

# **A Study Of The Correlation Between Grades And Levels Of Difficulty For A Statistics Course At The Faculty Of Engineering, Universiti Kebangsaan Malaysia**

Azami Zaharim, Ahmad Kamal Ariffin Mohd Ihsan,  
Mohd Jailani Mohd Nor & Abdul Halim Ismail

Faculty of Engineering  
Universiti Kebangsaan Malaysia  
43600 UKM Bangi Selangor  
MALAYSIA  
[azami@vlsi.eng.ukm.my](mailto:azami@vlsi.eng.ukm.my)

*Abstract:* Engineering studies involve a lot of Mathematics learning as a prelude to Engineering studies and application. In the Faculty of Engineering at the Universiti Kebangsaan Malaysia (UKM), students are required to take one statistics course which is offered in the second year of a four-year engineering program. This study is limited to students from the 2004/2005 academic session. The focus of this paper is a study of the correlation between grades obtained and the levels of difficulty that the students perceived for the course.

*Keywords:* Correlation, grades, level of difficulties, mathematics learning, statistics course

## **1 Introduction**

Statistics assumes a position of great importance in the field of engineering. Thus, Mathematics education at the school level should lay the groundwork for effective study and application at the professional ranks. Many factors have been identified in studies of the relationship between performance and students' attitudes toward statistics. There is a strong correlation between a student's performance and his attitude as well as strategies that he employs in statistics study [3]. Gourgey (1984), Harvey, Plake, and Wise (1985), Stevens (1982), and Yager and Wilson (1986) are some authors who opined that recognizing and addressing concerns about student anxiety is a vital initial step in the design of an introductory statistics courses.

A set of self-administered questionnaire was utilized by this writer in acquiring the information on students' perception, grades obtained and views towards the statistics course.

## **2 Survey Results and Analysis**

In this survey, questionnaires were distributed to 300 Year Two students from the 2004/2005 academic session in the Faculty of Engineering, UKM. These students enrolled in the statistics course and were from the Civil and Structural; Electrical, Electronics and Systems; Chemical and Process; and Mechanical and Materials departments. The respondents totaled 298. A summary of respondents is given in Table 1 below.

TABLE 1: Total number of respondents according to gender in the various departments

Department	Gender		Total (%)	
	Male (%)	Female (%)		
Civil and Structural	37 (12.42)	40 (13.42)	77	25.84
Electrical, Electronics and Systems	32 (10.74)	43 (14.43)	75	25.17
Chemical and Process	35 (11.74)	42 (14.09)	77	25.84
Mechanical and Materials	49 (16.44)	20 (6.71)	69	23.15
<b>Total</b>	<b>153 (51.34)</b>	<b>145 (48.66)</b>	<b>298</b>	<b>100</b>

TABLE 3: The total number of respondents according to grades and their opinions on the levels of difficulty

Scale	Grade	Scale	Levels of difficulty
	Total (%)		Total (%)
Excellent (1)	44 (15.83)	Very difficult (1)	14 (5.15)
Average (2)	200 (71.94)	Difficult (2)	111 (40.81)
Pass (3)	34 (12.23)	Normal (3)	127 (46.69)
Weak (4)	0 (0.00)	Easy (4)	19 (6.99)
Fail (5)	0 (0.00)	Very easy (5)	1 (0.37)
<b>Total</b>	<b>278 (100)</b>	<b>Total</b>	<b>272 (100)</b>

A correlation analysis is conducted to find the relationship between grades and levels of difficulty. Grades and levels of difficulty of this particular statistics engineering course are shown in Table 2 and Table 3 below.

TABLE 2: Scale of Grades and Levels of Difficulty

Scale	Grade	Grade Scale
1	A+,A, A-	Excellent
2	B+,B,B-	Average
3	C+,C,C-	Pass
4	D+,D,D-	Weak
5	E,F	Fail

Scale	Levels of Difficulty
1	Very Difficult
2	Difficult
3	Normal
4	Easy
5	Very Easy

Table 3 displays the total number of respondents according to grades and their opinions on the levels of difficulty in the engineering statistics course at UKM. About 72% of respondents fall in the *Average* level, that is, 200 out of 278 respondents. This data could well mean that the course was taught at a medium level of difficulty (not too difficult and not too easy). Nevertheless, none of the respondents fall in *Weak* and *Fail* grade, which means that all respondents were equipped with a good foundation in statistics. As for the scales of difficulty, the majority of respondents fell under *Normal* (47%) and *Difficult* (41%) as shown in Figure 1. Only 0.37% of respondents scaled it as easy. Out of 300 respondents, 22 respondents did not disclose their grades and 28 respondents did not disclose their opinions on the levels of difficulty.

As shown in Table 4 below, there is a negative relationship between grades and levels of difficulty ( $p\text{-value} = 0.00 < 0.05$ ), the relationship is weak, only -0.181 (e.g. when the scale of grade is '1', the level of difficulty is '5'). This result indicates that students with low grades would most likely state that the course was difficult.

TABLE 4: Scale of Grades and Levels of Difficulty

		GRED	SKALA
GRED	Pearson Correlation	1	-.181**
	Sig. (2-tailed)	.	.004
	N	278	251
SKALA	Pearson Correlation	-.181**	1
	Sig. (2-tailed)	.004	.
	N	251	272

\*\* . Correlation is significant at the 0.01 level

Beliefs about Factors Related to Statistics Achievement," *paper presented at the Annual Meeting of the American Educational Research Association, Chicago.*

[3]Yager, G., and Wilson (1986), "Ten Suggestions on Teaching Research Counselling to Students," *Annual Meeting of the North Central Association for Counsellor Education and Supervision, Kansas City.*

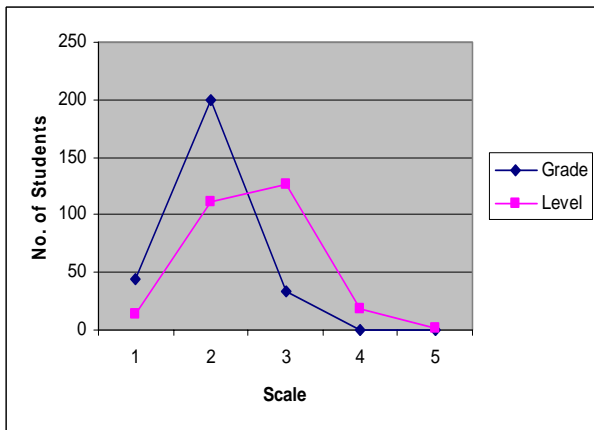


FIGURE 1: Correlation analysis between Grades and Levels of Difficulty

### 3 Conclusion

There is a negative relationship between grades and levels of difficulty (**p-value= 0.00 < 0.05**), but the relationship is weak, i.e. only **-0.181**. This result indicates that students with low grades would most likely state that the course was difficult.

#### References:

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