

Learning Motivation and Mathematics Achievement among Form Four Students in Miri, Sarawak, Malaysia

Johnattan AK James Sindoi*, Nurulwahida Hj Azid @Aziz

Universiti Utara Malaysia, Sintok, Kedah, Malaysia

*Corresponding author

Johnattan AK James Sindoi

Article History

Received: 25.08.2018

Accepted: 03.09.2018

Published: 30.09.2018



Abstract: The International student's participation report in PISA 2012, the achievement of Malaysian students' performance in mathematics is below the international average score. Many studies have found that mathematics achievement is influenced by student motivation factor. The objectives of study were to measure the reliability of learning motivational items, to measure the level of learning motivation and mathematics achievement and to identify the extent of the relationship between them. A total of 100 respondents from Form 4 students, 33 males and 67 female students were participated in study. Part A consists of seven demographic items and part B were measure motivational learning using are Motivation Strategy Questionnaire for Learning Questionnaire (MSLQ) which consisted of six dimensions, namely intrinsic orientation goals, extrinsic orientation goals, work values, learning confidence controls, self-efficacy learning and performance and test anxiety. Reliability Analysis showed that Cronbach coefficient of 0.970 and an exploratory factor analysis was conducted to test the validity of the learning motivation construct too. For learning motivational variables, only 2 items were itemized which are item 8 and item 28 from test anxiety. Findings showed that overall mathematical achievement and learning motivation were moderate with mean 2.56 and 4.38. There was a positive significant relationship between learning motivation and mathematics achievement. The findings also showed that extrinsic dimensions, work values and efficacy have significant positive relationships with mathematical achievements. However, the control of trust and test anxiety have negative relationships with mathematics achievement. Motivational factors played a very important role in influencing the Mathematics achievement. Highly motivated students can certainly achieved better academic achievement.

Keywords: Learning Motivation, Mathematics Achievement, Form Four Students, Reliability.

INTRODUCTION

Learning motivation has a great influence on mathematics achievement. Many past studies have shown that there was a positive significant correlation between learning motivation and mathematics achievement. The International students participation report in PISA 2012, the achievement of Malaysian students' performance in mathematics is below the international average score [1]. Overall, the achievement's gap of Malaysian students with other students is widening and the achievement of Malaysian students also is not comparable to the students in Singapore, South Korea, Hong Kong and Shanghai [2]. This might influence the competitiveness of Malaysia's workforce in promoting the nation's science and technology civilization and economy internationally.

Noor Erma Binti Abu and Leong Kwan Eu [3] stated that mathematics is one of the important subjects in the education system in the country. But so often, various parties complaint about the weak achievement

of mathematical of our students in the country [4]. Our students think Mathematics is a difficult subject. There are students who showed a good achievement but there are some could not master these subjects. Furthermore, some say that mathematics is a boring subject, especially the additional mathematical subjects.

Many studies have found that mathematics achievement is influenced by a student motivation factor [5, 6]. Similarly, in Norlia *et al.* [7], Nisa [8], Hee and Mohamad Yusuff [9], and Hamsari and Yahaya [10] also found that there was a significant relationship between student motivation and Mathematics achievement. This finding is consistent with the theory of relevant motivational theories.

Objective of study

The objectives of study are as below:

- To measure the reliability of learning motivational items.

- Measure the level of learning motivation and mathematics achievement.
- To identify the extent of the relationship between learning motivation and mathematics achievement.

The Motivational Theories

The selection of motivational variables in this study was carried out based on the theoretical studies on motivation in the field of education. Weiner [11], claimed that the history of research on motivation in education began in the 1940s. He concluded that in the decade of 1940-1950 the application of motivational theories in the field of education included praise and affirmation, success and failure, cooperation and competition, feedback and punishment were influenced by the theory of urgency (Theory of 'Drive' - Hull & Spense). Subsequently in the 1960s, a study on the motivation was still influenced by the assumptions of behavioral approaches, namely the theory of insistence and the theory of relevance (The Theory of Relation - John Watson). Two more theories affecting research in the field of motivation in the decade are cognitive theory (Kurt Lewin and John Atkinson) and psychoanalytic theory (Freud). The next development refers to the emergence of theories of social learning approaches and cognitive approaches such as attribution theory, achievement motivation theory and self-esteem as emphasized in the self-efficacy theory of self-determination by Bandura.

As a result of the survey of motivational theories and previous studies, some of the motivational variables believed to be associated with metacognition were selected, namely self - efficacy from Self-Efficacy Theory [12-15], 'learning goals' variables and goals [16-20] and 'trust in control of efforts' from Attribution Theory [21].

Previous studies on learning motivation and Mathematics achievement

There are many past studies have shown that there was a positive significant correlation between learning motivation and academic achievement. The studies of Hee and Mohamad Yusuff [9] emphasize that motivation strongly correlates with Mathematics achievement. Similarly, the study of Hamsari and Yahaya [10] also found that there was a significant relationship. The study of Kim, Park, and Cozart [6] showed that motivation has a major role in Mathematics achievement. The study of Lei Mee Thian, Gusti Ngurah Darmawan and Mei Yean Ong [9] on PISA data [1] found that there was a difference in the relationship between student and school variables levels in Mathematics achievement between Malaysia, Indonesia and Thailand.

Hee and Mohamad Yusuff [9] also conducted a study to measure the three levels of motivation namely intrinsic motivation, extrinsic motivation and self-

regulation and to study the relationship between the level of motivation and academic achievement of distance education students at University of Science Malaysia. The findings showed that level of intrinsic motivation, extrinsic motivation and self-regulation in distance education students were high. However, the high level of motivation did not indicate significant relationship with academic achievement.

Hamsari and Yahaya [10] conducted a study to determine the relationship between learning motivation, parenting style and attitudes with academic achievement among high school students in Kulai district, Johor. The results showed that the goal factor ($M = 4.22$) was the dominant factor in intrinsic motivation, while the factor ($M = 3.88$) was the dominant factor in extrinsic motivation. ($R = 0.021$, $p = 0.723$), extrinsic motivation ($r = 0.057$, $p = 0.331$) at the significant level, but there is no significant correlation between learning motivation = 0.05. With academic achievement of students. Idris [10] states that effective learning exists if there is an interest in students and one of the ways to motivate students was through engaging teaching and learning activities. Interest was a source of motivation that encourages one to do whatever they want when they have the freedom to choose.

RESEARCH METHODOLOGY

This study is based on a quantitative approach by using a set of questionnaires. A total of 100 respondents from Form 4 students, 33 males and 67 female students were participated in this pilot study. Questionnaires include two sections as follows:

Part A: Respondent Profile

Part A consists of seven demographic items. The items are aimed at obtaining background information of the respondents like gender, race, parent, father and mother education level, and form three mathematics assessment grade. The measurement scale for all demographic variables is in the form of nominal scale.

Part B: Motivation of Learning

Instruments that measure motivational learning are modified from the Motivation Strategy Questionnaire for Learning Questionnaire (MSLQ) created by Pintrich, Smith, Garcia & McKeachie [22]. This instrument is one of the most frequently used [23, 24].

Questionnaires consisted of six dimensions, namely intrinsic orientation goals, extrinsic orientation goals, work values, learning confidence controls, self-efficacy learning and performance and test anxiety. A total of 31 items in this section. Sample item is "I believe I will receive excellent grade in Mathematics". The seven likert scale used is 1 is very improbable and 7 is very true. Item distribution is as in Table 1 below.

Table-1: Item distribution of Motivation Learning

Dimensions	Item
intrinsic orientation goals	1, 16, 22, 24
extrinsic orientation goals	7, 11, 13, 30
work values	4, 10, 17, 23, 26, 27
learning confidence control	2, 9, 18, 25
self-efficacy learning and performance	5, 6, 12, 15, 20, 21, 29, 31
test anxiety	3, 8, 14, 19, 28
Total item	31

Reliability Analysis

According to Hair, Black, Babin, Anderson, Tatham[7], the Cronbach coefficient value below 0.5 is unacceptable, while the value of 0.60 is normal, 0.70 is more than normal, 0.80 is satisfactory and if more than 0.90 is very good. The findings of this pilot study showed Cronbach coefficient values are between 0.970 and 0.971.

Learning motivation variables consist of intrinsic orientation goals, extrinsic orientation goals, work values, learning beliefs control, self-efficacy

learning and performance and test anxiety have the same Cronbach coefficient of 0.970.

FINDINGS

This section discusses the findings of the study based on the respondents of the study, the achievement level of mathematics, the level of motivation of learning and the relation of learning motivation with the achievement of mathematics.

Level of Learning Motivation

Table-2: Learning Motivation Level

Motivation Dimensions	N	Minimum	Maximum	Mean	Standard Deviation	Level
Learning Motivation	100	2.52	5.87	4.38	0.72	Moderate high
Intrinsic orientation goals	100	2.50	7.00	4.36	0.80	Moderate high
Extrinsic orientation goals	100	2.00	6.75	4.72	0.97	Moderate high
Work values	100	1.83	6.50	4.32	0.98	Moderate high
Learning confidence control	100	2.25	7.00	5.00	1.08	Moderate high
Self-efficacy learning and performance	100	1.13	7.63	4.10	1.04	Moderate high
Test anxiety	100	2.00	6.80	4.16	0.88	Moderate high

Learning Motivation and Mathematics Achievement

Based on the data in Table 3, the findings showed that there was a positive significant relationship between learning motivation and mathematics achievement. This means that the higher of learning motivation of the students, they will gain the higher of their mathematics achievement. But the correlation between learning motivation and mathematical achievement is ($r = .26$) is very weak.

In addition, the findings also show extrinsic dimensions, work values and efficacy have significant positive relationships with mathematical achievements. The correlation of extrinsic dimension with

mathematical achievement ($r = .22$) was very weak while correlation between work value with mathematical achievement ($r = .40$) and between efficacy dimension with mathematical achievement ($r = .39$) was weak. However, this finding also shows that the higher the level of extrinsic motivation and the value of work and the efficacy of a student the higher the mathematical achievement. However, the results of the study show the dimensions of the control of trust and the dimensions of the test have negative relationships. However, this negative relationship is significant. This means that the higher the level of control of trust and the worry of lowering the mathematical achievement and vice versa.

Table-3: Correlation of learning motivation with academic achievement

Correlation		MM	Learning Motivation	intrinsic	extrinsic	Work values	Learning confidence control	Self-efficacy learning and performance	Test Anxiety
Mathematics	Pearson correlation	1	.26**	0.02	.22*	.40**	-0.03	.39**	-0.13
	Sig. (2-tailed)		0.01	0.88	0.028	0	0.76	0	0.19
	N	100	100	100	100	100	100	100	100

DISCUSSIONS

The findings showed that the level of mathematics achievement and learning motivation are moderate. Such findings are consistent with TIMSS 2015 and PISA 2012 reports as well as findings on Thian, Darmawan and Ong [1].

The findings showed that there was a positive significant correlation between learning motivation and mathematics achievement. This finding was consistent with the findings of the study conducted by Norlia *et al.* [25] which emphasizes that motivation was strongly correlated with the achievement of Mathematics. This finding was also consistent with the findings of Kim, Park, and Cozart [6] findings that showed that motivation plays a key role in achieving Mathematics. This finding was also supported by the findings of Hee and Mohamad Yusuff [9] and the findings of Hamsari and Yahaya [10].

CONCLUSIONS

Motivational factors played a very important role in influencing the Mathematics achievement. Based on Theory of Behaviorism Learning, students will feel more motivated through the stimuli that the teacher gives during the teaching and learning process. When students do the right thing and good, teachers are encouraged to reward and praise the student's achievement or behavior. Likewise in the Self-Efficiency Theory which refers to individual perceptions of his ability to perform certain tasks can increase the motivation of the student to continue to achieve success in the lesson. Many previous studies have shown that there was a positive significant relationship and influence between the motivational factors and the achievement of Mathematics. Highly motivated students can certainly achieve better academic achievement. However, there are other factors such as parents' encouragement and peer influence also affect the level of motivation of students in the lesson. Therefore, parents are encouraged to give positive encouragement to the children to be more successful in the lesson and succeed in future life.

REFERENCES

1. Thien LM, Darmawan IG, Ong MY. Affective characteristics and mathematics performance in Indonesia, Malaysia, and Thailand: what can PISA 2012 data tell us?. *Large-scale Assessments in Education*. 2015 Dec 1;3(1):3.
2. Radzali R. Mathematics Beliefs, Metacognition, Problem Representation and Problem Solving in Mathematics amongst students. Unpublished Doctoral Thesis. University Kebangsaan Malaysia. 2007.
3. Abu NE, Eu LK. Hubungan antara sikap, minat, pengajaran guru dan pengaruh rakan sebaya terhadap pencapaian matematik tambahan tingkatan
4. JuKu: Jurnal Kurikulum & Pengajaran Asia Pasifik. 2017 Oct 19;2(1):1-0.
4. Kamel Ariffin Mohd Atan. Memperluaskan peranan ilmu Matematik dalam sistem pendidikan. *Prosiding Persidangan Kebangsaan Pendidikan Malaysia*. 2002.
5. Hattie J. Visible learning: A synthesis of over 800 meta-analyses relating to achievement. routledge; 2008 Nov 19.
6. Kim C, Park SW, Cozart J. Affective and motivational factors of learning in online mathematics courses. *British Journal of Educational Technology*. 2014 Jan;45(1):171-85.
7. Hair JF, Jr. Black WC, Babin BJ, Anderson RE and Tatham RL.(2006). *Multivariate data analysis*. 6th ed. New Jersey: Prentice Hall.
8. Nisa K. *Kesan Motivasi Intrinsik Dan Motivasi Extrinsic Ke Atas Pencapaian Pelajar Tingkatan 5 SMK. Khir Johari Sungai Sumu*. Universiti Pendidikan Sultan Idris. Kajian ilmiah. 2011.
9. Malaysia JJ. Hubungan Antara Tahap Motivasi Dengan Pencapaian Akademik Pelajar Pendidikan.2011.
10. Hamsari¹ NA, Yahaya A. Peranan Motivasi Pembelajaran, Gaya Keibubapaan Dan Sikap Dengan Pencapaian Akademik.2012.
11. Weiner B. History of motivational research in education. *Journal of educational Psychology*. 1990 Dec;82(4):616.
12. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*. 1977 Mar;84(2):191.
13. Bandura A. Fearful expectations and avoidant actions as coefficients of perceived self-inefficacy.1986
14. Bandura A. Human agency in social cognitive theory. *American psychologist*. 1989 Sep;44(9):1175.
15. Bandura A. Perceived self-efficacy in cognitive development and functioning. *Educational psychologist*. 1993 Mar 1;28(2):117-48.
16. Weiner B. An attributional theory of achievement motivation and emotion. *Psychological review*. 1985 Oct;92(4):548.
17. Archer J, Scevak JJ. Enhancing students' motivation to learn: Achievement goals in university classrooms. *Educational Psychology*. 1998 Jun 1;18(2):205-23.
18. Ames C. Achievement goals and the classroom motivational climate. Student perceptions in the classroom. 1992;1:327-48.
19. Wolffe AP. Transcription: in tune with the histones. *Cell*. 1994 Apr 8;77(1):13-6.
20. Archer J, Scevak JJ. Enhancing students' motivation to learn: Achievement goals in university classrooms. *Educational Psychology*. 1998 Jun 1;18(2):205-23.

21. Weiner B. A theory of motivation for some classroom experiences. *Journal of educational psychology*. 1979 Feb;71(1):3.
22. Pintrich PR, De Groot EV. Motivational and self-regulated learning components of classroom academic performance. *Journal of educational psychology*. 1990 Mar;82(1):33.
23. Wolters CA, Shirley LY, Pintrich PR. The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and individual differences*. 1996 Jan 1;8(3):211-38.
24. Mousoulides N, Philippou G. Students' motivational beliefs, self-regulation strategies and mathematics achievement. In *Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education 2005 Jul 10 (Vol. 3, pp. 321-328)*. PME.
25. Aziz NA. Hubungan Antara Motivasi, Gaya Pembelajaran Dengan Pencapaian Matematik Tambahan Pelajar Tingkatan. *Jurnal Pendidikan Malaysia (Malaysian Journal of Education)*. 2006;31:123-41.