

CURRICULUM IMPLEMENTATION ACROSS GENDER IN EDUCATION**IKHSAN OTHMAN (PhD)***Faculty of Education and Human Development Sultan Idris Education University
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Malaysia***ABSTRACT**

All school students no matter what kind their gender are assets for their country as they are future human capital for nation development. Human capital can be developed through education. Therefore no student should be left behind in education. Nowadays most countries are reinforcing gender stereotypes in education. Therefore curriculum used in the education system should be democratic and should have no gender bias in its content and implementation. Discussion in this article is on the issues about democratization in education focusing on gender equality in curriculum implementation base on a case study. The study was done to identify whether gender equality do exist in curriculum implementation. The participants in the study were groups of students from a selected year 5 primary schools comprised of 48 male and 53 female. Interventions were done to the participants in the form of teaching and learning processes to acquire knowledge of science (KOS) and science process skills (SPS) in Year 5 Science curriculum. Multivariate analyzes MANCOVA was used to analyze the collected data. Pretest scores were used as covariate. The findings of the study show that the teaching and learning processes had increased students learning achievement to acquire KOS and SPS. Female students scored higher than male students on both KOS and SPS. From the multivariate analyses, $\lambda = .614$, at $F_{(2, 96)} = 30.174$, $p = .000$ show that there is a significant difference on the achievement between male and female students. Results from analyzes using univariate test on KOS-test score show $F_{(1, 97)} = 54.030$, $p = .000$ and SPS-test score $F_{(1, 97)} = 11.507$, $p = .001$ show that the significant difference mean scores between male students and female students were on KOS-test and SPS-test. Basically, the results of the study show that the teaching and learning processes have positive impacts on students' learning achievement but anyway there seem issue regarding with gender bias on students' achievement. Further study should be done to get clearer perspective regarding with the matter.

Keywords: *Curriculum implementation, gender.*

1.0 INTRODUCTION

Every country has an intension to make its peoples as human capital for nation development. In the context of modern world and globalization, higher quality of human capital has become a necessity and priority. Every people no matter what kind of gender is an asset for the nation. Therefore most countries abide the principle of gender equality and belief that the principle will come to reality through education. In Malaysia for instance, education is considered as a continuous effort towards enhancing human potentials in an orchestrated manner in order to create harmonious individuals who are well balanced and equipped intellectually, spiritually, emotionally and physically (Malaysia Ministry of Education, 2006). A well and harmonious peoples are peoples who posses diligence personality and able to enjoy physical and spiritual sustainability. At the same time the peoples will also posses competencies, feel grateful and ready to face challenges and competitions as well as making effort to solve and overcome the incoming problems. The peoples will also have stronger sense of self-esteem and cannot be easily swayed by the challenges of globalization or waves of modernization. They are actually precious assets and natural resources for the future nation development.

Education system should undergo enhancement to make it more democratic and friendly to student base on their gender, race, culture and social status for the rationale that they are actually future human capitals for the nation. Great education system is a system that can ensure every student will succeed. No child should left behind regardless of their background including their gender. Therefore teachers have bigger roles to play especially in schools and classrooms to unlock students' as the schools and the classrooms are training ground for the young generations. Teaching and learning activities should be done democratically and should abide the principle of gender equality. Discrepancy as stated by Sadker in Chapman (2013) "Sitting in the same classroom, reading the same textbook, listening to the same teacher but boys and girls receive very different educations." should never happen and should be avoided especially in Malaysia for instance which is reinforcing gender stereotypes in education.

2.0 RESEARCH

2.1 Background

Generally gender inequality can occur in students' activities as well as in their subject areas. In learning Mathematics and Sciences for instance, there was seen different patterns of boys and girls

in term of their participation and achievement. Young boys are seen to be more aware on physical and spatial than girls can do while girls are more social and learn language faster than boys (Strauss, 2005). Furthermore, boys focus more on tasks, while girls focus more on processes (Reed, 2014). At school, girls are socialized to be feminine and ideal. They are praised to be quiet, clean, neat and calm. Boys are persuaded to be more vocal, brave, active and independent which are different from girls. In nature, biological growth rate between boys and girls is not equal and therefore it influences their potentials and performance (Reinhartz & Beach, 1998). Therefore students' performance in education differs according to gender.

In England almost half of state-funded mixed schools are 'reinforcing gender stereotypes' which shows that gender equality in education is taken into consideration. That is why it becomes issues when the effort done did not really meet the required intension. Gender bias is a UK-wide issue, when it is evidently happened in Wales, Scotland and Northern Ireland (Gill, 2013). These issues also found in Canada and British Columbia as well (Chapman, 2013). Performance discrepancies between male students and female students in education become popular. In 2005 female university students in United State were higher than male, and these phenomena were also found in other countries like United Kingdom and Canada. In Malaysia, Bhasah Abu Bakar (2002) realized that percentage of female students entering higher education institutions is higher than male students; and the scenario reflects on gender's performance in education or in their learning processes at schools. Finding of a study by Sanda Kumari (2002) provides evidences that gender bias exist in learning material used in curriculum implementation. These kinds of inequality have consequences on classroom climate and further on students learning processes, and student's learning achievement.

Chapman (2013) suggested that the modifications could be done to make students' learning environment more conducive and thus minimize discrepancies. Teachers need to be more aware of any tendency regarding with students gender-biased phenomena. That is when teachers have recognized any student's gender-biased behavior; the student need to be provided with something to help them change. Other than that, strategies should be suggested to teachers to change the students' behaviour (Chapman, 2013). Finally, efforts need to be made to combat gender bias in educational materials such as in textbooks, multimedia materials and other teaching and learning materials. Alternatively Reed (2014) suggests the use of technology as strategies for teachers to make

curriculum relevant to real world concerned. Anyway be sure that the use of technology also must be free from any gender bias phenomena.

2.2 Research Questions

Base on the preceding discussion, this case study aims to identify randomly whether teaching and learning activities had any element of discrepancy from gender equality point of view. The study embarked on teaching and learning Year 5 primary school Science curriculum in a selected primary school in Malaysia. The study was carried out to answer the following research questions:

- (a) Are specified teaching and learning processes to acquire knowledge of science (KOS) in primary school Science curriculum show gender equality?
- (b) Are specified teaching and learning processes to acquire science process skills (SPS) in primary school Science curriculum show gender equality?

2.3 Null Hypotheses

Base on the research questions, research hypotheses were stipulated as follows:

Ho(1) : There is no significant difference on students' achievement in KOS, base on gender in the specified teaching and learning processes.

Ho(2) : There is no significant difference on students' achievement in SPS, base on gender in the specified teaching and learning processes.

3.0 METHODOLOGY

This study was done to identify the existence of gender equality in curriculum implementation. The study embarked on teaching and learning of Science subject in a selected primary school. The study was done using one-group pre test and posttest design involving a single group. That is pretested (O_1), exposed to a treatment (X) and then post tested (O_2) as follow.

Participant Group	O_1	X	O_2
X :	treatment ,	O_1 :	pretest, O_2 :
			posttest

The success of the treatment was determined by comparing pretest with posttest scores (Gay & Airasian, 2000). The participants for the study were from a selected Malaysia Primary Schools comprised of 48 male and 53 female students in three classrooms. The study just not possible to

randomly assign participants to groups as agreement or permission received for the study need to keep students in the existing classrooms. Therefore randomization was avoided due to the availability of intact classrooms in their natural setting without disruption to classrooms learning.

Intervention was done to the participants in the form of teaching and learning processes of Year 5 Primary School Science curriculum. The intervention was done in a period of eight weeks. Prior to the intervention, a pretest was administered and a posttest was also administered at the end of the intervention.

4.0 DATA ANALYSIS AND FINDINGS

The effect of the intervention was measured based on the students' achievement in acquiring KOS and achievement in acquiring SPS. KOS-Test was used to measure students' achievement in acquiring KOS. SPS-Test was used to measure students' achievement in acquiring SPS. Both tests were proven to have high reliability for a classroom test. The KOS-Test and SPS-Test been validated by teachers who are specialist in Year 5 Primary School Science subject.

The independent variable in the study is gender, while there are two dependent variables involved. First is students' achievement in acquiring KOS and second is students' achievement in acquiring SPS. Multivariate analyzes is suitable to analyze dataset with more than one dependent variable (Hair, Black, Babin, Anderson & Tatham, 2006). Therefore Multivariate Analyses of Covariance (MANCOVA) was suitably used to analyze the dataset from the pretest and posttest of this study. Scores from pretest are as covariate. Covariate could handle the effect of pre-existing group differences as it reduces the effect by making a compensation and adjustment to the posttest scores of the intervention groups (Coakes & Steed, 2003). Anyway analyses on pretest scores using independent t-test was also done. The result showed that there was no significant difference between male students and female students on KOS pretest scores ($t=-4.232$, $p=.068$) and SPS pretest scores ($t=.177$, $p=.860$). To permit multivariate analyses, the dataset would first be subjected to exploratory data analyses for meeting associated assumptions include normality and homogeneity of regression slopes.

The results of the study reported according to the stipulated research questions and research hypotheses. To illuminate the research questions the null hypotheses were examined. Datasets were analyzed and the findings are summarized in Table 1, Table 2, Table 3, Table 4 and Table 5. Table 1 shows the result of Box's M test while Table 2 shows the result of Levene's test. Box's M test and

Levene's test are exploratory data analyses to meet associated assumptions include normality and homogeneity of regression slopes to permit the use of MANCOVA (Hair, Black, Babin, Anderson, Tatham, 2006). Box's M test should not significant at $p < .001$), to show that the observed covariance matrices of the dependent variables are equal across groups. Levene's test should not significant at $p < .05$ to show that the error variance of the dependent variable is equal across groups (Coakes & Steed, 2003).

Table-1. Box's M Test of Equality of Covariance Matrices^a

Box's M	2.977
F	.971
df1	3
df2	2598430
Sig.	.405

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a Design: Intercept+coKOS+cosps+gender

Table-2 . Levene's Test of Equality of Error Variances^a

	F	df1	df2	p
KOS-Test	.164	1	99	.686
SPS-Test	.234	1	99	.630

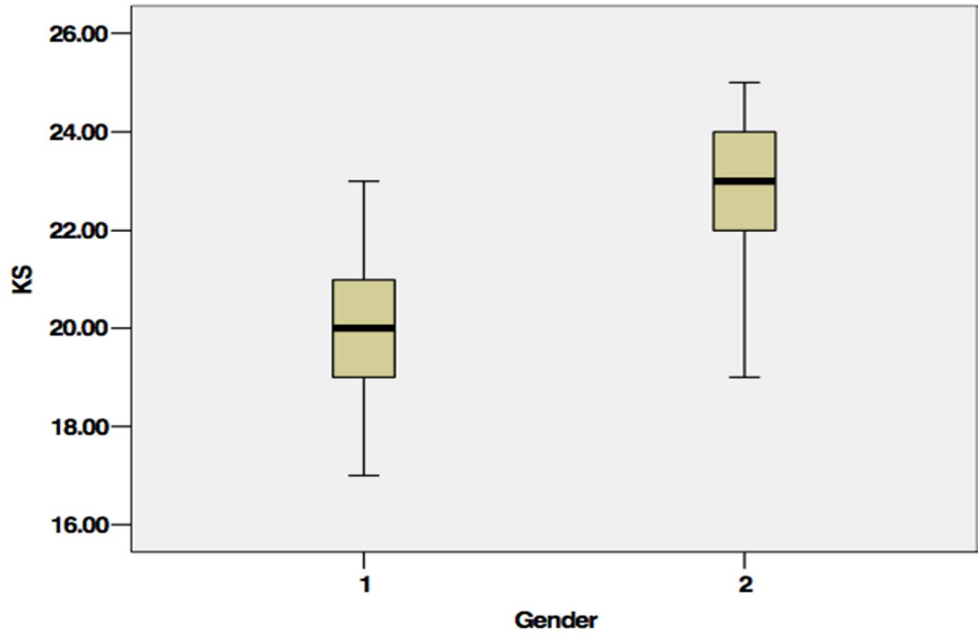
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Table-3. Adjusted Mean Scores Male Students and Female Students

Test	Gender	N	Adjusted Mean Scores (μ)	SD (σ)
KOS-Test	Male	48	20.13 ^a	.227
	Female	53	22.53 ^a	.215
SPS-Test	Male	48	10.76 ^a	.230
	Female	53	11.88 ^a	.218

a Covariates appearing in the model are evaluated at the following values: coKOS = 2.4653, cosps = 2.2970.

Table 3 shows descriptive statistics of the adjusted mean scores for male students and female students on the achievement in KOS-Test and the achievement in SPS-Test. In relation with that, Figure 1 and Figure 2 are box plots for the mean score in KOS-Test and mean score in SPS-Test respectively.



*1 – Male Students, 2 – Female Students

Figure-1. Box Plot Mean Scores on KOS-Test for Male and Female Students

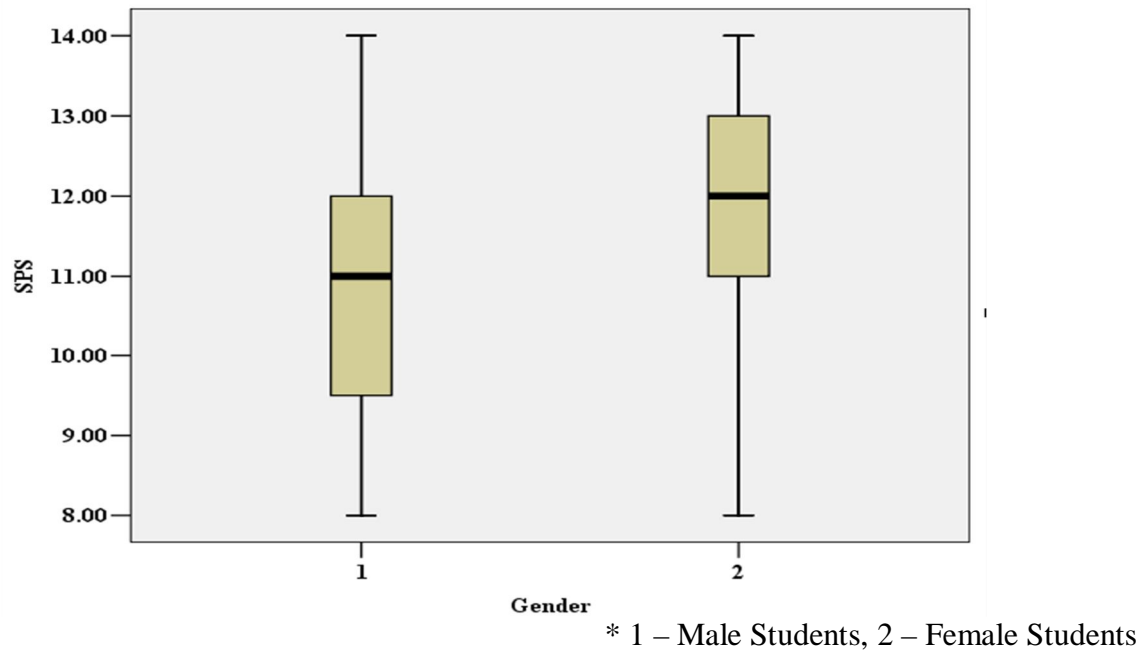


Figure-2. Box Plot Mean Scores on KOS-Test for Male and Female Students

Table-4. Multivariate Tests

Test	Value	F	Hypotheses df	Error df	p
Pillai's trace	.386	30.174 ^b	2	96	.000
WilKOS' Lambda (λ)	.614	30.174 ^b	2	96	.000
Hotelling's trace'	.561	30.174 ^b	2	96	.000
Roy's largest root	.561	30.174 ^b	2	96	.000

* $p < .05$

Each F tests the multivariate effect of gender. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a Computed using alpha = .05

b Exact statistic

Table-5. Univariate Test

	Dependent Variable		Sum Squares	df	Mean Square	F	P
Gender	KOS-Test	Contrast	120.931	1	120.931	54.030	.000*
		Error	217.108	97	2.238		
	SPS-Test	Contrast	26.586	1	26.586	11.507	.001*
		Error	244.733	97	2.310		

* $p < .05$

The F tests the effect of gender. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

a Computed using alpha = .05

Research Question (a): Are specified teaching and learning processes to acquire knowledge of science (KOS) in primary school Science curriculum show gender equality?

Ho(1) : There is no significant difference on students' achievement in KOS, base on gender in the specified teaching and learning processes.

Base on Table 3 above, adjusted mean score on KOS-Test for female students ($\mu = 22.53$, $\sigma = .215$), which is greater than adjusted mean score on KOS-Test for male students ($\mu = 20.13$, $\sigma = .227$). Further multivariate analyses done to identify whether the difference in the scores between male students and female students is significant. Table 4 presents the result of the multivariate analyses. Base on the results in Table 4 the value $\lambda = .614$, at $F_{(2, 96)} = 30.174$, $p = .000$ shows that there is a significant difference mean scores between male students and female students. From univariate test result as in Table 5, there significant difference mean score between male students and female students were on KOS-Test $F_{(1, 97)} = 54.030$, $p = .000$. Therefore Ho(1) was rejected. The analyses illuminate the Research Questions (a). The teaching and learning processes has significant effect on students' achievement in acquiring KOS (knowledge of science) between male students and female students. It seems like teaching and learning processes gave more benefit to the female students compare to the male students.

Research Question (b): Are specified teaching and learning processes to acquire science process skills (SPS) in primary school Science curriculum show gender equality?

Ho(2) : There is no significant difference on students' achievement in SPS, base on gender in the specified teaching and learning processes.

Adjusted mean scores on SPS-Test for female students ($\mu = 11.88$, $\sigma = .218$). It is also greater than adjusted mean score on SPS-Test for male students ($\mu = 10.76$, $\sigma = .230$). Female students achieved better than male students. Further multivariate analyzes done to identify whether the difference in the scores between male students and female students is significant. Table 4 presents the result of the multivariate analyses. From univariate test result as in Table 5, there significant difference mean score between male students and female students were on SPS-Test $F_{(1, 97)} = 11.507$, $p = .001$. Therefore Ho(1) was rejected. The analyses illuminate the Research Questions (b). The teaching and learning processes has significant effect on students' achievement in acquiring SPS (Science Process Skills) between male students and female students. It seems like teaching and learning processes gave more benefit to the female students compare to the male students.

5.0 CONCLUSION, DISCUSSION AND SUGESTION

From the findings of this study, the teaching and learning processes markedly have significant impact on students' achievements. In addition, the findings also revealed that there is a significant difference on students' achievement base on gender in acquiring knowledge of science (KOS) as well as in acquiring science process skills (SPS). There seems issue on gender bias amongst the students, although they followed the same teaching and learning processes with similar content coverage and within the same duration of treatments. Prior to this, finding from Ikhsan Othman (2011) also showed that the implementation of Science curriculum with five-phase constructivism model seem to be biased or more beneficial to female students rather than to male students. These findings are also in parallel with Scantlebury (2009) that gender bias can occur within subject areas and school activities such as in Mathematics and Sciences.

Further study by involving more subjects taught to students should be done to get clearer perspective regarding with this matter. Teaching and learning activities should show democratic effect on student's achievement. Every student no matter what kind their gender is an asset for the

nation. Mixed schools as found in Malaysia and also in other countries, are reinforcing gender stereotypes in education. Steps should also be taken to improve quality of teaching and learning processes so as curriculum implementation will become more democratic and give more opportunities towards enhancing student's potentials for the production of quality human capitals who can contribute to their nation development.

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