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The Time Spending and Availability of Reference Books to Do Mathematics Homework towards Mathematics Achievement

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ABSTRACT

Background: Homework plays a major role in education system. There are a lot of researches about mathematics homework and mathematics achievement. However, these studies were showing instability in findings, especially time spending on mathematics homework and availability of reference books towards mathematics achievement. Descriptive analysis was applied and Pearson correlation coefficient was used to determine relationships between the factors. **Objective:** The aims of this research were to determine the amount of time spend to do mathematics homework weekly, the level of availability of reference books to do mathematics homework and to identify relationships between time spending on mathematics homework and availability of reference books towards mathematics achievement. **Results:** In Sabah state, findings revealed that 58% of the students spent more than 1 hour weekly to do their mathematics homework compared to 42% students spent less than 1 hour weekly. Besides that, 60% of the students were having enough references books to do mathematics homework and 40% of students do not have enough references books to do their mathematics homework. Research findings showed a positive moderate relationship with achievement in two aspects: (1) time spending in Mathematics Homework; (2) availability of reference books to do mathematics homework**.** **Conclusion:** The research findings implied that teachers should not burden students with too much of homework but need to assign tasks based on reference books that they have and consider about students capabilities while assigning quality mathematics homework.

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INTRODUCTION

Homework is an important and an effective way in education system that develops the education (Bembenutty, 2011; Dettmers, Trautwein, Ludtke, Goetz, Frenzel, and Pekrun, 2011). In Malaysia, homework is compulsory to be given to students after a lesson was completed based on needs of the student (KPM, 2004). Past research was on the relationship between academic achievement and homework using variables such as amount of homework given, time spent on homework, and the amount of homework is actually completed (Trautwein, Koller, Schmitz, and Baumert, 2002; Zimmerman and Kitsantas, 2005).

Although the effectiveness of this homework was challenged by educators, parents, and students (Kohn, 2006), but it still goes on and become an important supplement in the system used by most of the teachers to enhance the experience of students (Patall, Cooper, and Wynn, 2010). Homework is one of the important factor in the aspect of curriculum (Hua, 2007) and it is a part of student success in academic (Mohd Fami, Mohammed Sharif and Roslee, 2008). Most teachers felt that homework can reduce student achievement gap, improve the process from school to home, and boost student motivation (Trautwein *et al*., 2009). The study found that the way teachers give Homework brings an impact on student achievement.

Sabah is one of the member states of the country of Malaysia and is in the northern part of the island of Borneo, which is rich in natural resources but has problems with illegal traders and renegade rebels. The state is highly populated but welcomes many illegal immigrants who are unemployed which leads to the unequal distribution of wealth there. Because of this imbalanced economy, Sabah has become one of the poorest among the Malaysian states and most of the people there are still living below the poverty bracket. Political analysts believe that the economy of Sabah is still in a critical development phase and

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has many inappropriate strategies or policies that hinder their growth (Asefa, 2005). The Malaysian government has continued to pursue community development. They have envisioned that by 2020, the state shall achieved full development and industrialization through scientific innovation throughout education system.

Homework is one of the activities that promote the development of skills learned in school. Research consistently shows that students who is doing homework have a good academic achievement compared to students who do not do their homework (Cooper, Robinson, and Patall, 2006; Trautwein, 2007; Trautwein, Koller, Schmitz, and Baumert, 2002). In addition, the relationship between the amount of time spent on homework and achievement in mathematics is negative (Kitsantas et.al., 2011). The results showed that the addition of a reference to complete mathematics homework can improve student achievement. This study occupies the research gab in the field on Malaysian context about relationships between time spending on mathematics homework and availability of reference books towards mathematics achievement.

Literature Review:

Self-regulation works in three important areas of psychology of learning: cognitive (eg, learning scheme), motivation (eg. self-efficaciousness, task value), and metacognitive (eg, self-monitoring and self-reflection; Bandura, 1993; Hong, Peng, and Rowell, 2009; Trautwein and Koller, 2003). The three areas of self-regulation operate cyclically which controls task depending on the belief in one's capabilities and expectations of success.

In the process of completing homework effectively, students need to set aim for self-regulated homework done, selecting appropriate acquisition and strategizing, maintaining motivating , monitor progress , and evaluate the results of the homework carefully (Bembenutty, 2011). In this field of study, he found that there was a positive relationship between homework and self-regulatory skills that facilitates academic achievement. Homework assignments are given to improve the development process of self-regulatory opinion, as well as goal setting, time direction, and maintaining attention. Effective completion of homework requires learning self-regulation (Kitsantas and Zimmerman, 2009). Students who are highly self-regulated can complete homework in a different way than the less skilled students (Kitsantas and Zimmerman, 2009).

Time Spending in Mathematics Homework:

One of the most studied factors that are commonly complaint is the time for homework. The results showed that the time variation towards homework (Bembenutty, 2009;. Hoover-Dempsey *et al*, 2001; Kitsantas and Zimmerman, 2009; Warton, 2001; Xu, 2009), as reported in the interest of time on homework. Studies have shown that it takes different times to complete the homework for the younger and older students. Many schools have practiced 10 minutes as a general guide for the development of appropriate homework (Henderson, 1996). For example, students who are in the lower and middle grades should be given 10 minutes while for higher grade students should multiplied by grade level (eg, 30 minutes for a third grade student).

For high school students, homework could help to improve to standardized test scores and grades. Teachers suggested that the homework should be corrected and should be given time to make sure assignments are related to the course; introduce effective policies at the level of the curriculum, and the school (Markow *et al*., 2007).

Kitsantas, Cheena, and Ware (2011) studied the effect of time spent on homework, support resources to complete homework, and mathematics self-efficacy in mathematics achievement of students without regard to race and gender, using data extracted from the Program 2003 for International Student Assessment (PISA, 2012). Participants in this study are high school students from the U.S. The results revealed that the achievement gap is reduced when homework resources and self-efficacy was taken into account.

In addition, the amount of time spent on mathematics homework is negative with mathematics achievement (Kitsantas et.al., 2011). Findings suggest that the achievement gap decreases with the increase in the availability of reference resources for homework. They also found that increasing in ratio of time spent on homework associated with a decrease in mathematics achievement. Kitsantas *et al*. (2011) concluded that teachers should try to provide resources for students to complete homework and assignment needs which structured accordingly.

According to Steven McMullen (2007) who studies of amount of time spending to complete the homework by students showed that schools played a great success in raising student achievement from districts of low-performing schools. Besides that, it reduces the gap between low and high performing students. On average, each additional hour available per week for the completion of homework has increased the achievement of 0.243 standard deviation (American Federation of Teachers, 2007). This change is large enough to boost student achievement in math from 50 to 59 percentile within a year of schooling (Betts, 1996).

Another study found that students complete their homework during non-instructional time with less help from teachers and also less narrow timeline for completion. Researchers see homework as a tool to help students to develop self-regulatory skills (Bembenutty, 2009; Kitsantas and Zimmerman, 2009). Zimmerman (1998) defines self-regulation as

"self-generated thoughts, feelings, and actions to achieve academic goals" (p. 73).

Besides that, the researchers consistently conclude that the time spent on homework showed a positive correlation with academic achievement for students of secondary schools and tertiary levels (Cooper, Robinson, and Patall, 2006). In additional, Mullis, Martin, Foy and Arora, (2012), reported in TIMMS 2011 that, 20 % of Malaysian students weekly spent more than 3 hours, 46 % of them spent between 45 minutes and 3 hours and about 34% of them spent less than 45 minutes to do their mathematics homework.

Availability of Reference Books:

Brock, Lapp, Flood, Fisher, and Han (2007), found that teachers who teach in urban schools are aware that lack of resources available for some students makes the teachers to avoid giving homework that requires references with other sources. As an alternative, the teacher will try to provide resources for students to complete their homework. Seen in the context of the impact of support resources homework on mathematics achievement, teachers need to structure homework accordingly based on the resources available.

Ramdass and Zimmerman (2011) pointed out that homework provides opportunities for students to engage in self-regulation and self-motivation, prevent disruptions, using strategies to complete homework, manage their time, set goals, reflect on their own performance, and delaying gratification. They also suggest that it is important to continue training at all levels in such a way as to make the students aware of the relationship between homework and self-regulation activity process.

Objectives of the Study:

The aims of this study are:

1. To determine the amount of time spend to do mathematics homework weekly and the level of availability of reference books to do mathematics homework.
2. To determine the relationship between time spend on mathematics homework and availability of reference books to complete mathematics homework towards mathematics achievement.

Methodology:

Population and Sample:

This study was conducted in secondary schools in Sabah, Malaysia. From the total population of 19,105, 9000 of boys and 10105 of girls who represent from all secondary school students in the state. However, the sample size of this study were 380 secondary schools students from grade 10, 176 (46.25%) were male students and 204 (53.75%) were female students.

Data Analysis:

In this study, SPSS were applied to conduct descriptive analysis and the Pearson correlation Coefficient among variables. Furthermore, the Pearson coefficient was used to determine relationships between the factors.

Findings:

Descriptive Analysis:

Weekly Time Spending for Mathematics Homework:

Table 1 reported that weekly time spending by students to do mathematics homework. It is revealed that only 13% of the students were spent less than 30 minutes weekly to do their mathematics homework. In addition, 51% of the students were reported spent 1 to 2 hours weekly to do their mathematics homework.

Table 1: Weekly time spent for mathematics homework.

	Frequency	Percent
Less than 30 minutes	49	13.0
30 minutes – 1 hour	112	29.0
1 hour – 2 hours	192	51.0
More than 2 hours	27	7.0
Total	380	100.0

Availability of Reference Books to do Mathematics Homework:

Table 2 showed that availability of reference books to do mathematics homework. The findings revealed that, 13% of the students do not have any reference books while they doing mathematics homework, 27% of the students do not have enough reference books while 60% of the students reported that they have enough reference books to do mathematics homework.

Table 2: Availability of reference books to do mathematics homework.

	Frequency	Percent
Don't have	49	13.0
Not Enough	101	27.0
Enough	176	46.0
More enough	54	14.0
Total	380	100.0

Correlation Analysis:

A Pearson correlation coefficient was computed to assess the relationship between the time spent and mathematics achievement. The relationship between time spend to do mathematics homework and reference books availability towards mathematics achievement was statistically significant. There was a positive correlation between these two variables, r = 0.64, n = 380, p = 0.000. Besides that, there was a positive correlation between reference books availability and mathematics achievement, r = 0.48, n = 380, p = 0.000. Among this two variables, time spending to do mathematics homework revealed a strong correlation compared to reference books availability to do mathematics homework towards mathematics achievement. The table 3 revealed the correlation between the factors in these studies.

Table 3: Correlation between time spending on mathematics homework and reference books availability towards mathematics achievement

	Mathematics Achievement
Time	0.64**
Reference books	0.48**

**. Correlation is significant at the 0.01level (2-tailed).

Discussion:

The relationship between time spent to do mathematics homework towards mathematics achievement was statistically significant. The positive relationship between student's time spent to do mathematics homework towards mathematics achievement was aligned with those reported by Kitsantas, Cheena, and Ware (2011), Steven McMullen (2007), Betts (1996), Bembenutty, (2009) and Cooper, Robinson, and Patall, (2006). On the other hand, this findings was against where the amount of time spent on mathematics homework was negative with mathematics achievement (Kitsantas et.al., 2011). Whereby, reference books availability to do mathematics homework towards mathematics achievement was statistically significant as well. This finding was aligned with those reported by Brock, Lapp, Flood, Fisher, and Han (2007). However, findings suggested that the achievement gap decreases with the increase in the availability of reference resources for homework. Kitsantas *et al.* (2011) concluded that teachers should try to provide resources for students to complete their homework and assignment needs which structured accordingly.

Conclusion:

In Sabah state, findings revealed that 58% of the students spent more than 1 hour weekly to do their mathematics homework compared to 42% students spent less than 1 hour weekly. Besides that, 60% of the students were have enough reference books to do mathematics homework and 40% of students do not have enough reference books to do their mathematics homework. Moreover, this study revealed a positive moderate relationship between time spending to do mathematics homework and availability of reference books to do mathematics homework towards mathematics achievement of grade 10 students in Sabah, Malaysia. Between these two variables, time spending to do mathematics homework has a strong correlation compared to availability of reference books towards mathematics achievement. Teachers need to plan to give mathematics homework so that students will have the interest to spend their time to do mathematics homework. Besides, planning in mathematics homework is necessary. Teachers need to take into account of availability of reference books in order for the students to engage with their task at home. This attributes is in line with self-regulations theory that operates cyclically which controls task depending on the belief in one's capabilities and expectations of success.

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