

# A SURVEY ON THE USE OF METACOGNITIVE SELF-REGULATORY LEARNING STRATEGIES BY STUDENTS FROM THE DIFFERENT FACULTIES OF UiTM PULAU PINANG

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## ABSTRACT

*Self-regulated learning (SRL) is one of the focal points of learner self-directedness in any given learning situation, especially in higher learning institutions where learning autonomy is greatly emphasized. Within SRL, it has been discovered that the metacognitive self-regulatory strategies have only been moderately used by students of higher learning institutions. Therefore, this survey was carried out to gauge the level of metacognitive self-regulatory learning strategies employed by the degree students from the different faculties of Universiti Teknologi MARA Pulau Pinang (UiTMPP). The metacognitive self-regulatory strategies subscale from the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich, Smith, Gracia and McKeachie (1991) was used for this purpose. It was found that no significant difference existed among the students from the different faculties for the subscale overall. However, some degree of significant difference was discovered for two of the individual items. Additionally, the findings also showed that the majority of the students were only moderate strategy users, besides also highlighting the most commonly used strategies among them, by faculty and overall. The findings of this study could prove useful for course instructors in trying to understand the learning practices of their students, especially the metacognitive strategies and also help to create better learning environments for their students.*

**Keywords:** metacognitive self-regulation; learning strategies; learner autonomy; university education.

## 1. INTRODUCTION

One of the primary aims of the 21<sup>st</sup> century university education is to develop students of considerable disposition to cope with complexities and uncertainties in life (McCune & Entwistle, 2011). Owing to the fact that students are very teacher dependent while at school, stepping into higher learning institutions has necessitated that they become increasingly independent learners. Thus, what Van Eekelen, Boshuizen and Vermunt (2005) have said

holds true that higher learning institutions strive towards the concept of self-regulated learning among their students in order to encourage meaningful learning in contrast to rote-learning. In addition, it would also train these students to master lifelong learning skills. Eventually, it is hoped that 'student-centred learning' at the higher education level will reflect this new way of thinking (Nicol & Macfarlane-Dick, 2006). According to Vermetten, Vermunt and Lodewijks (2002), learning environments and the students' learning process continuously influence one another. Therefore, their self-regulation too becomes an integral part in the classroom learning process. The question of self-regulation of academic learning and performance had emerged more than two decades ago to answer the question of how students become masters of their own learning processes (Zimmerman, 2008). According to Vanderstoep, Pintrich and Fagerlin (1996), self-regulated learning involves the use of both cognitive and metacognitive strategies for learning as well as endorses adaptive motivational beliefs. Metacognitively, these strategies which are part of self-regulation involve planning, self-monitoring (Ross, Green, Salisbury-Glennon & Tollefson, 2006) and also regulating that lead to better academic performance. Naug, Colson and Donner (2011) have found that learners who have mastered metacognitive strategies such as planning, monitoring, reacting to and reflecting on their learning often develop into autonomous learners.

## **2. PROBLEM STATEMENT**

Although many students have developed their metacognitive strategies even before they begin their university studies (Naug, Colson & Donner, 2011), this is not true in several other cases. Ley and Young (1998) have found that almost one third of the students who enter higher education institutions were lacking in the skills needed to be successful. They feel it is no more the issue of accepting or rejecting them but more on how to identify and assist them. Van der Veen and Peetsma (2009) were more specific in pointing out that the problem was in the self-regulated learning behavior of the students. Additionally, Vermetten, Vermunt and Lodewijks (2002), found that learners might ignore the effects of the instructional measures due to their own perceptions, habitual learning approach and metacognitive learning conceptions. Additionally, the students' goal orientation has also been linked to the decline of their self-regulated learning behavior (Van der Veen & Peetsma, 2009). With special attention to the use of metacognitive strategies of university students in local institutions, this situation is not far off. It is no surprise that Naug, Colson and Donner (2011) have come up with the suggestion that effective instruction also involves the teaching of metacognitive skill, besides the teaching of the content.

## **3. OBJECTIVES**

The objectives of the study are to find out the following:

- i. the difference in the use of the metacognitive self-regulatory learning strategies among the various faculties in UiTMPP.
- ii. the most favoured metacognitive self-regulatory learning strategies employed by the students of these faculties.

#### 4. LITERATURE REVIEW

Numerous researches have been conducted using the metacognitive self-regulation learning strategies where it was found that these learning strategies would appear to be more important for the low achievers compared to the high achievers. Vermetten, Vermunt and Lodewijks (2002) had pointed out the metacognitive component to be the most important mediating component of learning, which can be divided into the procedural part and also the declarative part. According to Pintrich (1999), most models of metacognitive control or self-regulating strategies include three general types of strategies: planning, monitoring, and regulating that are conceptually highly related. These strategies can be explained as below:

- i. Planning - setting goals for studying, skimming a text before reading, generating questions before reading a text, and doing a task analysis of the problem.
- ii. Monitoring - alerting the learner to breakdowns in attention or comprehension that can then be repaired using regulation strategies.
- iii. Regulating - bringing behavior back in line with the goal or to come closer to the criterion.

Kosnin (2007) in her study on a group of local tertiary institution students had found that the lower level of metacognitive strategies reported by the low achievers as compared to the high achievers indicated that the low achievers were not using metacognitive strategies enough in their studies.

#### 5. METHODOLOGY

##### 5.1 Sample

The sample for the study was selected from the six faculties at UiTMPP comprising 152 students. The breakdown according to the respective faculties is as follows: Faculty of Hotel and Tourism Management (N = 28), Faculty of Business Management (N = 22), Faculty of Civil Engineering (N = 23), Faculty of Mechanical Engineering (N = 26), Faculty of Electrical Engineering (N = 28) and Faculty of Chemical Engineering (N = 25).

##### 5.2 Instrument

The Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich, Smith, Gracia, and McKeachie (1991) is an 81-item self-report questionnaire composed of two broad components: Motivation and Learning Strategies. The Motivation section comprises 31 statements that are distributed over 6 subscales while the learning strategies are made up of another 31 statements concerning cognitive and metacognitive strategies and 19 statements concerning student management of different resources over 9 subscales. A 7-point ratings Likert scale that range from *not at all true of me* to *very true of me* is used by respondents to provide feedback (Zimmerman, 2008). Each of the 15 subscales is modular in nature and can be used in isolation to suit the researcher's needs (Artino, 2005). For the purpose of this study, the metacognitive self-regulation subscale comprising 12 statements was used as a separate instrument to gauge the students' metacognitive self-regulation practice. Items 6 and 7 (Table 1) were negatively worded and were later reverse coded before the analysis was done. The

review of the instrument by Artino (2005) had returned the metacognitive subscale alpha value at 0.79 (*r*), while another study that was conducted by Kosnin (2007) at a local tertiary institution found the reliability analysis for the same subscale to be 0.72 (*r*). Interestingly, for the current study too, the subscale returned the same alpha value at 0.72 (*r*).

## 6. RESULTS AND ANALYSIS

### 6.1 The Difference in the Use of the Metacognitive Self-Regulatory Learning Strategies among the Various Faculties in UiTMPP

The one way ANOVA was used to analyse the students' responses to ascertain if there existed a significant difference among students from the different faculties of UiTMPP for both the individual items as well as the overall total for the metacognitive self-regulatory strategies subscale.

Table 1: One way ANOVA results of the use of metacognitive self-regulatory strategies among the various faculties (by items and the overall total)

Metacognitive Self-Regulatory Learning Strategies	Results	Significance	Remarks
1. Before I study a new course material thoroughly, I often skim it to see how it is organized.	F(5,146) = 1.434, p = .215	No	-
2. If I get confused taking notes in class, I make sure I sort it out afterwards.	F(5,146) = 1.030, p = .402	No	-
3. If course readings are difficult to understand, I change the way I read the material.	F(5,145) = 1.705, p = .137	No	-
4. When I become confused about something I'm reading for this class, I go back and try to figure it out.	F(5,146) = 2.458, p = .36	No	-
5. I ask myself questions to make sure I understand the material I have been studying in this class.	F(5,146) = 1.789, p = .119	No	-
6. I often find that I have been reading for this class but don't know what it was all about.*	F(5,143) = 2.222, p = .55	No	-
7. During class time I often miss important points because I'm thinking of other things.*	F(5,145) = 2.360, p = .43	No	-
8. When studying for this course I try to determine which concepts I don't understand well.	F(5,145) = 3.568, p = .005	Yes	1. HM & BM (p = .030) 2. HM & EH (p = .003)

9. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.	$F(5,146) = 1.979,$ $p = .085$	No	-
10. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.	$F(5,146) = 0.765,$ $p = .576$	No	-
11. When I study for this class, I set goals for myself in order to direct my activities in each study period.	$F(5,145) = 1.764,$ $p = .124$	No	-
12. When reading for this course, I make up questions to help focus my reading.	$F(5,146) = 2.753,$ $p = .021$	Yes	1. HM & BM ( $p = .008$ )
<b>Total for all Metacognitive Self-regulatory learning strategies items</b>	<b><math>F(5,140) = 1.773,</math></b> <b><math>p = .122</math></b>	<b>No</b>	<b>-</b>

From Table 1, it is evident that there were no significant difference among the various faculties with regards to the use of the metacognitive self-regulatory learning strategies overall [ $F(5,140) = 1.77, p = .122$ ].

By items, it was found that out of the 12 statements that were administered to the students, 10 of them did not show any significant difference when compared among the different faculties at UiTMPP. However, item 8 [ $F(5,145) = 3.57, p = .005$ ] was found to show a significant difference. Post hoc comparison using the Tukey HSD test for item 8 ('*When studying for this course I try to determine which concepts I don't understand well*') showed a significant difference ( $p < .05$ ) between the mean scores for the Faculty of Hotel and Tourism Management ( $M = 3.96, SD = 1.26$ ) and the Faculty of Business Management ( $M = 4.86, SD = 0.83$ ). Significant difference ( $p < .05$ ) was also noted between the Faculty of Hotel and Tourism Management ( $M = 3.96, SD = 1.26$ ) and the Faculty of Chemical Engineering ( $M = 5.04, SD = 0.91$ ) for the same item. Similarly, item 12 [ $F(5,146) = 2.75, p = .021$ ] was also found to show a significant difference. Post hoc comparison using the Tukey HSD test for item 12 ('*When reading for this course, I make up questions to help focus my reading*') indicated a significant difference ( $p < .05$ ) between the mean scores for the Faculty of Hotel and Tourism Management ( $N = 3.82, SD = 0.94$ ) and the Faculty of Business Management ( $M = 4.86, SD = 1.08$ ).

### **6.2 The Most Favoured Metacognitive Self-Regulatory Learning Strategies Employed By the Students of the Various Faculties in UiTMPP**

The one way ANOVA was used to analyse the students' responses to ascertain if there existed a significant difference among students from the different faculties of UiTMPP for both the individual items as well as the overall total for the metacognitive self-regulatory strategies subscale.



Table 2: Top three (3) metacognitive self-regulatory learning strategies employed by the students of the various faculties (overall and according to the faculties)

Metacognitive Self-Regulatory Learning Strategies*	Overall	Faculties					
		Hotel & Tourism Man.	Bus. Management	Civil Engineering	Electrical Engineering	Mechanical Engineering	Chemical Engineering
	N = 152	N = 28	N = 22	N = 23	N = 28	N = 26	N = 25
1. Before I study a new course material thoroughly, I often skim it to see how it is organized.	4.5000 <sup>a</sup>	4.9286 <sup>a</sup>	5.2273 <sup>a</sup>	5.3478 <sup>a</sup>		5.4231 <sup>a</sup>	5.1200 <sup>c</sup>
2. If I get confused taking notes in class, I make sure I sort it out afterwards.	4.5000 <sup>b</sup>	4.6786 <sup>c</sup>			4.9643 <sup>b</sup>		5.2800 <sup>a</sup>
3. If course readings are difficult to understand, I change the way I read the material.	4.2000 <sup>c</sup>		5.0455 <sup>c</sup>	5.1304 <sup>c</sup>	4.8929 <sup>c</sup>	5.3462 <sup>b</sup>	5.1250 <sup>b</sup>
4. When I become confused about something I'm reading for this class, I go back and try to figure it out.				5.2174 <sup>b</sup>			
9. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.		4.7500 <sup>b</sup>	5.0909 <sup>b</sup>			5.2692 <sup>c</sup>	
11. When I study for this class, I set goals for myself in order to direct my activities in each study period.					5.1481 <sup>a</sup>		

<sup>a</sup> = most preferred strategy; <sup>b</sup> = second most preferred strategy; <sup>c</sup> = third most preferred strategy  
 \* Items 5, 6, 7, 8, 10 and 12 did not feature as the top three strategies for any of the above groups

Table 2 above displays the top 3 metacognitive self-regulatory learning strategies used by the students in the survey. Overall, the top two equally preferred metacognitive strategies by the degree students of UiTMPP were ‘Before I study new course material thoroughly, I often skim it to see how it is organized’ and ‘If I get confused taking notes in class, I make sure I sort it out afterwards’, both at 4.50 (mean). This was followed by ‘If course readings are difficult to understand, I change the way I read the material’ at 4.20 (mean).

For the Faculty of Hotel and Tourism Management, the top 3 metacognitive strategies were ‘Before I study new course material thoroughly, I often skim it to see how it is organized’ (M = 4.93), ‘I try to change the way I study in order to fit the course requirements and the instructor's teaching style’ (M = 4.75), and ‘If I get confused taking notes in class, I make sure I sort it out afterwards’ (M = 4.69). For the Faculty of Business Management, the top 3 metacognitive strategies were ‘Before I study new course material thoroughly, I often skim it to see how it is organized’ (M = 5.23), ‘I try to change the way I study in order to fit the course requirements and the instructor's teaching style’ (M = 5.09), and ‘If course readings are difficult to understand, I change the way I read the material’ (M = 5.05). For the Faculty of Civil Engineering, the top 3 metacognitive strategies were ‘Before I study new course material thoroughly, I often skim it to see how it is organized’ (M = 5.35), ‘When I become confused about something I'm reading for this class, I go back and try to figure it out’ (M = 5.22), and ‘If course readings are difficult to understand, I change the way I read the material’

(M = 5.13). For the Faculty of Electrical Engineering, the top 3 metacognitive strategies were 'When I study for this class, I set goals for myself in order to direct my activities in each study period' (M = 5.15), 'If I get confused taking notes in class, I make sure I sort it out afterwards' (M = 4.96), and 'If course readings are difficult to understand, I change the way I read the material' (M = 4.89). For the Faculty of Mechanical Engineering, the top 3 metacognitive strategies were 'Before Before I study new course material thoroughly, I often skim it to see how it is organized' (M = 5.42), 'If course readings are difficult to understand, I change the way I read the material' (M = 5.35), and 'I try to change the way I study in order to fit the course requirements and the instructor's teaching style' (M = 5.27). For the Faculty of Chemical Engineering, the top 3 metacognitive strategies were 'If I get confused taking notes in class, I make sure I sort it out afterwards' (M = 5.28), 'If course readings are difficult to understand, I change the way I read the material' (M = 5.13), and 'Before I study new course material thoroughly, I often skim it to see how it is organized' (M = 5.12).

Across the board, it was found that the majority of the students from 4 out of the 6 faculties that had participated in this study reported that the metacognitive self-regulation strategy of '*Before I study new course material thoroughly, I often skim it to see how it is organized*' to be the most popular for them. Conversely, the least popular metacognitive strategy among these students happened to be '*When reading for this course, I make up questions to help focus my reading.*' It was also interesting to note that students from 3 of the faculties in the study had chosen the strategy of '*I try to change the way I study in order to fit the course requirements and the instructor's teaching style*' as one of their top three metacognitive self-regulation strategy. Additionally, it could also be noted that none from the sample group had scored highly for any of the items for these strategies. This is evident because from a possible maximum score of 7.0, the highest average for the entire sample was only 4.50 (mean) for '*Before I study a new course material thoroughly, I often skim it to see how it is organized*' overall. Even for the individual faculties, only the sample from the Faculty of Mechanical Engineering had scored a mean of 5.42 for the same item. Meanwhile, the lowest mean score overall was 3.33 for '*When reading for this course, I make up questions to help focus my reading*'. For the individual faculties though, the item '*During class time I often miss important points because I'm thinking of other things*' (reverse coded) had the lowest mean at 3.19 from the Faculty of Business Management.

## 7. DISCUSSION AND CONCLUSION

Based on the findings, no difference exists among the degree students of UiTMPP with regards to the use of metacognitive self-regulatory learning strategies. Students across all the faculties that had participated in the study seem to display the same pattern of usage in the use of the above strategies on the whole. This is also same for all the individual items under this subscale of the MSLQ, with the exception of two. 'Determining which concepts that they do not understand while reading' and 'making up questions in order to help them focus on their reading' were the only two practices where some students from certain faculties displayed difference compared to their counterparts from the other faculties. This could mean that degree students across the board at UiTMPP generally employ the same types of metacognitive self-regulatory strategies in their learning. Quite interestingly, it was also found that overall, the students from the sample had only average use of the metacognitive strategies, judging from the moderate mean score between 4.50 and 3.33 for all the items. No strategies had a score of a perfect 7.0 or near to it, while no item had the lowest score of 1.00

or anywhere near it. In terms of the most common metacognitive strategies employed by all these students, generally the practice of ‘skimming through the organization before starting a new course’, ‘sorting notes that have been haphazardly taken in class earlier’ and ‘adjusting the reading method when the reading task becomes difficult’ are quite evidently popular. By exception, students from some faculties also stated their preferences for other metacognitive strategies such as ‘adjusting oneself to the requirements of the course and its instructor’, ‘trying to figure out later the earlier confusion in the reading activity’ and ‘setting personal goals to direct one’s reading activities in class’ also seem to be common among some of these students.

In view of the importance of the metacognitive self-regulatory strategies that are employed by the degree students, it has now become imperative that they are trained in the proper use of these strategies so that it helps them in the course of a study. University students who come from the secondary and primary levels are not equipped with the correct self-regulatory learning strategies (Ley & Young, 1998). Therefore, it is important that several measures are taken so as to develop these tertiary level students to become better learners in terms of self-regulating their own learning. First and foremost, it has been found that learners’ motivation to be an integral contributor towards better self-regulation in learning (Zimmerman, 2008). Thus, university students need to be motivated through several measures so that they are interested in what they are learning and become more accountable towards their own learning process while setting their own learning goals. Besides, the onus is also on the teachers to promote student centred learning by devising lessons that can accommodate independent decision-making and mobility of their students. Research has amply proven that effective student-centred learning activities encourage better self-regulation among students (Yen *et al.*, 2005).

In conclusion, Bail, Zhang and Tachiyama (2008) have claimed that metacognitive self-regulatory strategies are known to be an essential set of skills in learning. Hence, its mastery will definitely have a great impact on the long term academic achievement of higher education students. Thus, true to Ross *et al.*’s (2006) recommendations, it is utmost important to develop programmes that can aid better metacognitive self-regulation practices among our students. Through such efforts, it is hoped that our tertiary learners will eventually develop

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