CHAPTER 4

RESULTS

Results of the pre- and posttests conducted with a hundred and thirty-three Form One students are presented in this chapter. The results are presented in three sections. The first section deals with the comparisons of scores obtained by the students in the experimental and the control groups as well as the scores obtained by boys and girls on the MVQ and the SAT in the pretests. The second section deals with a similar discussion but for the posttests. The third section describes the levels of moral reasoning in the five areas of moral values obtained by the students in the experimental group based on the pretest and posttest.

Scores on the Pretests

The pretests were conducted one week prior to the beginning of the first science lesson. When the pretests were conducted, it was found that only Sekolah Menengah Bukit Bandaraya had started some lessons on laboratory rules and regulations ; other schools had not begun any lessons.

The pretests were conducted to determine whether initial differences existed between students in the experimental and control groups as well as between boys and girls with regards to their moral values and academic performance.

MVQ and SAT scores for the
experimental and control groups

The results on the MVQ and SAT are shown in Table 4. ests were used to test for significant difference between mean score of the experimental group and the mean score the control group on both the MVQ and the SAT.

TABLE 4

T-test comparisons between
the experimental and control groups on the
MVQ and SAT pretests

	Group		t-test	
	Expt	Control	t	p
Mean	105.63	105.15	0.32	0.83
SD	13.52	11.68		
Mean	10.18	9.38	1.32	0.19
SD	3.58	3.41		

As shown in Table 4, the experimental group has a an MVQ score of 105.63 and a standard deviation of 13.52 whereas the control group has a mean MVQ score of 105.15 and standard deviation of 11.68. The standard error of the ifference between the two means was calculated and found to 2.16. The pooled-variance estimate was used because the F shows that the population from which the two groups

selected have the same variances. The t-value of 0.22 not significant at $p < .05$. This shows that there was no significant difference between the mean score of the experimental and that of the control group on the MVQ.

As shown in the same table, the experimental group has mean SAT score of 10.18 and a standard deviation of 3.58 whereas the control group has a mean SAT score of 9.38 with standard deviation of 3.41. The standard error of the difference between the two means is 0.61. The t value of .32 taken from the pooled variance estimate is not significant at $p < .05$ level of significance. This shows that there was no significant difference between the mean score of the experimental and that of the control group on the SAT. Based on the two results above, it can be assumed that there were no initial differences between the students in the experimental and those in the control group with regards to their moral values and academic performances.

MVQ and SAT scores among students in the Four Schools

Results on the MVQ and SAT in the pretests were also compared among the students in the four schools. Table 5 shows the analysis of variance among the four schools on the MVQ scores with the pretests.

TABLE 5

Analysis of variance among schools on the MVQ pretest scores

Source	D.F.	Sum of Squares	Mean Squares	F ratio	F prob
Between Groups	3	5148.30	1716.10	14.01	.0000
Within Groups	129	15797.36	122.46		
Total	132	20945.67			

Significant Mean Difference

Mean	Group	School 1	School 3	School 4
97.00	School 1			*
104.90	School 3			
105.35	School 4			
114.51	School 2	*	*	*

* denotes the school which has significant mean difference at the .05 level.

Note

School 1 = Sekolah Menengah Petaling
School 2 = Sekolah Menengah Taman Desa
School 3 = Sekolah Menengah Bukit Bandaraya
School 4 = Sekolah Menengah Sri Pantai

Table 5 shows the one way analysis of variance using scores as the dependent variable and the four schools as independent variable has a F-ratio of 14.01 which is gnificant at the p < .05 level. A post hoc Scheffe ltiple comparison procedure was then applied. The results w that there was a significant difference in the moral de of students studying in Sekolah Menengah Taman Desa students studying in the other three schools. There was a significant difference between students studying in olah Menengah Petaling and students studying in Sekolah nengah Sri Pantai.

Table 6 shows the analysis of variance among the four ools on the SAT scores in the pretests. The one-way alysis of variance using SAT scores as the dependent riable and the four schools as the independent variable s F-ratio of 12.28 which is significant at p < .05 el. A post hoc Scheffe multiple comparison procedure was applied. The results show that there was no significant ference between students from Sekolah Menengah Sri Pantai Sekolah Menengah Petaling with regards to their academic formance. However, there was a significant difference ween students from the squatter or low cost flats (SAS) pared to those from the housing estates (HES).

TABLE 6

Analysis of variance among schools on the SAT pretest scores

[illegible]	D.F.	Sum of Squares	Mean Squares	F ratio	F prob
[illegible] groups	3	460.03	120.01	12.28	.0000
[illegible] groups	129	1260.64	9.77		
[illegible]	132	1620.68			

Significant Mean Difference

[illegible]	Group	School 4	School 1
[illegible].14	School 4		
.44	School 1		
[illegible].97	School 3	*	*
[illegible].97	School 2	*	*

[illegible] denotes the school which has a significant mean [illegible]ifference at the .05 level

[illegible]te

[illegible]hool 1 = Sekolah Menengah Petaling
[illegible]hool 2 = Sekolah Menengah Taman Desa
[illegible]hool 3 = Sekolah Menengah Bukit Bandaraya
[illegible]hool 4 = Sekolah Menengah Sri Pantai

MVQ and SAT scores between the sexes

The MVQ and SAT mean scores were also compared between sexes. Table 7 shows the t-test comparisons between boys girls on the pretests for both the MVQ and SAT.

TABLE 7

T-test comparisons between boys and girls on the MVQ and SAT pretests

	Group		t-test	
	Boys	Girls	t	p
MVQ				
Mean	103.64	107.52	- 1.78	0.08
SD	12.78	12.14		
SAT				
Mean	9.95	9.58	0.61	0.54
SD	3.98	2.84		

As shown in Table 7, the girls have a mean MVQ score 107.52 and a standard deviation of 12.14 whereas the es have a mean MVQ score of 103.64 with a standard viation of 12.78. The standard error of the difference ween the two means is 2.18. The variance of the two mples is the same and the t-value of - 1.78 from the led variance estimate is not significant at $p < .05$ l. It shows that there was no significant difference ween boys and girls in their moral values. The mean SAT

...e for the boys is 9.95 with a standard deviation of 3.98 ...reas the girls obtained a mean SAT score of 9.58 with a ...ndard deviation of 2.84. The standard error of the ...ference between the two means is 0.59. The t-value of ... is not significant at $p < .05$ level. The results also ...icate that there was no significant difference between ... sexes on their academic performance.

Table 8 shows the t-test comparisons between boys and ...ls in the experimental group on the MVQ pretest scores.

TABLE 8

T-test comparisons between boys and girls in the experimental group on the MVQ pretests

	Group		t-test	
	Boys	Girls	t	p
Mean	103.03	109.48	- 1.96	0.06
SD	14.53	11.03		

As shown in Table 8, the boys in the experimental ...up obtained a mean MVQ score of 103.03 with a standard ...viation of 14.53 whereas the girls obtained a mean score ... 109.48 with a standard deviation of 11.03 on the ...Q pretests. The standard error of the difference between ... two means is 3.29. A t-value of - 1.96 is not ...gnificant at the .05 level. The results show that there

no significant difference between boys and girls in the experimental group with regards to their moral values.

Scores on the Posttests

Since the four teachers from the different schools planned to finish the first topic at different times, the posttests were conducted within a range of one month from the first school to the last.

MVQ and SAT scores for the experimental and control groups

T-tests were used to test for significant difference in the mean scores for the MVQ and SAT obtained by the two different groups. The results are shown in Table 9.

TABLE 9

T-test comparisons between the experimental and control groups on the MVQ and SAT posttests

	Group		t-test	
	Experimental	Control	t	p
MVQ				
Mean	111.58	106.71	2.17	0.03
SD	13.47	12.34		
SAT				
Mean	13.52	12.18	1.90	0.06
SD	4.82	3.17		

As shown in Table 9, the experimental group has a mean score of 111.58 and a standard deviation of 13.47 whereas the control group has a mean MVQ score of 106.71 and standard deviation of 12.34. The standard error of the difference between the two means is 2.24. The t-value of 2.17 is significant at $p < .05$. Hence, the results show that there was a significant difference between students in the experimental and control groups with regards to their level of moral reasoning after being exposed to the moral dilemma episodes.

As for the SAT scores, the experimental group has a mean SAT score of 13.52 and a standard deviation of 4.82 whereas the control group has a mean SAT score of 12.18 and standard deviation of 3.17. The standard error of the difference between the two means is 0.71. The t-value of 1.90 is not significant at $p < .05$. The results show that there was no significant difference between the experimental and control groups with regards to their academic performance.

MVQ and SAT scores among students in the Four Schools

The posttest results were also compared for the four different schools. Table 10 shows the analysis of variance among the four schools for the MVQ scores on the posttests.

TABLE 10

Analysis of variance among schools on the MVQ posttest scores

Source	D.F.	Sum of Squares	Mean Squares	F ratio	F prob
Between Groups	3	4083.14	1361.05	9.45	.0000
Within Groups	129	18579.22	144.03		
Total	132	22662.36			

Significant Mean Difference

Mean	Group	School 1	School 3	School 4
104.68	School 1			
106.48	School 3			
106.89	School 4			
118.70	School 2	*	*	*

* denotes the school which has a significant mean difference at the .05 level

Legend

School 1 = Sekolah Menengah Petaling
School 2 = Sekolah Menengah Taman Desa
School 3 = Sekolah Menengah Bukit Bandaraya
School 4 = Sekolah Menengah Sri Pantai

Table 10 shows the one-way analysis of variance using scores as the dependent variable and the four schools as independent variable has a F-ratio of 9.45 which is significant at $p < .05$ level. The post hoc Scheffe multiple comparison procedure shows that there was a significant difference in the moral values of students studying in Sekolah Menengah Taman Desa and students studying in the other three schools. No significant difference was found among the students in the three other schools with regards to their moral values.

A comparison made between students from both experimental schools revealed that students studying in Sekolah Menengah Taman Desa had a mean MVQ score which is higher than the mean MVQ score of students studying in Sekolah Menengah Petaling. However, the results show that students from Sekolah Menengah Petaling managed to increase their scores by a larger margin (from 97.0 to 104.68) than students from Sekolah Menengah Taman Desa (from 114.51 to 118.70). Looking at the mean scores of students from Sekolah Menengah Petaling, a score of 97.0 places them at a Stage Three moral reasoning level but a score of 104.68 places them at a Stage Four level. However, students from Sekolah Menengah Taman Desa did not increase that much and remained in the same moral reasoning stage after the treatment.

posttest scores on the SAT were also compared
four different schools. Table 11 shows the
of variance among the four schools on the SAT
in the posttests. The one-way analysis of variance
SAT scores as the dependent variable and the four
as the independent variable has a F-ratio of 36.68
significant at the $p < .05$ level. A post hoc
multiple comparison procedure was then applied .The
show that there was a significant difference in the
performance of students studying in Sekolah
Taman Desa and students studying in the other three
. Significant differences were also found between
studying in Sekolah Menengah Petaling and students
in the other three schools with regards to their
performance.

TABLE 11

Analysis of variance among schools on the SAT posttest scores

[illegible]	D.F.	Sum of Squares	Mean Squares	F ratio	F prob
[illegible] groups	3	1033.17	344.39	36.68	.0000
[illegible] groups	129	1211.11	9.39		
[illegible]	132	2244.29			

Significant Mean Difference

		School 1	School 4	School 3
Mean	Group			
[illegible].85	School 1		*	*
[illegible].46	School 4	*		
[illegible].10	School 3	*		
[illegible].30	School 2	*	*	*

[illegible]notes the school which has a significant [illegible] difference at the .05 level

[illegible]ool 1 = Sekolah Menengah Petaling
[illegible]ool 2 = Sekolah Menengah Taman Desa
[illegible]ool 3 = Sekolah Menengah Bukit Bandaraya
[illegible]ool 4 = Sekolah Menengah Sri Pantai

MVQ and SAT scores between the sexes

T-tests were also used to compare the mean scores on MVQ and SAT for boys and girls on the posttests. Table 12 presents the t-test comparisons between the sexes on posttests for the MVQ and SAT mean scores.

TABLE 12

T-test comparisons between boys and girls on the MVQ and SAT posttests scores

	Group		t-test	
	Boys	Girls	t	p
Mean	107.82	110.80	- 1.31	0.19
SD	13.99	11.84		
Mean	12.48	13.32	- 1.17	0.25
SD	4.54	3.54		

As shown in Table 12, the boys obtained a mean MVQ score of 107.82 and a standard deviation of 13.99 whereas girls have a mean MVQ score of 110.80 with a standard deviation of 11.84. The standard error of the difference between the two means is 2.27. The t-value of - 1.31 is not significant at $p < .05$. Hence, the results show that there is no significant difference between the boys and girls in their moral values after being exposed to the moral dilemma

odes.

Table 12 also shows that the boys have a mean SAT score .48 and a standard deviation of 4.54 whereas the girls ed a mean SAT score of 13.32 with a standard deviation .4. The standard error of the difference between two is 0.72. The t-value of - 1.17 is not significant at p . This implies that there was no significant difference ween the sexes in their academic performance after being ed to the moral dilemma episodes.

Table 13 shows the t-test comparisons between boys and s in the experimental group on the MVQ posttest scores.

TABLE 13

T-test comparisons between boys and girls in the experimental group on the MVQ posttests

	Group		t-test	
	Boys	Girls	t	p
Mean	110.03	113.89	-1.15	0.25
SD	14.38	11.89		

As shown in Table 13, the boys in the experimental p obtained a mean MVQ score of 110.03 with a standard ation of 14.38 whereas the girls obtained a mean score 13.89 with a standard deviation of 11.89 for the MVQ tests. The standard error of the difference between the

means is 3.36. A t-value of - 1.15 is not significant the .05 level. The results show that there was no ificant difference between boys and girls in the mental group with regards to their moral values.

Levels of Moral Reasoning

MVQ scores in the moral areas

Increases in the student's level of moral reasoning in areas of moral values after being exposed to the moral dilemma episodes were also investigated in this study. The areas of moral values were honesty, cleanliness, responsibility, cooperation and compassion. There were thirty items in the MVQ. Each area of moral value is represented by six items. The total score for each area of moral value was obtained by adding the scores on each item in the area. Table 14 shows the t-test comparisons between the scores in the pretests and posttests in the five areas of moral values.

As shown in Table 14, there were significant increases in the mean scores for three areas of moral value, namely cleanliness, responsibility and cooperation.

TABLE 14

T-test comparisons between scores in the pretests and posttests on the five areas of moral values

...as of ... Values	Pretests		Posttests		t-test	
	Mean	SD	Mean	SD	t	p
...ity	22.39	3.72	23.34	3.98	- 1.92	0.06
...ilness	18.66	3.03	19.75	3.63	- 2.12	0.04
...onsibility	21.69	4.88	22.84	4.15	- 2.16	0.03
...peration	21.49	4.69	23.40	3.77	- 3.55	0.00
...passion	21.40	3.31	22.31	3.96	- 1.83	0.07

MVQ scores and stages of moral reasoning

Table 15 shows the percentage of students belonging to different stages of moral reasoning for both the ...erimental and control groups based on their performance ...the pre-and posttests. None of the students were found ...be in Stage One. On the pretests, only 1.5 % (n=2) were ...nd to be in Stage Two and 0.8 % (n=1) in Stage Five. ...rity of the students, 52.6 % (n=70) were found to have ...hed Stage Four while 45.1 % (n=60) were in Stage ...e. According to Kohlberg (1975), children at age ...teen (most of the Form One students) should have reached ...e Four. The above results seemed to support Kohlberg's ...ry.

TABLE 16

Percentage of students in each moral reasoning stage based on their pre- and posttests

Reasoning Stage	Pretests		Posttests	
	No of students	Percent	No of students	Percent
Stage One	-	-	-	-
Stage Two	2	1.5	-	-
Stage Three	60	45.1	39	29.3
Stage Four	70	52.6	93	69.9
Stage Five	1	0.8	1	0.8
Total	133	100.0	133	100.0

Results on the posttests show that the two students who in Stage Two during the pretests had already increased r level of moral reasoning after the treatment. larly, 15.8 % (n=21) of the students in Stage Three has ady increased their level of moral reasoning to Stage . This shows that almost half of the students who were tage Three on the pretests had increased their level of l reasoning to Stage Four after the treatment.

Table 16 shows the percentage of students in the rimental group belonging in each moral reasoning stage he pretests and posttests.

TABLE

Percentage of students in the experimental group responding in each reasoning stage based on the pretests and posttests

Reasoning Stage	Pretests		Posttests	
	No of students	Percent	No of students	Percent
Stage One	-	-	-	-
Stage Two	1	1.5	-	-
Stage Three	30	44.8	13	19.4
Stage Four	36	53.7	53	79.1
Stage Five	-	-	1	1.5
Total	67	100.0	67	100.0

As shown in Table 16, out of 67 students in the rimental group, only 1.5 % (n=1) was in Stage Two during pretest, 44.8 % (n=30) were in Stage Three and 53.7 % 6) in Stage Four. On the posttest, there were 19.4 % 13) of the students in Stage Three and 79.11 % (n=53) in ge Four. Only one student reached Stage Five on posttest.

Table 17 shows the percentage of students at different es of moral reasoning after the posttests.

TABLE 17

Percentage of students at different stages of moral reasoning after the posttests

al reasoning stage	No of students	Percent
ge Two to Four	1	1.5
ain in Stage Three	13	19.4
ge Three to Four	17	25.4
ain in Stage Four	35	52.2
ge Four to Five	1	1.5
Total	67	100.0

As shown in Table 17, one student (1.5%) from experimental group jumped two stages above, from Stage to Stage Four. Seventeen students (25.4 %) managed to ease their moral reasoning stage from Stage Three to and only one student (1.5 %) reached Stage Five. The of the students remained at their respective stage ls, 13 (19.4 %) at Stage Three and 35 (52.2 %) at Stage .

The interpretations of the above mentioned results will iscussed in the following chapter.