Pertanika J. Soc. Sci. & Hum. 24 (S): 77 – 86 (2016)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Self-Regulated Learning in UKM

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ABSTRACT

Education has always been a significant contribution to the development of human capital in terms of social and economic growth. Hence, it should be able to inspire students to foster creativity and innovation and provide them with the skills needed to compete in the modern labour market. Furthermore, education provides talented human capital and is the key driver of economic growth for developing countries. University students are, therefore, required to acquire high-level thinking skills besides being able to regulate their own learning because the self-measurement method has proven to be effective in improving students' academic achievement and learning behaviour. This paper analyses the data collected using the instrument designed by Pintrich and Zusho (2002) to assess motivation and strategies of students and to what extent these factors regulate student learning. The population used in this study were 78 students from the Circuit Theory course for the 2013/2014 session. Scores used were based on their self-regulated learning (SRL) characteristics and their impact on student learning strategies. The study found that the majority of the students still practised the traditional method of learning, namely, learning for higher grades and at the eleventh hour, just before the exam. They did not put more effort into understanding the course content and attempted only the simple assignments given. In order for these findings to be more conclusive, further study is necessary to assess the impact of interventions of SRL through teaching and learning strategies practised in the Faculty of Engineering and Built Environment, UKM such as cooperative learning and problem-based learning, among others.

Keywords: Learning motivation, self-regulated learning, teaching and learning strategies

ARTICLE INFO

Article history:
Received: 09 October 2015
Accepted: 31 March 2016

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ISSN: 0128-7702

INTRODUCTION

The blueprint for the New Economic Model, Economic Transformation Plan and the Government Transformation Plan contain some of the measures taken by the government of Malaysia to drive the nation to the mainstream of developed nation status. One of the challenges that need to be addressed is the human capital generated through the education system so that graduates can compete in an ever competitive global economy. It is fundamental to the development of the country and will help to meet the high aspirations and needs of the nation using systematic transformation to improve student achievement in total. This can be done by understanding and improving the dynamic process of teaching and learning as discussed in Malaysia's Education Action Plan 2013-2025 (Ministry of Education, 2000).

Various reports on student achievement in science and technology learning have stated that lack of interest and a decrease in the ability to master the concepts of science (Lee, 1989; Kong, 1993; Ministry of Education, 2000) have raised concerns among policy-makers in the education system. The same trend can also be seen in the process of learning mathematics. This is a very challenging and serious problem as science and mathematics are the core of the other applied sciences and are also the foundation for the economic growth of a nation. When students were asked why they were not interested to pursue their studies in the science and technology field, their main reason was that they found science and mathematics to be very difficult to understand and that these subjects required higher effort to pass the programmes. This is the same problem among students of the Faculty of Engineering and Built Environment, UKM. Engineering programmes are among the more demanding and strenuous programmes. Unfortunately, through years of experience and observation, most of the students usually attend lectures and participate passively and do not take the initiative to do any prior preparation. They are found to be more inclined towards rote-learning than to understanding and comprehending concepts because that takes too much effort.

The ability of students to self-regulate their learning is crucial because it forms the basic training for self-advancement in university and progress in the workplace. Many individuals have successfully adopted the technique of self-regulation in learning and their careers. For example, Benjamin Franklin wrote in his autobiography about how he improved his writing by selecting models of the best writing and trying to emulate them. He had set his learning objectives and recorded his progress with every achievement from stage to stage (Zimmerman, 2008).

The research question in this study was focussed on whether the students in the Department of Electrical, Electronics and Systems Engineering (JKEES) in UKM were able to:

1. Plan, monitor and regulate learning

2. Manage time and learning environment
3. Regulate effort and attention to learning
4. Get help from friends or instructors when faced with learning difficulties

Self-Regulated Learning (SRL)

Self-regulated learning or SRL provides students with an idea of how one should assess his or her ability in learning on a course and how to handle the problems associated with the learning environment. This is very important in the learning process (Zimmerman, 2008; Jarvela & Jarvenoja, 2011). Those who self-regulate their studies are aware of what they know and what they do not know. Unlike their counterparts who are very passive, these students find information proactively and take the steps necessary to master a concept. When they encounter an obstacle such as a misinforming instructor, a non-conducive learning environment or less informative college textbooks and notes, they will find a way to solve it (Zimmerman, 2000). SRL students view the acquisition of knowledge as a systematic process that can be controlled, and feel accountable for the results of their learning (Zimmerman, 2000). Most importantly, SRL creates better learning habits and strengthens students' learning skills (Wolters, 2011).

Self-Regulated Phase

The process of self-regulation occurs when student actions lead to the accumulation and mastery of information and skills. Most SRL models are divided into three phases: the initial thinking and planning stage; performance monitoring stage; and reflection on achievement stage (Zimmerman, 2000; Pintrich & Zusho, 2002). These phases are further illustrated in Figure 1.

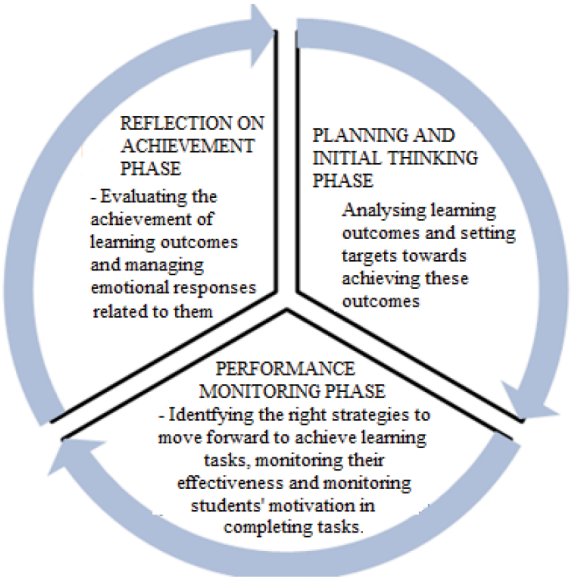

Figure 1. SRL phases.

Target setting, planning, selections of strategy, performance monitoring, management of emotional and evaluation of academic achievement progress are processes that require expert guidance (Bruin et. al., 2001; Harris et. al., 2005). Therefore, it is necessary for instructors to be able to recognise the factors that could affect a student's ability and identify strategies that they can use to promote SLR in the class.

METHODOLOGY

This study employs quantitative methods to determine the level of student motivation to learning through self-regulating strategies such as the metacognitive component, time-management, regulated effort and getting assistance in learning. The questionnaire on Motivational Strategies for Learning (Pintrich & DeGroot, 1990) was used to collect the data. It consisted of 81 statements designed to measure student motivation orientation and the use of different learning strategies in or outside the classroom. Respondents should provide answers ranging from 1 to 7 (1 = 'very untrue about me' to 7 = 'very true about me'). For negative questions (as marked * in the Appendix), the value of the rank given by the students was subtracted from 7 (example, if the student ranked the question as 5, then the actual answer would be 2). In this model, analysis was formulated on the four components as listed:

i. Metacognitive self-regulation
   - It refers to the three general processes that construct metacognitive self-regulatory activities, namely, planning, monitoring and regulating. Planning of activities, such as setting goals and tasks helps in analysis and understanding of information more easily. Monitoring of activities includes detecting someone's attention when he or she reads, examines and asks questions; this helps students to understand the material and integrate it with prior knowledge. Regulating refers to continuous adjustment of one's learning, where the learner needs to improve performance by correcting any misleading and misinformed conceptions.

ii. Time-management strategies
   - Students should be able to manage and regulate time and their learning environment. They not only need to know how to set the appropriate learning time, they also need to know how to use time effectively and set realistic goals.

iii. Regulated-effort strategies
   - Students should have the ability to regulate effort and attention when they are distracted by other things or bad assignments. It reflects the commitment of students to complete a task, even if the task is difficult or they are diverted by other more interesting preoccupations.

iv. Strategies to acquire assistance
   - Another aspect of regulating the environment is the need for students to manage learning aids and supports.

Good students are able to realise when they lack knowledge or understanding of a subject or topic and can identify those who can help them.

Only the responses to questions that were related to each component were selected based on the recommendations by Pintrich and DeGroot (1990).

DISCUSSION

Table 1 (a) to (d) shows the descriptive statistical analysis conducted on students' responses to statements that were based on the four components. In this case the significant statements were based on scores above 3.5. For the metacognitive component, Table 1 (a) indicates that the responses to statements 33 and 57 were low, with a mean of <3.5 and a median of <4. The students stated that they always missed important information because they were always preoccupied with other things. They admitted that even if they read the notes and books, they still did not understand what was being read. However, it should be noted that 33 and 57 are negative questions. On the contrary, the responses to other statements, such as if they were confused about certain concepts, they revise the material in order to figure out the concept or when studying for the course they would try to ascertain concepts they did not understand well, showed means that were quite high, and more than 85% rated themselves 3.5 and above.

For time-management strategies, Table 1 (b) shows that the responses to questions 52 and 77 indicate the lowest achievement and again, these are negative questions. Students acknowledged that they were not maintaining their studying schedule and moreover, they did not devote all their time to the course due to being involved in other activities. On the other hand, about 85% of the students claimed that they attended class regularly, with the highest mean of 5.6 for their responses to statement 73.

Along with the findings above, in terms of regulated effort, Table 1 (c) shows that even when the mean value for the students' responses were slightly higher than 3.5, the responses for the two statements, namely 37 and 60, were still low. Responses to these statements provide evidence that almost 50% of the students did not put in effort or became uninterested and often did not commit to what had been planned. Sadly, when learning became more difficult, these students would give up or just complete the easy tasks. However, again, more than 80% claimed that they put in a lot of effort into learning, as indicated from their responses to questions 48 and 74.

Interestingly, Table 1 (d), which analyses the strategies to acquire assistance in learning, shows that more than 90% of the students stated that although they had problems related to the course content and the material taught in class, they tried to complete the task without the help of friends or the instructors.

Table 1
Statistical Parameters for the Four Components

(a) Metacognitive self-regulation

Statements	33	36	41	44	54	55	56	57	61	76	78	79
Mean	3.01	4.18	5.33	4.69	4.05	4.55	5.09	2.96	4.45	5.23	4.78	4.59
Standard Err.	0.15	0.18	0.13	0.15	0.19	0.15	0.15	0.18	0.16	0.14	0.15	0.16
Median	3	4	5	5	4	5	5	3	5	5	5	5
Mode	3	3	5	5	4	5	5	2	5	5	4	5
Standard Dev.	1.32	1.62	1.15	1.35	1.66	1.34	1.34	1.63	1.42	1.22	1.34	1.37
Sample Variance	1.75	2.62	1.32	1.83	2.75	1.81	1.80	2.66	2.02	1.48	1.78	1.88

(b) Time-management strategies

Statements	35	43	52	65	70	73	77	80
Mean	5.346	4.115	2.718	4.346	4.179	5.603	3.269	4.538
Standard Err.	0.167	0.148	0.180	0.198	0.152	0.162	0.191	0.180
Median	6	4	2	4	4	6	3	5
Mode	6	4	1	4	4	7	2	5
Standard Dev.	1.476	1.309	1.586	1.749	1.346	1.426	1.688	1.593
Sample Variance	2.177	1.714	2.517	3.060	1.812	2.035	2.849	2.537

(c) Regulated-effort strategies

Statements	37	48	60	74
Mean	3.949	5.077	3.769	4.974
Standard Err.	0.167	0.168	0.201	0.167
Median	4	5	4	5
Mode	3	6	4	5
Standard Dev.	1.476	1.484	1.780	1.477
Sample Variance	2.179	2.202	3.167	2.181

(d) Strategies to acquire assistance

Statements	40	58	68	75
Mean	3.436	4.910	5.756	5.782
Standard Err.	0.178	0.188	0.142	0.136
Median	3	5	6	6
Mode	3	5	7	7
Standard Dev.	1.576	1.661	1.250	1.202
Sample Variance	2.483	2.758	1.563	1.445

Table 2 indicates the performance of the students in their Circuit Theory course. Consistent with the policy in the faculty, the students who obtained C-, D+, D- and E were considered to have failed the course. From the table, about 19% of the students failed and interestingly, this shows that their learning strategies and motivations somehow correlated to their performance.

Table 2
Students' Grade in Circuit Theory Course

Grade	Percentage	Status
A and A-	17.2%	Pass
B, B+ and B-	36.6%	Pass
C and C+	27.2%	Pass
C-	9%	Fail
D and D+	7.3%	Fail
E	2.7%	Fail

CONCLUSION

This study analysed the motivation and strategies of students and to what extent they regulated their learning using the measurement instrument designed by Pintrich and Zusho (2002). About 80% of the students enrolled in the KL1124 Circuit Theory course claimed and rated themselves more than 3.5 in most of the questions asked. However, there were a few negative questions (defined by Pintrich & DeGroot, 1990) that were not applicable. These findings somehow correlated with the performance of the students based on their grades in the course. Based on the research question, as a whole, motivation and attitude in regulating learning still needs to be improved. Teaching and learning strategies implemented should consider appropriate measures for this purpose. The suggestions include providing the students with assistance in identifying specific and feasible learning goals, guiding them to choose appropriate learning strategies, helping them learn to accurately self-monitor the learning process and promoting positive attitudes towards learning outcomes.

ACKNOWLEDGEMENT

The author would like to thank Universiti Kebangsaan Malaysia for the financial support of this project through grant PTS-2013-006.

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APPENDIX

The Motivated Strategies for Learning Questionnaire in this study was used to assess the students' attitude towards learning. It is based on the general cognitive view of motivation and learning strategies. The four components that were given focus in this study were metacognitive self-regulation, time-management strategies, regulated-effort strategies and strategies to acquire assistance. The statements were extracted from the 81 questionnaire statements and selected based on the recommendation by Pintrich (2002).

Time-management strategies

The statements assess student ability to manage and regulate time and study environment. In this case, time management involved scheduling, planning and managing time. In addition, study environment management indicated the setting in which students studied.

No.	Statement
35	*I usually study in a place where I can concentrate on my course work.*
43	*I make good use of my study time for this course.*
52*	*I find it hard to stick to a study schedule.*
65	*I have a regular place set for studying.*
70	*I make sure I keep up with the weekly readings and assignments for this course.*
73	*I attend class regularly.*
77*	*I often find that I don't spend very much time on this course because of other activities.*
80	*I rarely find time to review my notes or readings before an exam.*

Metacognitive self-regulation

The statements reflect awareness, knowledge and control of cognition. Goal setting and task analysis were made part of the planning activities as they were expected to assist in organising and understanding the content material better.

No.	Statement
33*	*During class time I often miss important points because I'm thinking of other things.*
36	*When reading for this course, I make up questions to help focus my reading.*
41	*When I become confused about something I'm reading for this class, I go back and try to figure it out.*
44	*If course materials are difficult to understand, I change the way I read the material.*
54	*Before I study new course material thoroughly, I often skim through it to see how it is organised.*
55	*I ask myself questions to make sure I understand the material I have been studying in this class.*
56	*I try to change the way I study in order to fit the course requirements and instructor's teaching style.*
57*	*I often find that I have been reading for class but I don't know what it was all about.*
61	*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.*

76	*When studying for this course I try to determine which concepts I don't understand well.*
78	*When I study for this class, I set goals for myself in order to direct my activities in each study period.*
79	*If I get confused taking notes in class, I make sure I sort it out afterwards.*

Regulated-effort strategies

The statements selected include the students' ability to control their effort and attention when facing distractions and uninteresting tasks.

No.	Statement
37*	*I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.*
48	*I work hard to do well in this class even if I don't like what we are doing.*
60*	*When course work is difficult, I give up or only study the easy parts.*
74	*Even when course materials are dull and uninteresting, I manage to keep working until I finish.*

Strategies to acquire assistance

The statements measures whether the students were able to manage to get support from peers and instructors. The students should be able to tell when they do not understand some concepts or theories and are able to identify someone to provide them with assistance.

No.	Statement
40*	*Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.*
58	*I ask the instructor to clarify the concepts I don't understand well.*
68	*When I can't understand the material in this course, I ask another student in this class for help.*
75	*I try to identify students in this class whom I can ask for help from if necessary.*