

# Examining the Mathematics Performance of the First Semester 'Galus' Students in Malaysian Higher Level Institution

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## ABSTRACT

*In the process of reaching a fully developed country by the year 2020, science, mathematics and technology subjects have been a significant focus in the education system in Malaysia. However, the mathematics performance among students as early as in the primary school until the higher level institution is still an issue. Therefore, the general focus of this paper is to examine the relationship and differences between the mathematics performance of the first semester students in higher level institution and their mathematics performance at Sijil Pelajaran Malaysia (SPM) level. 122 students of the 'galus' category students from one of the public universities in Malaysia were selected. The finding shows that there is a very weak positive relationship between mathematics performance of the first semester students and their mathematics performance at SPM level. In addition, it is found that the performance of*

*students is not affected by gender but there is a relationship within female students which their mathematics performance in SPM level is better than first semester result in university. Besides that, students from the Science and Technology field with additional mathematics at the SPM level perform better in their mathematics during the first semester. Thus, the finding of this study is hoped to provide useful information in improving the mathematics performance in higher level institution.*

**Keywords:** *diagnostic test, 'galus' students, mathematics performance*

## **Introduction**

Science, mathematics and technology have been a significant focus in the education system in Malaysia in order to be a fully developed country by the year 2020. According to the fourth Prime Minister of Malaysia, Tun Dr. Mahathir bin Mohamad who introduced the Vision 2020, there are many challenges in achieving the vision. One of the challenges is on the weak performance of students in mathematics subject (Pandangan Masyarakat, n.d.). Although the mathematics subject has been introduced to the students as early as the pre-school level, solving basic mathematics questions is still become a problem to many students at the higher level of education.

Most people think that the mathematics subject is a killer paper, tough paper, difficult to learn, very complex, hard to pass and so on. Jamil and Shahril (1999), indicate that students who obtain a good grade in mathematics will also have a greater chance of obtaining Grade One in SPM in comparison to those with a lower grade in mathematics. These findings indicate that the likelihood of students to be awarded Grade One in SPM is high if they can obtain distinction in mathematics. It seems that mathematics is most likely a determinant factor for the students' achievement in the SPM. Whatever perception given to it, mathematics has to be accepted as a passport to either being able to continue for further education or a promise to a better paid job either in the government or private sectors. In addition, a strong background in mathematics is critical for many career and job opportunities in today's increasingly technological society.

Hence, the general focus of this paper is to examine the relationship and significant differences between the mathematics performance, including additional mathematics, of the first semester students in higher institution and their mathematics performance at the SPM level. The

case study was carried out in one of the public universities in Malaysia. It is hoped that useful and beneficial information from the finding of this study can be provided to students, educators and parents in improving the mathematics performance in higher level institution.

## **Literature Review**

Many studies have been conducted in investigating the performance level of mathematics and the factors affecting it. In a study by Chansarkar and Mishaeloudis (2001), they found out that the performance of students is not affected by factors like age, sex and place of residence but is associated with the qualification in the quantitative subject. Their findings also show that students live near the university perform better than the others. Kiamanesh (2004) conducted a research on the factors affecting Iranian students' achievement in mathematics. He found that mathematics self-concept, home background, teaching, and attitude towards mathematics were the most important factors that affected the students' achievement while school climate was not contributed at all. In a recent study, Syed Tahir Hijazi and Raza Naqvi (2006) found out that mother's educations, attendance in class, family income and study hour per day after college are significant to students' performance but the mother's age is not significant to students' performance.

As mentioned earlier, passing the mathematics subject is a passport to being able to continue for further education and fail to do so is one of the main reasons why most students cannot graduate on time. There are also cases where students cannot complete their study because of failing three times in the mathematics subject (Nazirah et al., 2006). In a local context, Zakiyah et al.'s study (2008) stated that the average percentage of passing in mathematics is not as well performed as compared to the other subjects. While, Yudariah et al. (2001) found that some students had to take the mathematics subject repeatedly before passing because of poor understanding of basic concepts, poor computational competence, inability to effectively organise known facts and problems in mastering the mathematical language and symbols.

In relation to the issue of the students' performance in mathematics subject, Nazirah et al. (2006) has conducted a study on the diagnostic test of the first year students in one of the university in the East Coast of Malaysia. They investigated the relationship between the diagnostic test result and the performance of students in mathematics subject through

out the year spending in the university. Their findings show that there is a significant relationship between the diagnostic test result and the university examination result and no significant relationship in the diagnostic test result within gender or home background.

Hamidah et al. (2005) also developed a diagnostic test, Ujian Kemahiran Asas Matematik (UKAM) to students of Diploma Quantitative Sciences. In the study, they that identified there is a weak correlation between students' achievement in mathematics at SPM level and UKAM but there is more significant correlation between additional mathematics and UKAM. Zakiyah et al. (2008) found out that the 'galus' category students, who attend the Maths Workshop, obtained better results in their coursework assessment and final examination compared to those who did not attend the workshop. Their findings show that the Math Workshop was able to motivate the students and improve their mathematics performance. This is consistent with Papanastasiou's study (2002) which stated that there is a positive relationship between mathematics attitudes and mathematics achievement.

## **Methodology and Hypotheses**

The case study on the 'galus' students were conducted at one of the public universities in Malaysia. 122 out of 752 of the first semester students from various faculties and who had undergone the diagnostic test were identified as 'galus' students. According to Nazirah et al. (2007), a 'galus' student is defined as a student who may have potential to pass in their examination if they are given continuous improvement. However, there is also a possibility that may fail again. In this study, students who had scored less than 30% marks in their diagnostic test result were identified as 'galus' students.

Questionnaire was distributed to the students when they attended the Maths Workshop organised by the Mathematics and Statistics Department of the university. The data obtained were analysed using statistical procedures executed by the SPSS 12 including descriptive statistics, normality test, regression analysis and t-test. The hypotheses tested in this study are as follows:

$H_{01}$ : There is no relationship between SPM result in mathematics and first semester result in mathematics at Malaysian higher level institution.

$H_{02}$ : There is no significance difference of SPM result in mathematics and first semester result in mathematics at Malaysian higher level institution between gender.

$H_{03}$ : There is no relationship of SPM result in mathematics and first semester result in mathematics at Malaysian higher level institution for each gender.

$H_{04}$ : There is no significance difference of first semester result in mathematics between Social Science students with additional mathematics and without additional mathematics at SPM level.

$H_{05}$ : There is no significance difference of first semester result in mathematics between Science and Technology students with additional mathematics and without additional mathematics at SPM level.

The grades of SPM and at higher level of education were ranked consistently using the Spearman's Rank method. The rank is shown in Tables 1 and 2:

Table 1: Rank of SPM Grades

Grade	A	B	C	D	E	F	G
Rank	7	6	5	4	3	2	1

Table 2: Rank of Higher Level Education Grades

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	E	F
Rank	13	12	11	10	9	8	7	6	5	4	3	2	1

## Findings and Discussion

Table 3 shows out of 122 total samples, 53 respondents (43.44%) were males and 69 respondents (56.56%) were females. The respondents were from seven different programmes in the selected university. Most of the students which is 27 respondents (22.13%) involved in this study were from Plantation Management and Business Study (General), 25 respondents (20.49%) were from Wood Technology, 22 respondents (18.03%) from Science, nine respondents (7.38%) from Civil Engineering, seven respondents (5.74%) from Business Study (Banking) and the least number of respondents which is 4.10% were from Computer Science programme. From 34 respondents of the Social Science students, 26 of

them (76.47%) took additional mathematics at SPM level meanwhile 70 out of 88 respondents (79.55%) from Science and Technology base took that subject.

Table 3: Frequency Table

Items	Frequencies (%)	With Additional Mathematics	Without Additional Mathematics
Gender			
Male	53(43.44%)	41(42.71%)	12(9.83%)
Female	69(56.56%)	55(45.08%)	14(11.48%)
	122	96(78.69%)	26(21.31%)
SOCIAL SCIENCE			
Programmes			
Business Study (General)	27(22.13%)	20(58.82%)	7(20.59%)
Business Study (Banking)	7(5.74%)	6(17.65%)	1(2.94%)
	34(27.87%)	26(76.47%)	8(23.53%)
SCIENCE AND TECHNOLOGY			
Programmes			
Plantation Management	27(22.13%)	19(21.59%)	8(9.09%)
Wood Technology	25(20.49%)	17(50.00%)	8(9.09%)
Science	22(18.03%)	20(58.82%)	2(2.27%)
Computer Science	5(4.10%)	5(14.71%)	0
Civil Engineering	9(7.38%)	9(10.23%)	0
	88(72.13%)	70(79.55%)	18(20.45%)

Table 4 shows that only 5.78% of respondents scored below D in the Mathematics subject in their SPM. Most of the respondents (43.40%) scored B while 27.90% scored A and 22.10% scored C. This reflects that majority of the selected respondents have good SPM results in Mathematics subject before entering the university.

Table 4: SPM Results for Mathematics Subject

Grade (Mathematics)	Number of Students	Percentage
A	34	27.90%
B	53	43.40%
C	27	22.10%
D	7	5.70%
E	1	0.08%

Based on the p-value of Shapiro Wilk in Table 5, it shows that the entire data of variables tested in this study are not normally distributed because the p-values are less than 0.05. However, according to Leech et al. (2005), if the skewness value is in between -1 and 1, then the data is approximately normally distributed. This statement is also supported by Myers and Well (2002). Therefore, the data can be said as normal distribution by referring to the skewness value. Thus, regression analysis and t-test are used to answer the stated hypotheses of this study.

Table 5: Normality Test

Variable	Mean	Standard Deviation	p-value (Shapiro Wilk)	Skewness
SPM Result (Mathematics)	5.92	0.896	0.000	(-0.607, 0.219)
SPM Result (Additional Mathematics)	3.59	1.366	0.000	(-0.366, 0.246)
First Semester Result (Mathematics)	6.52	3.390	0.000	(-0.038, 0.219)

Table 6 explained the average grade of students in this study for mathematics at SPM level is B and C+ at their first semester in university.

Table 6: Result of Mathematics

Examination	Mean	Grade
SPM	5.92	B
First semester	6.52	C+

The relationship of SPM result in mathematics and first semester result in mathematics exists because the p-value obtained in regression analysis (Table 7) is less than 0.05. However, the relationship is very weak positive relationship. It shows the low correlation between the SPM result in mathematics and the first semester students' performance in mathematics at higher level education. The R Square showed only 8.2% of the variations in first semester result in mathematics can be explained by changes in SPM result in mathematics.

Comparison between male and female was also conducted to determine whether there is a significance difference of SPM result in mathematics and first semester result in mathematics at the university.

Table 7: Result of Regression Analysis

Hypothesis	Correlation	R Square	p-value	Decision
$H_{01}$ : There is no relationship of SPM result in mathematics and first semester result in mathematics.	0.286	0.082	0.001	Reject $H_{01}$

Independent samples t-test is used to achieve second hypotheses since the number of sample is not equal for each group of gender. Result of independent samples t-test in Table 8 states that there is not enough evidence to reject  $H_{02}$  since the p-values obtained is greater than 0.05. Thus, there is no significance difference of SPM result in mathematics and first semester result in mathematics at Malaysian higher level institution between gender, which means that their level of performance in mathematics in SPM and first semester in university is not affected by gender. This finding is supported by Chansarkar and Mishaeloudis (2001) who found out that the performance of students is not affected by factor like sex.

Table 8: Result of Independent Samples T-Test

Hypothesis	Mean	T-Value	p-value	Decision
$H_{02}$ : There is no significance difference of SPM result in mathematics between gender.	0.045	0.273	0.785	Do not Reject $H_{02}$
$H_{02}$ : There is no significance difference of first semester result in mathematics between gender.	-1.147	-1.871	0.064	Do not Reject $H_{02}$

Even though there is no significance difference between gender, this study found out that there is a very weak positive relationship between SPM result in mathematics and first semester result in mathematics at university within female students since the p-value obtained in regression analysis (Table 9) is less than 0.05. However, it is different with male students where there is no relationship between SPM result in mathematics and first semester result in mathematics at the university among them.

The next analysis focused on the effect of additional mathematics at SPM level on first semester performance in mathematics at university. Students were divided into Social Science and Science and Technology



fields. Each field was investigated either there is a significance difference on the first semester result in mathematics if they took additional mathematics and did not take additional mathematics at the SPM level.

From Table 10, the finding shows that there is no significance difference of first semester result in mathematics between Social Science students whether they took additional mathematics or not at the SPM level.

Table 9: Result of Regression Analysis

Hypothesis	Gender	Correlation	R Square	p-value	Decision
H <sub>03</sub> : There is no relationship of SPM result in mathematics and first semester result in mathematics at Malaysian higher level institution for each gender.	Male	0.266	0.071	0.054	Do not reject H <sub>03</sub>
	Female	0.313	0.098	0.009	Reject H <sub>03</sub>

Table 10: Result of Independent Samples T-Test (Social Science)

Hypothesis	Additional Mathematics	Mean	T-Value	p-value	Decision
H <sub>04</sub> : There is no significance difference of first semester result in mathematics between Social Science students with additional mathematics and without additional mathematics at SPM level.	With	6.04	1.011	0.320	Do not reject H <sub>04</sub>
	Without	4.63			

On the other hand, the result shows that there is a significance difference of first semester result in mathematics among the Science and Technology students (Table 11). The results show that their performance was better if they had taken the additional mathematics at the SPM level compared to students without additional mathematics. Thus, it can be concluded that the additional mathematics at the SPM level also influenced the students' performance at the university.

Table 11: Result of Independent Samples T-Test (Science and Technology)

Hypothesis	Additional Mathematics	Mean	T-Value	p-value	Decision
H <sub>05</sub> : There is no significance difference of first semester result in mathematics between Science and Technology students with additional mathematics and without additional mathematics at SPM level.	With	7.20	2.098	0.039	Reject H <sub>05</sub>
	Without	5.39			

## Conclusion

Nowadays, the issue of students' performance in the mathematics subject has been the nation's concern if Malaysia is to be a fully developed country by 2020. Science, mathematics and technology have become an important focus in the education system in Malaysia. Many The mathematics subject has been perceived as a killer paper, tough paper, difficult to learn, very complex and hard to pass and so on. Whatever perceptions given to it, mathematics has to be accepted as a passport to either continuing further education or a better paid job be it in the government or private sector. However, solving basic mathematics questions is still a problem to many students in higher education although they have studied it for more than ten years. Since mathematics is a compulsory subject in higher education, especially for science and technology courses, failure in that subject may result in incompleteness of studies or being dismissed from the university.

Thus, the general focus of this paper is to examine the mathematics performance of the first semester students in the higher education and their mathematics performance at the SPM level. The findings revealed that there is a very weak positive relationship between the mathematics performance level of the first semester students in the 'galus' category at the university and SPM level. The findings also found that there is a significance difference in the mathematics result of the Science and Technology students at the university level regardless whether they took additional mathematics or not at the SPM level. Therefore, it can be concluded that Science and Technology students in the 'galus' category

with good results in mathematics and with additional mathematics at their SPM level will perform good mathematics results in the first semester of higher level institution. However, it was found that the performance of students is not affected by gender.

Hence, in order to improve the mathematics performance at the higher education level, more attention should be taken to the 'galus' category students especially those with weak mathematics result in SPM and those without additional mathematics. More activities which can motivate them should be carried out such as Maths Workshop, seminars and quizzes. Although the number of students scored below D in SPM is small, that is, less than 6%, an immediate action has to be taken as early as they enter the university so as to improve the academic quality of the university. Thus, the finding is hoped to have provided some useful information to those involved in improving the mathematics performance at the higher education.

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