test showed that the covariance matrices are roughly equal as assumed, $F$(24, 60628.115) = 1.317, $p$ = .137.

### 4.6.8 Absence of Multicollinearity

The motivational component was moderately correlated with the metacognitive component, $r$(155) = .614, $p$ < .001 and behavioral component of self-

regulated learning, $r(155) = .396$, $p < .001$. The metacognitive component was moderately correlated with the behavioral component of self-regulated learning, $r(155) = .607$, $p < .001$ as well. Correlation coefficients ranging from .396 to .614 suggest that there is no multicollinearity between the dependent variables (Berry & Feldman, 1985).

## 4.7 Findings

The results of hypothesis tests using MANCOVA are reported in this section.

### 4.7.1 Difference in Self-Regulated Learning Between Solicited Teacher Feedback and Unsolicited Teacher Feedback

Table 4.6, Table 4.7, and Table 4.8 show the means, standard deviations, skewness, and kurtosis of motivational, metacognitive, and behavioral components of students‟ self-regulated learning across the type of feedback conditions respectively.

Table 4.6

*Means, Standard Deviations, Skewness, and Kurtosis of Motivational Component of Students' Self-Regulated Learning across Type of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited | 4.88 | 4.86 | .69 | -.28 | .31 | .45 | .62 |
| Unsolicited | 4.87 | 4.88 | .72 | .03 | .30 | 2.48 | .60 |
| Control (No Feedback) | 4.91 | 4.93 | .63 | .58 | .39 | .28 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.7

*Means, Standard Deviations, Skewness, and Kurtosis of Metacognitive Component of Students' Self-Regulated Learning across Type of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited | 4.77 | 4.75 | .62 | -.08 | .31 | -.51 | .62 |
| Unsolicited | 4.47 | 4.49 | .77 | .59 | .30 | 1.21 | .60 |
| Control (No Feedback) | 4.56 | 4.58 | .67 | .43 | .39 | -.39 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.8

*Means, Standard Deviations, Skewness, and Kurtosis of Behavioral Component of Students' Self-Regulated Learning across Type of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited | 4.70 | 4.69 | .55 | .57 | .31 | .16 | .62 |
| Unsolicited | 4.43 | 4.44 | .59 | .36 | .30 | .88 | .60 |
| Control (No Feedback) | 4.61 | 4.62 | .61 | .45 | .39 | .37 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Using Pillai"s trace, there was a significant difference in the motivational, metacognitive, behavioral components of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning, $F(3, 149) = 3.658$, $p = .014$, partial $\eta^2 = .069$. Separate univariate ANOVAs revealed that there was a significant difference in the metacognitive,

$F(1, 151) = 5.058$, $p = .026$, partial $\eta^2 = .032$ and behavioral, $F(1, 151) = 6.351$, $p = .013$, partial $\eta^2 = .040$, but not motivational component of students‟ self-regulated learning, $F(1, 151) = .056$, $p = .813$, partial $\eta^2 = .000$. These suggest that the level of metacognitive and behavioral components of self-regulated learning is different between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. The level of motivational component of self-regulated learning, however, is similar for both groups of students.

Specifically, the LSD *post hoc* test revealed that participants in the solicited teacher feedback condition ($M_{adj} = 4.75$, $SD = .62$) reported greater metacognitive component of self-regulated learning than participants in the unsolicited teacher feedback condition ($M_{adj} = 4.49$, $SD = .77$), $p = .026$. However, there was no significant difference in metacognitive component of self-regulated learning between participants in the solicited teacher feedback and control conditions ($M_{adj} = 4.58$, $SD = .67$), $p = .201$ as well as between participants in the unsolicited teacher feedback and control conditions, $p = .512$.

The LSD post hoc test also revealed that participants in the solicited teacher feedback condition ($M_{adj} = 4.69$, $SD = .55$) reported greater behavioral component of self-regulated learning than participants in the unsolicited teacher feedback condition ($M_{adj} = 4.44$, $SD = .59$), $p = .013$. However, there was no significant difference in behavioral component of self-regulated learning between participants in the solicited teacher feedback and control conditions ($M_{adj} = 4.62$, $SD = .61$), $p = .582$ as well as between participants in the unsolicited teacher feedback and control conditions, $p = .104$.

### 4.7.2 Difference in Self-Regulated Learning Between Formative and Summative Teacher Feedback, and Summative Teacher Feedback Only

Table 4.9, Table 4.10, and Table 4.11 show the means, standard deviations, skewness, and kurtosis of motivational, metacognitive, and behavioral components of students‟ self-regulated learning across the timing of feedback conditions respectively.

Table 4.9

*Means, Standard Deviations, Skewness, and Kurtosis of Motivational Component of Students' Self-Regulated Learning across Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Formative and Summative | 4.85 | 4.82 | .72 | -.05 | .31 | .51 | .61 |
| Summative Only | 4.90 | 4.92 | .69 | -.17 | .30 | 2.82 | .60 |
| Control (No Feedback) | 4.91 | 4.93 | .63 | .58 | .39 | .28 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.10

*Means, Standard Deviations, Skewness, and Kurtosis of Metacognitive Component of Students' Self-Regulated Learning across Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Formative and Summative | 4.63 | 4.61 | .75 | .01 | .31 | -.37 | .61 |
| Summative Only | 4.60 | 4.62 | .69 | .47 | .30 | 1.65 | .60 |
| Control (No Feedback) | 4.56 | 4.58 | .67 | .43 | .39 | -.39 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.11

*Means, Standard Deviations, Skewness, and Kurtosis of Behavioral Component of Students' Self-Regulated Learning across Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Formative and Summative | 4.59 | 4.57 | .58 | .27 | .31 | .40 | .61 |
| Summative Only | 4.54 | 4.55 | .59 | .47 | .30 | .79 | .60 |
| Control (No Feedback) | 4.61 | 4.63 | .61 | .45 | .39 | .37 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Using Pillai"s trace, there was no significant difference in the motivational, metacognitive, behavioral components of self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning, $V = .008$, $F(3, 149) = .388$, $p = .762$, partial $\eta^2 = .008$. Consistently, separate univariate ANOVAs revealed that there was no significant difference in the motivational, $F(1, 151) = .773$, $p = .381$, partial $\eta^2 = .005$; metacognitive, $F(1, 151) = .001$, $p = .976$, partial $\eta^2 = .000$; and behavioral component of students" self-regulated learning, $F(1, 151) = .040$, $p = .841$, partial $\eta^2 = .000$. These suggest that the level of motivational, metacognitive, and behavioral components of self-regulated learning is similar between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning.

### 4.7.3 Interaction Effect of Type of Feedback and Timing of Feedback on Self-Regulated Learning

Table 4.12, Table 4.13, and Table 4.14 show the means, standard deviations, skewness, and kurtosis of motivational, metacognitive, and behavioral components of students‟ self-regulated learning across the different type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) conditions respectively.

Table 4.12

*Means, Standard Deviations, Skewness, and Kurtosis of Motivational Component of Students' Self-Regulated Learning across Type of Feedback and Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited, Formative and Summative | 4.71 | 4.70 | .83 | -.03 | .44 | -.31 | .86 |
| Solicited, Summative Only | 5.03 | 5.01 | .49 | .47 | .43 | .40 | .83 |
| Unsolicited, Formative and Summative | 4.96 | 4.93 | .59 | .55 | .42 | 1.85 | .82 |
| Unsolicited, Summative Only | 4.78 | 4.83 | .82 | .02 | .41 | 2.32 | .81 |
| Control (No Feedback) | 4.91 | 4.92 | .63 | .58 | .39 | .28 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.13

*Means, Standard Deviations, Skewness, and Kurtosis of Metacognitive Component of Students' Self-Regulated Learning across Type of Feedback and Timing of Feedback Conditions*

| **Condition** | ***M*** | $M_{adj}$ | ***SD*** | **Skewness** | ***SE* Skewness** | **Kurtosis** | ***SE* Kurtosis** |
|---|---|---|---|---|---|---|---|
| Solicited, Formative and Summative | 4.78 | 4.77 | .73 | -.29 | .44 | -.77 | .86 |
| Solicited, Summative Only | 4.76 | 4.74 | .52 | .43 | .43 | -.44 | .83 |
| Unsolicited, Formative and Summative | 4.50 | 4.47 | .76 | .30 | .42 | .43 | .82 |
| Unsolicited, Summative Only | 4.45 | 4.50 | .80 | .86 | .41 | 2.29 | .81 |
| Control (No Feedback) | 4.56 | 4.58 | .67 | .43 | .39 | -.39 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Table 4.14

*Means, Standard Deviations, Skewness, and Kurtosis of Behavioral Component of Students' Self-Regulated Learning across Type of Feedback and Timing of Feedback Conditions*

| Condition | *M* | $M_{adj}$ | *SD* | Skewness | *SE* Skewness | Kurtosis | *SE* Kurtosis |
|---|---|---|---|---|---|---|---|
| Solicited, Formative and Summative | 4.73 | 4.71 | .53 | .28 | .44 | .06 | .86 |
| Solicited, Summative Only | 4.68 | 4.66 | .57 | .82 | .43 | .50 | .83 |
| Unsolicited, Formative and Summative | 4.46 | 4.44 | .60 | .46 | .42 | 1.05 | .82 |
| Unsolicited, Summative Only | 4.40 | 4.45 | .58 | .26 | .41 | 1.00 | .81 |
| Control (No Feedback) | 4.61 | 4.62 | .61 | .45 | .39 | .37 | .77 |

*Note*. $M_{adj}$ = Adjusted mean, after controlling for pre-manipulation level of self-regulated learning.

Using Pillai"s trace, there was no significant interaction effect between type of feedback and timing of feedback on the motivational, metacognitive, behavioral components of students" self-regulated learning after controlling for pre-manipulation self-regulated learning, $V = .036$, $F(3, 149) = 1.860$, $p = .139$, partial $\eta^2 = .036$. Consistently, separate univariate ANOVAs revealed that there was no significant interaction effect on the motivational, $F(1, 151) = 3.164$, $p = .077$, partial $\eta^2 = .021$; metacognitive, $F(1, 151) = .070$, $p = .792$, partial $\eta^2 = .000$; and behavioral component of students" self-regulated learning, $F(1, 151) = .088$, $p = .767$, partial $\eta^2 = .001$. These suggest that the level of motivational, metacognitive, and behavioral components of self-regulated learning is similar across the different combinations of the levels of the independent variables (solicited, unsolicited, formative and summative, and summative only).

A summary of all hypothesis tests of the current study is presented in Table 4.15.

Table 4.15

*Summary of Hypothesis Tests*

| **Hypothesis** | **Statistical Test** | **Result** |
|---|---|---|
| H1: There is a significant difference in self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. | ANCOVA | Not supported |
| | MANCOVA | Supported for Metacognitive & Behavioral Components of Self-Regulated Learning; Not supported for Motivation Component |
| H2: There is a significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning. | ANCOVA | Not supported |
| | MANCOVA | Not supported |
| H3: There is a significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. | ANCOVA | Not supported |
| | MANCOVA | Not supported |

*Note.* Independent Variables = Type of Feedback and Timing of Feedback;
Dependent Variable(s) = Self-Regulated Learning (ANCOVA), Metacognitive, Behavioral, and Motivational Components of Self-Regulated Learning (MANCOVA);
Covariate = Pre-Manipulation Level of Self-Regulated Learning.

## 4.8 Summary

The results of the study revealed that participants in the solicited teacher feedback condition reported greater levels of metacognitive and behavioral components of self-regulated learning than participants in the unsolicited teacher feedback condition, after controlling for pre-manipulation level of self-regulated learning. However, there was no significant difference in the motivational component of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. There was no significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation level of self-regulated learning. Finally, there was no significant interaction effect of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. A discussion of these results is included in the following chapter.

# CHAPTER 5

# DISCUSSION AND CONCLUSION

## 5.1 Introduction

The current study aimed to examine the role of solicited teacher feedback, and formative and summative teacher feedback in facilitating students‟ self-regulated learning, utilizing a randomized pretest-posttest control group experimental design. This chapter presents a summary and discussion of the results reported in the previous chapter. The theoretical, methodological, and practical implications are also highlighted. This is followed by a discussion of the suggestions from the study and recommendations for future research. The chapter ends with a conclusion.

## 5.2 Summary of the Findings

ANCOVA revealed that type of feedback (solicited, unsolicited), timing of feedback (formative and summative, summative only), and the interaction between type of feedback and timing of feedback had no significant effect on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. However, MANCOVA analysis showed that type of feedback had a significant effect on metacognitive and behavioral components of students‟ self-regulated learning, but not motivational component of students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. Specifically, there was a significant difference in the metacognitive and behavioral components of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. Timing of feedback, and the interaction between type of feedback and timing of feedback, however, had no significant effect on students‟

motivational, metacognitive, and behavioral components self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

## 5.3 Discussion of the Findings

### 5.3.1 Difference in Self-Regulated Learning Between Solicited Teacher Feedback and Unsolicited Teacher Feedback

The results of the current study revealed that there was a significant difference in the metacognitive and behavioral components, but not motivational component of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. The effect sizes of .032 (metacognitive) and .040 (behavioral) fall under the category of small effect (Cohen, 1988) and zone of desired effect in the educational context (Hattie, 2009). These suggest that the effect of type of feedback on metacognitive and behavioral components of self-regulated learning is nonnegligible. These findings are mostly consistent with the series of research by Schunk and Swartz (1993a) that established that students‟ self-regulated learning can be enhanced through social guidance and feedback.

Students who received solicited teacher feedback might have reported a greater level of self-regulated learning than students who received unsolicited teacher feedback possibly because the solicited feedback has encouraged the former group of students to better monitor their work and seek appropriate feedback from their teachers. This proposition is in line by Butler and Winne‟s (1995) theorization that external feedback such as teacher feedback on students‟ domain understandings aids the students in generating monitoring information, especially about cues that students can use to regulate their learning. Solicited teacher feedback might have also helped

students who received such feedback more in determining the accuracy of self-monitoring, which in turn, enhanced their level of self-regulated learning (Schunk, 2000; Zimmerman, Bonner, & Kovach, 1996). In addition, solicited teacher feedback might have boosted students‟ self-regulated learning more than unsolicited teacher feedback by providing evaluative information to aid the self-judgmental subfunction of self-regulation (Bandura, 1986).

It is important to note that the effect of type of teacher feedback (solicited versus unsolicited) was not significant when self-regulated learning was treated as a unitary construct as opposed to examining the subcomponents. This nonsignificant effect could have been contributed by the fact that the motivational component of self-regulated learning was not affected by type of feedback. While the three subcomponents of self-regulated learning – motivation, metacognition, and behavior – are highly correlated with each other, they are likely to be affected by different factors. The current study suggests that solicited teacher feedback (versus unsolicited teacher feedback) affect metacognitive and behavioral components, but not motivational component of self-regulated learning. Students having to cognitively monitor their learning process to fill in the Feedback Request Forms in the current study might have enhanced their metacognitive component of self-regulated learning. Similarly, having to manage their learning resources to fill in the forms and attend to the given teacher feedback might have enhanced the students‟ behavioral component of self-regulated learning. On the other hand, as students engaged in the teacher feedback process as a part of the research study and for the extra credit, their motivational component of self-regulated learning might not been as affected by the intervention.

### 5.3.2 Difference in Self-Regulated Learning Between Formative and Summative Teacher Feedback, and Summative Teacher Feedback Only

The results revealed that there was no significant difference in self-regulated learning between students who are given formative and summative teacher feedback, and students who are given summative teacher feedback only, after controlling for pre-manipulation self-regulated learning. This finding was surprising as it is inconsistent with research works by scholars such as Schunk and Swartz (1993b) and Llorens, Vidal-Abarca, and Cerdan (2016), who found formative feedback to have a facilitating effect on elements of students‟ self-regulated learning. The finding is also inconsistent with Brookhart‟s (2008), Budge‟s (2011), and Clark‟s (2012) theorizations that formative feedback provides opportunities for students to be aware of their progress and get scaffolded assistance to improve their academic work.

However, this finding needs to be interpreted in light of the current research context. The participants in the study were enrolled in about two other academic modules in addition to the module that the current research was implemented in. The study was also conducted during a seven-week short or special semester. As such, it is likely that the participants had a lot of academic tasks to focus on and they did not give the attention it deserves to the Teacher Feedback form that they received. As formative feedback would only be helpful to the extent to which the students actually use them to understand their current progress and work towards improvement (Brookhart, 2008), formative teacher feedback might not have enhanced students‟ self-regulated learning in the current study simply because the students did not have sufficient time to attend to the given feedback.

Alternatively, the number of formative feedbacks given in the current study which was two, could have been insufficient to have any meaningful effect on

students‟ self-regulated learning. While the frequency was determined based on the nature of the chosen module‟s assessments and the estimated student participants‟ workload for the academic semester, it might not have been sufficient to engage the students enough in cyclical feedback loop that is necessary for enhancing their self-regulated learning (Cleary & Zimmerman, 2004).

Conversely, although the importance of formative teacher feedback is well-established in educational psychology literature, most of these studies utilized Western students as participants and it is likely that different group of students react differently to formative feedback. Asian students, like the Chinese-majority private university students who made up the current study‟s sample, are known to have greater performance orientation as opposed to mastery orientation and thus are likely to be more focused on grades than their Western counterparts (Dekker & Fischer, 2008). As formative feedback is given without any accompanying grades, it is likely that the students did not take the teacher feedback as seriously. The student participants could have discounted the teacher feedback as in their view, the feedback does not have any meaningful consequences. Thus, giving formative and summative teacher feedback as opposed to summative only teacher feedback might not have made a difference to the participants in the current sample, alluding to the possibility that formative teacher feedback might not enhance Asian students‟ self-regulated learning as it does to Western students. If this finding is replicated in future studies utilizing similar sample demography, then another line of intervention aimed at educating Asian students of the importance of formative teacher feedback for superior learning is warranted.

### 5.3.3 Interaction Effect of Type of Feedback and Timing of Feedback on Self-Regulated Learning

The results revealed that there was no significant interaction effect between type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, and summative only) on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. This pattern of finding could have emerged primarily due to the timing of feedback factor and the plausible reasons for its nonsignificant effect discussed in the earlier section. Nevertheless, the finding alludes to the possibility that in fact, there is no meaningful interaction effect between type of feedback and timing of feedback on students‟ self-regulated learning.

## 5.4 Implication of the Findings

The discussed findings of the current study have theoretical, methodological as well as practical implications for the research and practice of students‟ self-regulated learning.

### 5.4.1 Theoretical Implications

The current research has played a non-trivial role in expanding knowledge on the role of teacher feedback in facilitating students‟ self-regulated learning. Specifically, the research has helped in addressing the gap in the literature on the effect of type of feedback (solicited teacher feedback and unsolicited teacher feedback) on students‟ self-regulated learning. The findings have enlightened us that teachers tailoring their feedback to the specific challenges faced by students during their academic tasks enhance students‟ self-regulated learning more than providing traditional unsolicited teacher feedback. The findings also further educate us on the importance of utilizing student-centered learning as the significant pedagogy in

contemporary educational institutions. The findings of the research also provide initial empirical evidence on the difference in self-regulated learning between students who are given formative and summative teacher feedback and students who are given summative teacher feedback only. Furthermore, this evidence helps the literature on the association between formative feedback and self-regulated learning to grow further from its state of infancy (Black & Wiliam, 2009).

Taken together, the current study findings elaborate the self-regulatory mechanisms of Bandura‟s (1986) social cognitive theory, particularly on the links between feedback, self-observation, and self-judgmental processes. Crucially, the findings of the effect of type of feedback (solicited and unsolicited) on students‟ self-regulated learning add additional layers to Bandura‟s conceptions of self-regulatory mechanisms. While Bandura and his academic successors have discussed extensively on the role of feedback in promoting self-regulated learning, there has not been much discussion on whether the feedback is solicited or unsolicited. As systematic differences are found between these two types of feedback, incorporating findings of the current study further strengthens Bandura‟s conceptions. The findings of the current study provide further empirical support for the notion of reciprocal causality of the social cognitive theory as well. That is, evidence was shown that both environmental (e.g., teacher feedback) and behavioral events (e.g., solicitation of feedback) influence one‟s self-regulatory processes in a reciprocal fashion.

Furthermore, as a significant proportion of research in the area of self-regulated learning has utilized samples from North America and Europe and having employed a Malaysian sample in the study, this study has provided unique insights on the topic as systematic differences are expected in teaching and learning practices and processes between countries from different regions of the world. More locally,

the findings have shed light on self-regulated learning of Malaysian students who are from the private university as most previous research conducted on this topic has relied on boarding school students as samples.

### 5.4.2 Methodological Implications

Methodologically, this study showed the utility of quasi-experiment in investigating the effect of teacher feedback on students‟ self-regulated learning. While a true experiment is viewed to be superior to a quasi-experiment, it is not always practical to utilize the former in educational psychology research. That is, random sampling of participants in educational contexts, especially in tertiary educational contexts, would be a challenge. Nevertheless, the findings of this study suggest that a quasi-experiment is sufficient to detect the effect of teacher feedback, specifically, solicited teacher feedback on students‟ self-regulated learning. As such, although generalization would still be a limitation, quasi-experiments can be utilized to investigate the topic area in smaller, more localized settings.

The study findings also attest to the value of self-report in investigating students‟ self-regulated learning, consistent with McCardle and Hadwin‟s (2015) assertion that self-reports provide vital information for investigating self-regulated learning even when the information may not be fully accurate. This is because it is crucial to take into account the students‟ perceptions when it comes to studying self-regulated learning. More specifically, the Motivated Strategies for Learning Questionnaire (MSLQ) has been shown to be a reliable and valid instrument to study students‟ self-regulated learning, especially in Malaysian private university settings.

In addition, the study findings imply that an intervention that spanned over a brief eight weeks period and that was integrated into an existing teaching and learning environment is sufficient to detect some meaningful effects of teacher

feedback on students‟ self-regulated learning. While a longer study period may inevitably provide more robust results, a brief eight weeks period could serve as a good start.

### 5.4.3 Practical Implications

The findings of the current study offer an evidence-based effective feedback method for both pre-service and in-service teachers. As solicited teacher feedback has been shown to enhance students‟ self-regulated learning more than unsolicited teacher feedback, the former technique can be taught to in-service teachers as a part of their continuous professional development. This technique would then complement the teachers‟ existing effort in facilitating students‟ self-regulated learning.

Pre-service teachers, on the other hand, can be taught this feedback technique as a part of their teacher training. The incorporation would allow the pre-service teachers to have another evidence-based feedback method in their teaching practices repertoire. The addition of the technique would also provide greater confidence for the teachers in promoting their students‟ self-regulated learning, given the empirical support for the stated method. Collectively, these teachers would assist in nurturing the students to be life-long learners by utilizing the stated teacher feedback technique.

## 5.5 Suggestions from the Study

Drawing from the discussion of the findings and its implications, there are several suggestions that the different relevant stakeholders including the university teachers, governing bodies, and undergraduate students may consider. First of all, teachers should give more solicited feedback to the students. That is, the teachers should give more opportunities for students to communicate the challenges the latter face while

they are working on an academic task and address the specific challenges in the feedback given to them. The teachers may adopt the Feedback Request Form and the Teacher Feedback Form used in the current study to facilitate the process. They can integrate the usage of these forms into their regular teaching and learning activities including lectures and assessments. The teachers may also measure students‟ self-regulated learning using the Motivational Strategies for Learning Questionnaire (MSLQ) at the beginning of the semester to establish students‟ baseline level of self-regulated learning. They can then implement solicited feedback practice and measure students‟ level of self-regulated learning again at the end of the semester. This procedure would help the teachers to determine the effectiveness of the practice in their specific class.

The relevant governing bodies such as the faculty leadership teams should ensure that teachers are trained to give more solicited feedback to students in an attempt to enhance the latter‟s self-regulated learning. The training can be provided to pre-service teachers during their teacher education period. For in-service teachers, on the other hand, the training can be provided as a part of their continuous development program. As the current study focused on psychology undergraduates only, the faculty leadership teams may encourage teachers from other academic programs to use the materials from the current study as a base to kick-start the practice of solicited teacher feedback in their own teaching and learning practice.

Students should play their part well for the intervention to successfully enhance their self-regulated learning as well. That is, students should attentively think about and respond to the prompts on the Feedback Request Form. They should also proactively respond to the feedback once they get back their Teacher Feedback Form from the teachers. In short, all stakeholders including university teachers,

governing bodies, and undergraduate students need to work together in implementing the practice of solicited teacher feedback, with the ultimate hope of enhancing students‟ self-regulated learning in the long run.

## 5.6 Recommendations for Future Research

The inclusion of only one private university in the study has limited the generalizability of the findings to all private universities in Malaysia and beyond. As there could be systematic variations between students from different private universities, future researchers may investigate the current topic in other private universities. Individual factors such as students‟ ethnicity and socioeconomic status were not fully controlled during the sampling of the current study as sampling was limited by the student demographics of the chosen private university. Replicating the current study in private universities with different ethnic compositions would be fruitful.

The current research focused on solicitation of feedback by the students and giving of the different forms of feedback by the teachers only. Future researchers may extend the research methodology by monitoring the students‟ behaviors in relation to addressing the given feedback. Future researchers may also increase the frequency of formative and summative teacher feedback to investigate if there are significant effects of timing of feedback (formative and summative, summative only), and the interaction between type of feedback (solicited and unsolicited) and timing of feedback on students‟ self-regulated learning then. As self-regulated learning tends to be domain-specific, the effectiveness of type of feedback (solicited and unsolicited) and timing of feedback (formative and summative, summative only) on students‟ self-regulated learning might vary according to chosen subjects. As

such, future researchers could investigate the topic of interest in the context of other subjects such as science and education.

Furthermore, given the likelihood that the student participants had a lot of academic tasks to focus on and they did not give the attention it deserves to the Teacher Feedback form that they received during the generally hectic eight-week short semester, the current study can be replicated in the context of a long semester, that is a 14-week semester, to better examine the topic of interest. Finally, as a period of eight weeks utilized in the current study might not have been optimal to fully capture the long-term changes in students‟ self-regulated learning, future researchers may employ longitudinal study design to capture the long-term changes.

## 5.7 Conclusion

The current study found that type of feedback had a significant effect on metacognitive and behavioral components of students‟ self-regulated learning, but not motivational component of students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning. Specifically, there was a significant difference in the metacognitive and behavioral components of self-regulated learning between students who are given solicited teacher feedback and students who are given unsolicited teacher feedback, after controlling for pre-manipulation level of self-regulated learning. Timing of feedback, and the interaction between type of feedback and timing of feedback, however, had no significant effect on students‟ self-regulated learning, after controlling for pre-manipulation level of self-regulated learning.

The findings of the current study have enlightened us that teachers tailoring their feedback to the specific challenges faced by students during their academic tasks enhance students‟ self-regulated learning more than providing traditional

unsolicited teacher feedback. The findings of the research provide initial empirical evidence on the difference in self-regulated learning between students who are given formative and summative teacher feedback and students who are given summative teacher feedback only. Collectively, the findings of the current study elaborate the self-regulatory mechanisms of Bandura‟s (1986) social cognitive theory, particularly on the links between feedback, self-observation, and self-judgmental processes. The findings also provide unique insights on the role of teacher feedback in enhancing students‟ self-regulated learning in Malaysian private university context. Furthermore, the study findings also attest to the value of quasi-experiment and self-report in investigating students‟ self-regulated learning. The findings offer an evidence-based effective feedback method for both pre-service and in-service teachers to enhance students‟ self-regulated learning as well.

Finally, it is hoped that the suggestions from the study and recommendations for future research presented above are critically reflected and acted upon by all relevant parties including academic researchers, university teachers, governing bodies, and undergraduate students, with the ultimate goal of enhancing students‟ self-regulated learning and nurturing the students to be life-long learners.

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