

INSTRUCTIONAL LANGUAGE AND THE PERFORMANCE OF UiTM CAWANGAN PAHANG DIS STUDENTS IN PHYSICS COURSES

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ABSTRACT

A study was carried out to investigate the performance in physics courses of UiTM Cawangan Pahang Diploma in Science (DIS) students before and after the introduction of English as the medium of instruction. The focus was on three courses taught each in the first three semester of their study. Their codes are PHY104, PHY154 and PHY204. The sets of students studied were those sitting the October 1998, April 1999 and October 1999 examinations, which represent students taught in Bahasa Malaysia, and the April 2000, October 2000 and April 2001 examinations, which represent students taught in English. Data for the study were obtained from the Academic Affair Section UiTM Cawangan Pahang, and analyzed using SPSS. The results showed that for PHY104 and PHY204 there is negative effect on students' performance after the adoption of English as the medium of instruction. How for PHY154 it was found that language of instruction did not influence students' performance in that course.

Key Words: *Students' performance, Language of instruction.*

INTRODUCTION

Universiti Teknologi MARA (UiTM) is the only university in Malaysia adopted English as its medium of instruction in every course offered since its conception in 1956. However, due to the change in education policy on the medium of instruction in school to Bahasa Malaysia (BM) at the end of 1970's, every university started using BM as medium of instruction in 1983. And, at around that time, science courses for Diploma in Science (DIS) program started to be conducted in BM. Towards the end of 1990's, due to the job market pressure as well as the aspiration of the university to produced excellent and globally accepted graduates, the medium of instruction was reverted back to English.

Language of instruction has always been a tool and a challenge in classroom situation (McKee, 1998). It can become an effective tool, if the teacher and learners are very fluent with the jargons and the language styles of the field. However, in opposite situation it is a mountainous challenge to be scalp by both the teachers and the students. In a sense the students need to have language skill in the form of expressing things in speech and in writing (Bhopal, 2002). Hence, initially there were some feeling the change of language of instruction will not be good to the students, as they has been familiarized for eleven years with scientific terms in BM. Thus there is no continuity in the medium of instruction between schools and the university. Hence it might be difficult for the students to comprehend scientific concepts taught in English using English terminologies. This will surely affect their academic achievement in the program.

To be effective in conveying knowledge and information to students, the level of instructional language used by the teachers and the students need to be at par (Ahmad *et al.*, 2001). Then there was another question. Do the lecturers themselves are ready and equipped with the ability to present the scientific concepts and knowledge in English at the same level as the students ability in that language? This was due to the fact that the majority of the senior lecturers have taught the courses for more than ten years in BM. As for the new lecturers, quite a number of them are local graduate that attended education in BM for the whole of their life. Hence, a less abrupt change in the medium of instruction may be more suitable, so that the lecturers have enough time to change themselves.

However, there are scientists who think that the knowledge conveyed will not be influenced by the language being used. They think that the words employed in any language are mere representations of an underlying materials or knowledge that has been discovered or mathematicized (Hoffmann, 2002). Therefore, if the words used were well defined in the language, then the language of instruction would not affect the students understanding in the concepts being conveyed.

To find indicators to the answers of these questions the present study was carried out. The main objective of the study was to check whether there is any change in DIS students' achievement in Physics courses after the introduction of English as the medium of instruction. The study was extended to find statistically whether there is significant effect of language of instruction on the students' achievement in the courses attended.

METHODOLOGY

Sample

In the study the samples were DIS students in six consecutive examinations from October 1998 to April 2001. The first three examinations were for students attended the courses in BM, while the last three attended in the English medium. The three courses considered were PHY104 (Mechanic and Heat), PHY154 (Electric and Heat) and PHY204 (Electricity and Magnetism). Table 1 summarized details of the samples.

Table 1. Details of the Samples. (N is the number of students.)

MEDIUM	EXAMS	PHY104	PHY154	PHY204
		N	N	N
BM	Oct. 1998	104	43	35
	Apr. 1999	33	49	44
	Oct. 1999	60	44	77
ENGLISH	Apr. 2000	35	61	43
	Oct. 2000	71	32	55
	Apr. 2001	88	71	26

Data

The data for each student studied was obtained from the records kept at the Academic Affair Section, UiTM Cawangan Pahang. The data comprises of each student grade and grade points scored for the particular courses studied.

Analysis

The data were analyzed using SPSS to produce two types of results. One is descriptive statistics, which return the mean, standard deviation, percentage etc. From the results comparison of students' achievements before and after the used of English can be made. The second is the analysis of variance (ANOVA) results. From the results we can conclude on the significance of the effect of medium of instruction on the students' achievements.

RESULTS AND DISCUSSIONS

Descriptive Analysis

Table 2 to Table 4 described the mean grade points of the students during the particular examinations, for the three courses PHY104, PHY154 and PHY204 respectively. In the tables SD represents the standard deviation of the mean.

As obviously seen in the tables, there is no trend in the change of mean of grade points for the three courses, either before or after the adoption of English as the medium of instruction. Hence base on these results, it is quite impossible to conclude whether medium of instruction has any effect on students' performance or not. However, for PHY204 drop in the means for the three semesters after the adoption of English, as compared to the previous three semesters is quite observable.

Figure 1 to Figure 3 compares the performance of students in each of the three courses based on the percentage number of students scored the particular grade. For PHY104 as can be seen in Figure 1, there is effect of language of instruction on the percentage number of students scored the various grades. The results showed that higher percentage for students attending the course in BM scored higher grades (grade B to A+). The opposite trend is observed for lower grades (grade F to C), where generally higher percentage of English medium students scored. Base on this, we may say that the change of medium of instruction may cause a negative effect of students' performance in PHY104 examinations.

An entirely opposite result was obtained for PHY154 as shown in Figure 2. The trend showed that higher percentage of English medium students scored higher grades (Grade B to A+). And generally higher percentage of BM medium students scored lower grades. The result indicated a positive effect on the students' performance at PHY154 examinations after the change of the medium of instruction to English.

Where high grades (grade B to A+) are concerned, the results for PHY204 showed that higher percentage of BM medium students scored the grades. For lower grades an identical trend as in PHY104 is observed. This is seen in Figure 3. Hence, the results showed negative effect of English as medium of instruction to students' performance in PHY204 examinations.

Table 2. Descriptive Results for PHY104

MEDIUM	EXAMS	GRADE		POINTS	
		Mean	SD	Minimum	Maximum
BM	Oct. 1998	1.571	0.664	0.67	3.00
	Apr. 1999	1.893	0.883	0.67	4.00
	Oct. 1999	2.209	0.540	0.67	3.33
ENGLISH	Apr. 2000	2.217	0.951	0.67	4.00
	Oct. 2000	1.985	0.893	0.67	4.00
	Apr. 2001	2.122	0.807	0.67	4.00

Table 3. Descriptive Results for PHY154

MEDIUM	EXAMS	GRADE		POINTS	
		Mean	SD	Minimum	Maximum
BM	Oct. 1998	1.967	0.951	0.67	4.00
	Apr. 1999	2.712	0.893	0.67	4.00
	Oct. 1999	2.390	0.807	0.67	4.00
ENGLISH	Apr. 2000	2.467	0.924	0.00	3.67
	Oct. 2000	1.894	0.979	0.67	4.00
	Apr. 2001	2.494	0.979	0.67	4.00

Table 4. Descriptive Results for PHY204

MEDIUM	EXAMS	GRADE		POINTS	
		Mean	SD	Minimum	Maximum
BM	Oct. 1998	2.467	0.926	0.67	4.00
	Apr. 1999	1.894	0.575	0.67	3.33
	Oct. 1999	2.494	0.860	0.67	4.00
ENGLISH	Apr. 2000	1.412	0.737	0.67	3.33
	Oct. 2000	1.836	0.785	0.67	3.33
	Apr. 2001	1.706	0.829	0.00	3.00

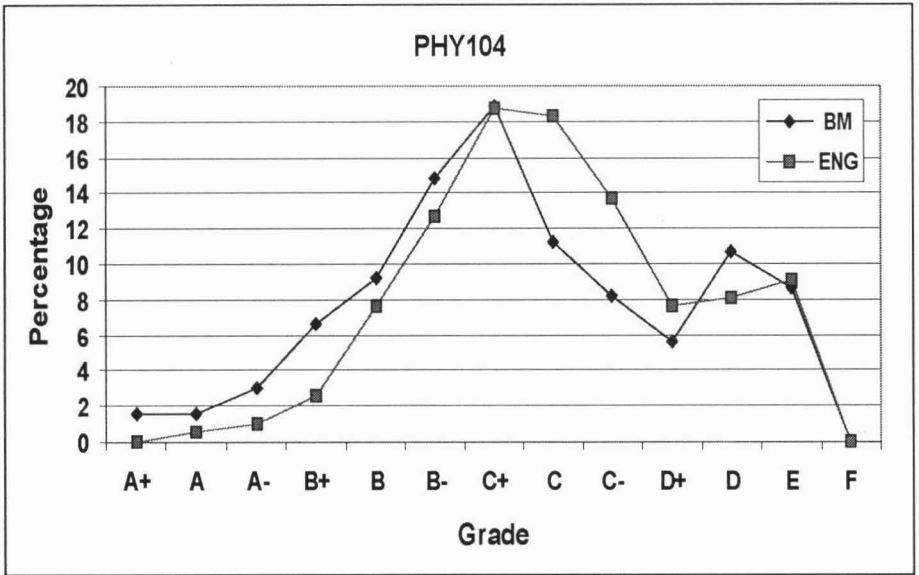


Figure 1. Percentage of Students Scoring the Various Grades at PHY104 Examinations.

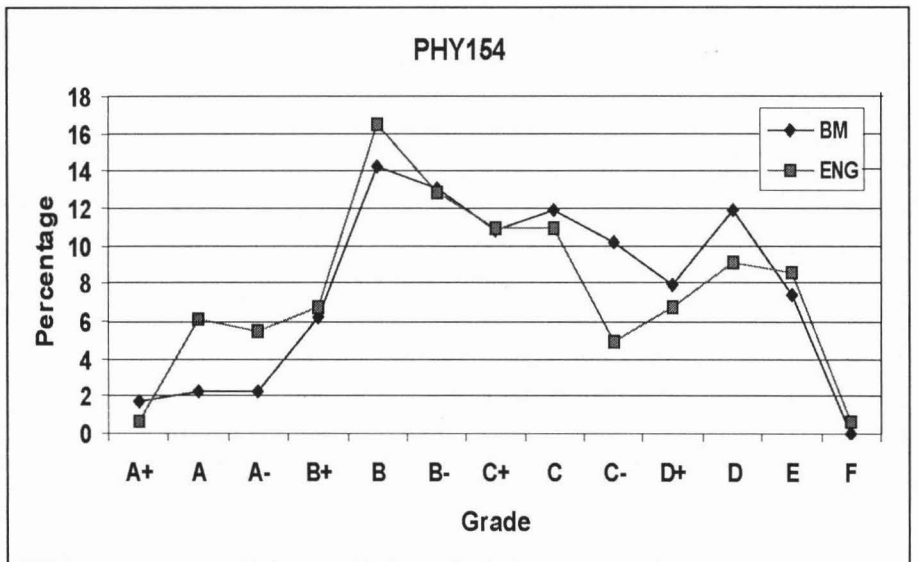


Figure 2. Percentage of Students Scoring the Various Grades at PHY154 Examinations.

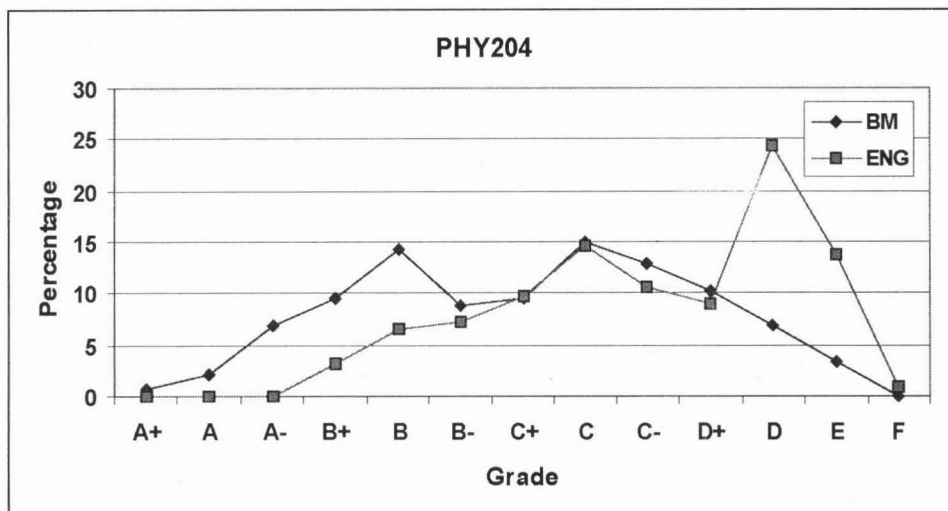


Figure 3. Percentage of Students Scoring the Various Grades at PHY204 Examinations.

As a consequence of the discussions with regards to the three figures above, it seems that the effect of the medium of instruction on students' performance based on grade scored is course dependent. However, we can look at the effect from another point of view, such as the overall passing percentage before and after the conversion to English as medium of instruction. Table 5 compares the percentage of passes with at least grade D in each of the three courses during the examination periods studied against the medium of instruction used. From the table it is obvious that the results suffer drops in passing percentage for the three courses after adopting English as the medium of instruction. The drop is about 0.5% in PHY104, 2% in PHY154 and 11% in PHY204. This is an indicator of negative effect.

Table 5. Percentage of students passed each of the courses.

MEDIUM	PERCENTAGE OF PASSES		
	PHY104	PHY154	PHY204
BM	91.33	92.61	96.60
ENGLISH	90.86	90.85	85.38

Significant of the Effect of Medium of Instruction

In this study the hypothesis was that there is a negative effect on students performance after English was used as the medium of instruction. Table 6 presents the results of the analysis for the test of the equality of the variances. In the test equal variances were assumed. Results of t-test for equality of means are also incorporated in the table. For PHY104 there is a significant different in the means of the grade points scored by the students before and after the usage of English. Thus it can be concluded that there is a negative effect on the students' performance at PHY104 examinations. However for PHY154, the conclusion that can be derived from Table 6 is that the means of the grade points before and after the adoption of English is the same. This means that language of instruction does not influence students' performance in PHY154 examinations. For PHY204 it was found that the

means of grade points before and after using English as medium of instruction is different. This means that there is a reduction in the students' achievements after the introduction of English as medium of instruction in PHY204.

Table 6. Results for Test of Variances and t-test for PHY104, PHY154 and PHY204.

Course	1 LEVENE'S TEST For Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Difference	Lower	Upper
PHY104	7.943	0.005	-2.222	388	0.027	-0.1834	0.255E-2	-0.3457	2.11E-2
PHY154	2.832	0.093	1.726	297	0.085	0.1820	0.1054	2.54E-1	0.3894
PHY204	0.331	0.566	-6.609	277	0.000	-0.6570	0.941E-2	-0.8527	-0.4613

The observation in present study is based on the assumption that language of instruction is the only variable that affects the students' performance. In real situation, however, other variables such as students' academic background before entering the university and the lecturers may also contributed significantly to the students' achievements in the courses' examinations. Since the students accepted to enrolled in the DIS program attained at least the minimum requirement set by the university, we can safely assumed that they are of equivalent academic background before entering the university, irrespective the date of intake. As for the lecturers teaching the various courses, it was assumed that they are at the same level of competency in the subject matter. Hence, these support the validity of the assumption made earlier.

Suggestions

The study shows that language of instruction affects students' performance in the courses they attended. This may be due to the lack of competency in the language, that forbid them to easily understand the subject matter being taught. And they may also face difficulty in understanding and answering questions in examinations. Thus to enhance students' performance, students' competency on the language of instruction need to be raised before attending the course. Therefore a diagnostic test needs to be developed to filter students with such language difficulty, and provide them with an appropriate pre-requisite language course.

As for the teaching staff, every opportunity need to be made available for them to enhance their competency in the language of instruction for the courses.

The present study was limited to three courses in Physics. Hence the conclusion will be limited to the present study scope. A more comprehensive study on all courses in other fields, and involving all other UiTM branches offering DIS would yield more far-reaching conclusions.

CONCLUSIONS

From the results of the study it can be concluded that

- i. Students' performance in terms of grade obtained in PHY104, PHY154 and PHY204 are affected by the change of language of instruction from BM to English.
- ii. The change of language of instruction from BM to English has reduced the percentage of passes for PHY104 by 0.5%, PHY154 by 2% and PHY204 by 11%.
- iii. For the range of the period studied, there is a significant different in the means of grade point scored by students for PHY104 and PHY204 examinations before and after the adoption of English as the medium of instruction. It showed a negative effect on the students' performance.
- iv. There is no different in the means of grade points scored by students for PHY154 examinations before and after the used of English as medium of instruction. Therefore, language of instruction has no influence on students' achievements in PHY154 examinations.

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