CHAPTER - IV

ANALYSIS

&

INTERPRETATION

4.1 INTRODUCTION:

The analysis of data is the heart & soul of any research work. If the collective data are systematically arranged & analyzed through appropriate scientific & statistical technique, the results obtained are scientific & correct. This is where precision counts most.

The analysis of the collected data has been done under two sections:

Section one: deals with results pertaining to major variables such as academic achievement, environmental attitude and cross domain concept map.

Section two: deals with results pertaining to demographic variables such as sex difference, mother's education, father's education, mother's occupation, father's occupation, types of schools etc.

## 4.2 RESULTS ACCORDING TO EACH FINDING :

I. MAJOR VARIABLES :

Hypothesis 1/Ho[1] :

There is no significant relationship between academic achievement of the students and their ability to construct cross-domain concept map. This hypothesis is verified & results are shown in table 1.

Table 1: Significance of 'r' between academic achievement and cross-domain concept mapping:

Variables	N	df	r	Significance
a.a. cdcm	99	97	0.615	0.00

The value of 'r' is found to be highly significant & hence hypothesis is rejected. From this it may be inferred that there exists a significant positive relationship between academic achievement & cross-domain concept mapping. This shows that students who score more in academic achievement are found to have better ability in cross-domain concept mapping.

SCATTER DIAGRAM

AA & CDCM

Figure - 1
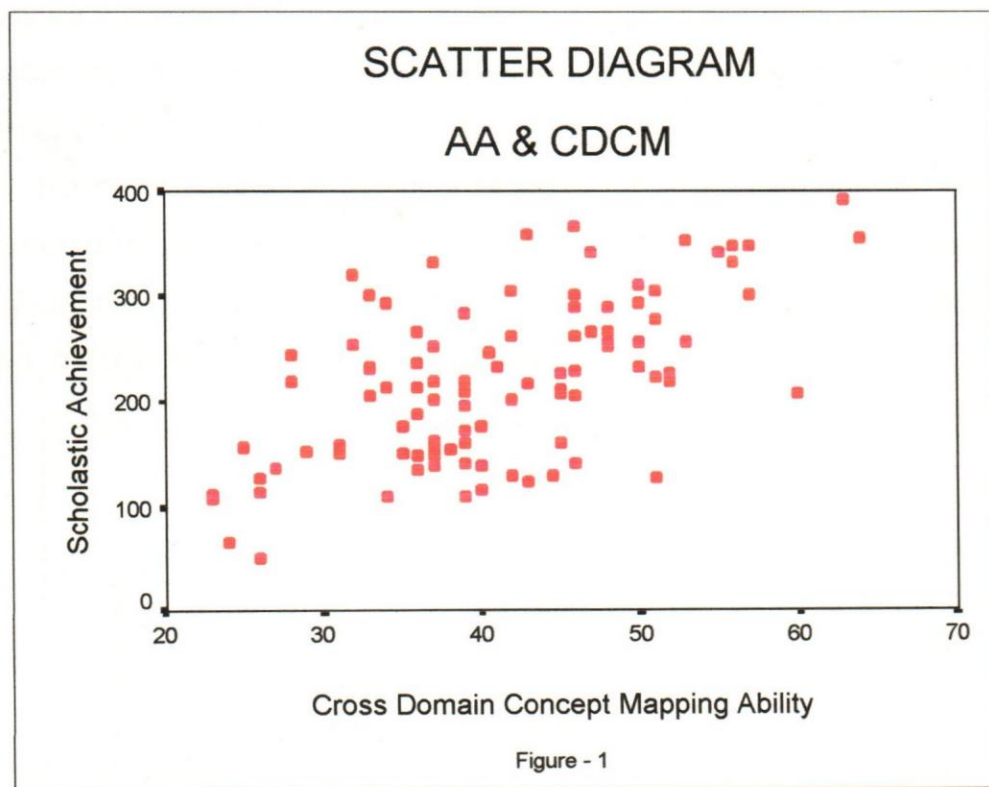
Ho^2 :

According to this hypothesis there is no significant relationship between the academic achievement of students and their environmental attitude. This hypothesis was also verified and the results are shown in table 2.

Table 2: Significance of 'r' between academic achievement and environmental attitude.

Variables	N	df	r	Significance
a.a. env. att.	99	97	0.355	0.000

From the above values it is observed that the value of 'r' is significant and hence hypothesis is rejected. This again shows that there is a significant positive relationship between a.a. & env. att. This further indicates that the students whose academic achievements are good have a better environmental attitude.

Besides testing hypothesis researcher intends to find out the relationship between different components of cross domain concept map and academic achievement. For this values of 'r' have been taken and shown in Table 3 and Table 4, respectively.
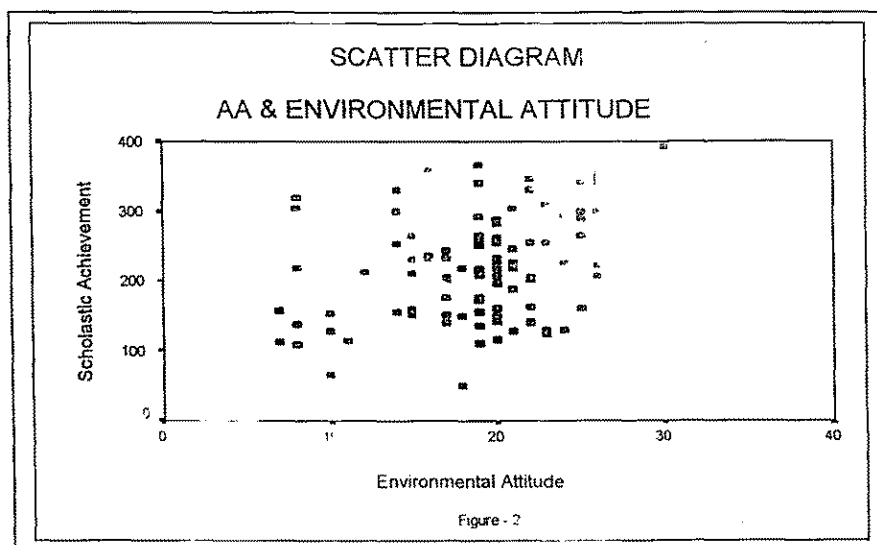

SCATTER DIAGRAM
AA & ENVIRONMENTAL ATTITUDE

Figure - 2

Table 3: Intra correlation between different components of cross-domain concept map. (taken values of 'r')

	Lang	Maths	Science	S.St.	Cult.	Rep.	Concept M.	Att.
Lang	1.00	.296**	.297**	.219*	.211*	.437*	.444**	.137
Maths		1.00	.224*	.211*	.401**	.307*	.435**	.207*
Science			1.00	.258**	.273**	.405**	.568**	.347**
S.St.				1.00	.249*	.151	.217*	.194
Cult.					1.00	.290**	.341**	.378**
Rep.						1.00	.503**	.259**
C.M.							1.00	.335**
Att.								1.00

*   Significant at .05 Level.

**   Significant at .01 Level.

The above results show that nearly all the different components of cross domain concept map have significant relationship with one another except the relationship between language and attitude, social studies and representation and social studies and attitude, which are found to be not significant.

This also shows that interdisciplinary knowledge is a must for constructing cross domain concept map.

But at the same time it is strange to know that social studies and environmental attitude share an insignificant relationship whereas S.St. is considered as a subject which generates the environmental attitude of a child.

Table 4: Intra correlation between different components of a.a. (taken values of 'r')

	S. Lang.	S. Math.	S.Sci.	S.St.	TS
S.Lang.	1.00	.593**	.771**	.755**	.857**
S. Math		1.00	.728**	.698**	.869**
S.Sci.			1.00	.772**	.919**
S.St.				1.00	.906**
T.S.					1.00

The above results show that all the values of 'r' are significant between all the components of a.a. This further indicates that achievement in Science & S.St. play a significant role in a child's a.a.

Table 5: Interrelationship between the components of a.a. and c.d.c.m. (taken value of 'r')

	S. Lang.	S. Math.	S.Sci.	S.St.	TS
Lang.	.456**	.402**	.346**	.325**	.427**
Math	.465**	.333**	.350**	.434**	.438**
Sci.	.448**	.223*	.344**	.387**	.384**
S.St.	.198*	.189	.261**	.275**	.260**
Cult.	.566**	.426**	.436**	.490**	.533**
Rep.	.543**	.252*	.424**	.406**	.443**
C.M.	.525**	.385**	.470**	.461**	.511**
Att.	.382**	.306**	.301**	.289**	.355**

The above results show that except one, i.e., S.St. & S. Math all the components of a.a. & c.d.c.m. share a highly significant relationship between themselves. Almost all the values are significant at .01 level.

II.   DEMOGRAPHIC VARIABLES:

Sex:

Ho[3] :

The hypothesis stating that there is no significant difference between the two sexes in respect of academic achievement and ability to construct cross domain concept map is split into two for the convenience of verification as follows: one with respect to cross-domain concept map and another with respect to academic achievement.

(1)   There is no significant difference between the two sexes with respect to cross-domain concept map.

(2)   There is no significant difference between the two sexes with respect to academic achievement.

These two hypothesis are verified and shown in the Tables 6.1, 6.2, 6.3, 6.4, respectively.

Table 6.1: Significance of 't' between boys & girls in respect of cdcm.

Category	AM	SD	N	df	t	Significance
Boys	40.79	9.07	55	~	-	-
				97	0.46	0.648
Girls	41.65	9.47	44	-	-	-

The value of 't' between boys & girls is found to be not significant and hence the hypothesis cannot be rejected. This shows that there is no significant difference between the two sexes in respect of cross-domain concept mapping. Hence it may be inferred that sex does not play any role in the ability to construct cross- domain concept map of eighth graders.

Table 6.2: Values of 't' between boys & girls in respect of components of cdcm.

Category	't'	Significance
Lang	.216	.829
Maths	.269	.789
Sci.	.112	.911
S.St.	.637	.526
Cult.	.286	.775
Rep.	.603	.548
C.M.	.748	.456
Att.	.633	.528

The values of 't' between boys & girls in respect of different components are not significant. This shows that there is no significant difference between boys & girls in respect of all the components of c.d.c.m.

**Table 6.3:** Significance of 't' between boys & girls in respect of a.a.

Category	AM	SD	N	df	t	Sig.
Boys	219.3818	75.93	55	97	.227	.821
Girls	222.9091	78.30	44			

Again the values of 't' between boys & girls are not found to be significant & hence the hypothesis cannot be rejected. This further infers that there is no significant difference between the two sexes in respect of a.a. and that the sex plays no role in the a.a. of eighth graders.

Table 6.4 : Values of 't' between boys & girls in respect of components of a.a.

Components	't'	Sig.
S. Lang.	.615	.540
S. Maths	.854	.395
S. Sci.	.984	.328
S. S.St.	1.670	.098
T.S.A	.227	.821

The values of 't' between boys and girls in respect of different components are not significant which shows that there is no significant difference between boys and girls in respect of all the components of a.a.

Figure - 3
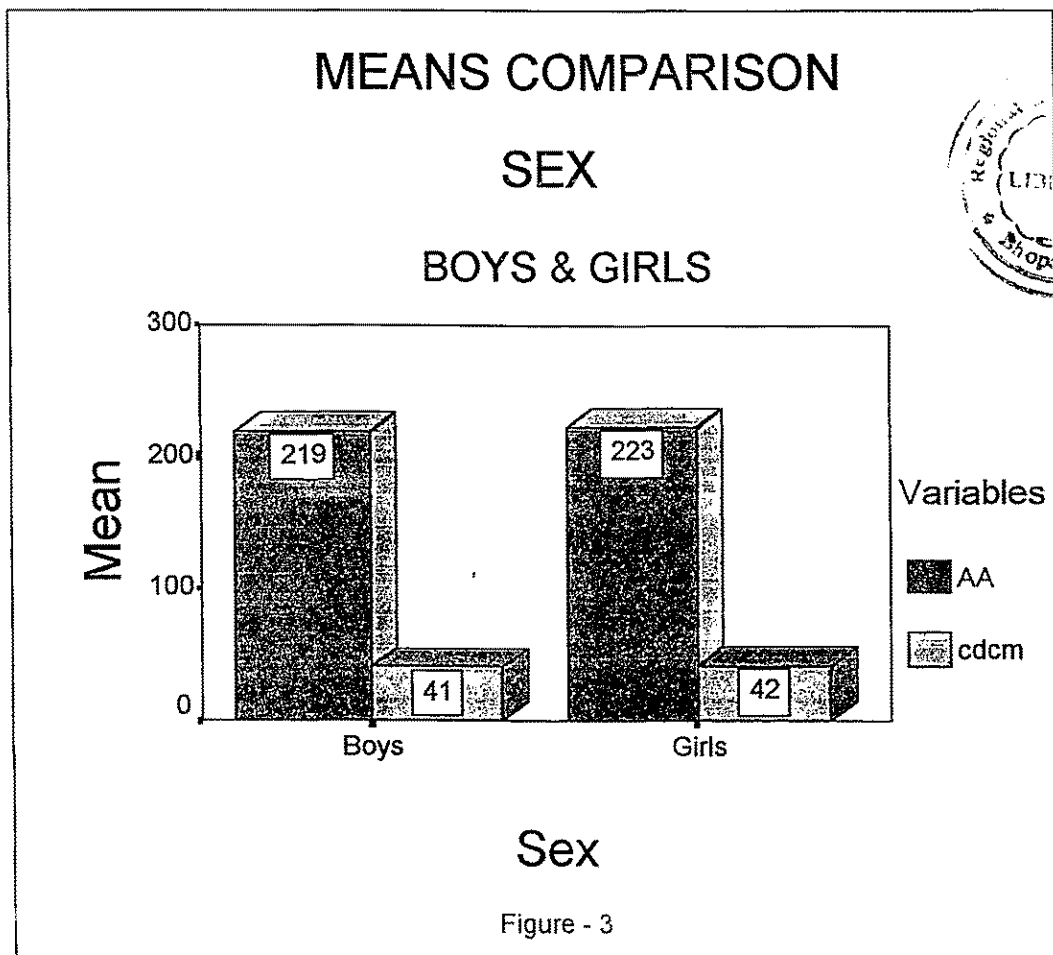
Type of School :

Ho^{7}a :

This hypothesis states that there is no significant difference between the students of two schools in respect to cdcm.

The hypothesis is verified and the results are shown in the table below.

Table 7.1 : Significance of 't' between two types of school in respect to cdcm.

Category	A.M.	S.D.	N	df	t	Sig.
Govt. School	39.00	8.661	42	97	2.046	.044
Private School	42.7719	9.353	57			

Here the value of 't' is found to be significant at (0.5) level hence the hypothesis is rejected i.e. there is significant difference between the eighth graders of two different schools in respect to c.d.c.m^{ng} ability. When means of two schools were compared it was found [govt. (39.00) and private (42.77)] private school students have better ability to construct c.d.c.m.

Table 7.2 : Values of 't' between two types of school in respect to different components of c.d.c.m.

Components	t	Sig.
Lang.	2.210	.029
Math.	1.810	.073
Science	1.488	.140
S.St.	.917	.361
Culture	2.750	.007
Rep.	1.571	.119
C.M.	1.964	.052
Env. Att.	.893	.374

When the values of 't' were compared between two types of school in respect to c.d.c.m. values of Lang., Culture and C.M. (to little extent) the same were found to be significant. On comparing means [govt. Lang. (2.76), private (3.26), govt. Cult. (3.30), pri. (3.85) and govt. C.M. (1.02) and pri. (1.682)]. It was found that private school students are better from the govt. school students with respect to Lang., Culture and Concept Map.

Ho[7] b :

According to this hypothesis there is no significant difference between the students of two schools in respect of academic achievement.

**Table 7.3:** Significance of 't' between two types of school in respect of a.a.

Category	A.M.	S.D.	N	df	t	Sig.
Govt. School	203.1667	75.7628	42			
				97	2.013	.047
Private School	234.0526	75.2276	57			

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The above data shows that the value of 't' is significant at (.05) level and hence the hypothesis is rejected i.e. there is difference between the eight graders of two schools in respect to a.a. When means were compared govt. school (203.166) and pvt. school (234.05), private school students showed better a.a.

Table 7.4: Values of 't' between two types of school in respect to components of a.a.

Components	't'	Sig.
S. Lang.	2.385	.019
S. Maths	2.296	.024
S. Science	.193	.848
S. S.St.	2.796	.006

The above values indicate that Lang., Maths and S.St. are significant. On comparing means the following values were found Lang. Govt. (55.09), Priv. (63.36), Maths Govt. (46.19), Pri. (57.63) and S.St. Govt. (46.14) and Pri. (58.17).

Figure - 4

39
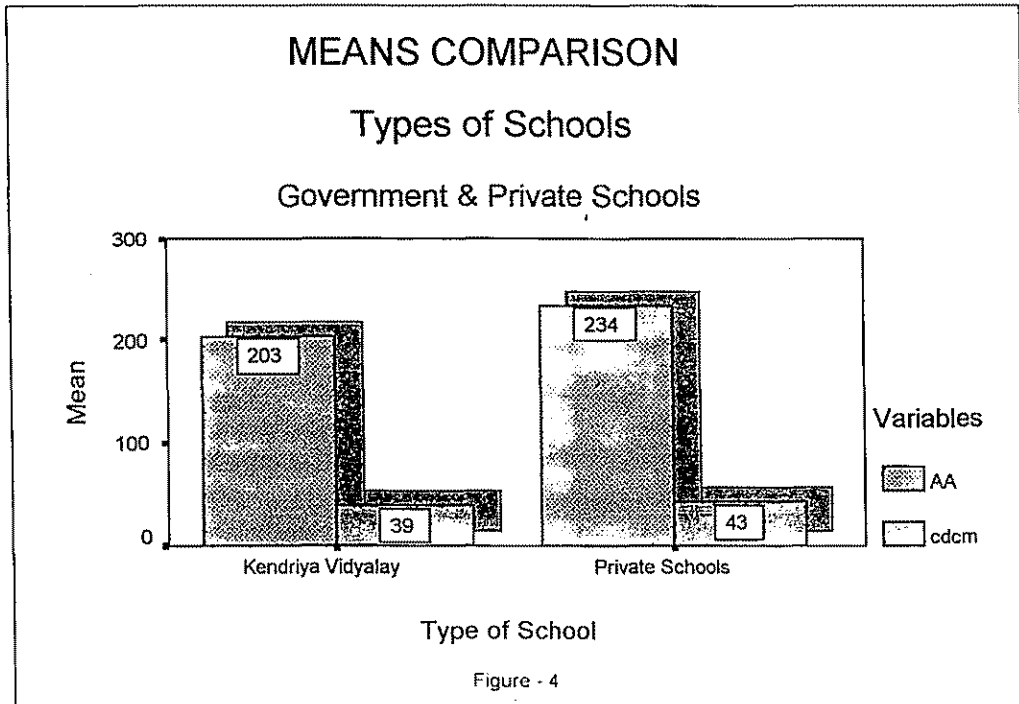
Mother's Occupation:

Ho[8]:

There is no significant relationship between mother's occupation and ability to construct c.d.c.m. and in the a.a. of eighth graders.

Table 8.1: Significance of 't' between mother's occupation in respect to cdcm ability.

Category	A.M.	S.D.	N	df	t	Sig.
House wife	41.0116	9.0349	86	97	.443	.659
Job	42.2308	10.6627	13			

The value of 't' between mother's occupation i.e. housewife and job was found to be not significant, hence the hypothesis is not rejected. This shows that there is no significant relationship between mother's occupation and cdcm of eighth graders.

Table 8.2: Values of 't' between mother's occupation in respect to different components of cdcm.

Components	t	Sig.
Lang.	.089	.929
Maths	.813	.418
Science	.459	.647
S.St.	2.268	.026
Culture	.250	.803
Rep.	.286	.775
C.M.	.398	.692
Env. Att.	.193	.847

When the values of 't' were compared between mother's occupation in respect to different components of c.d.c.m. the value of S.St. was found to be significant, on comparing the means of house wife and job (3.32) & (4.00) respectively it was found that the students whose mother's were working were better in S.St. component of c.d.c.m.

Table 8.3: Significance of 't' between mother's occupation in respect to a.a..

Category	A.M.	S.D.	N	df	t	Sig.
House wife	220.5930	77.2433	86	97	.118	.906
Job	223.3077	7532.42	13			

The value of 't' is not significant and this shows that there is no significant difference between mother's occupation in respect to a.a. of eighth graders.

Table 8.4: Values of 't' between mother's occupation in respect to different components of a.a.

Components	't'	Sig.
S. Lang.	.286	.776
S. Math.	.651	.517
S. Science	.695	.489
S. S.St.	.136	.892

The values of 't' between mother's occupation in respect to different components of a.a. were found to be not significant and hence it can be inferred that mother's occupation has nothing to do with the a.a. of eighth graders.

MEANS COMPARISON

Mother Occupation

House Wives & Job

Figure - 5
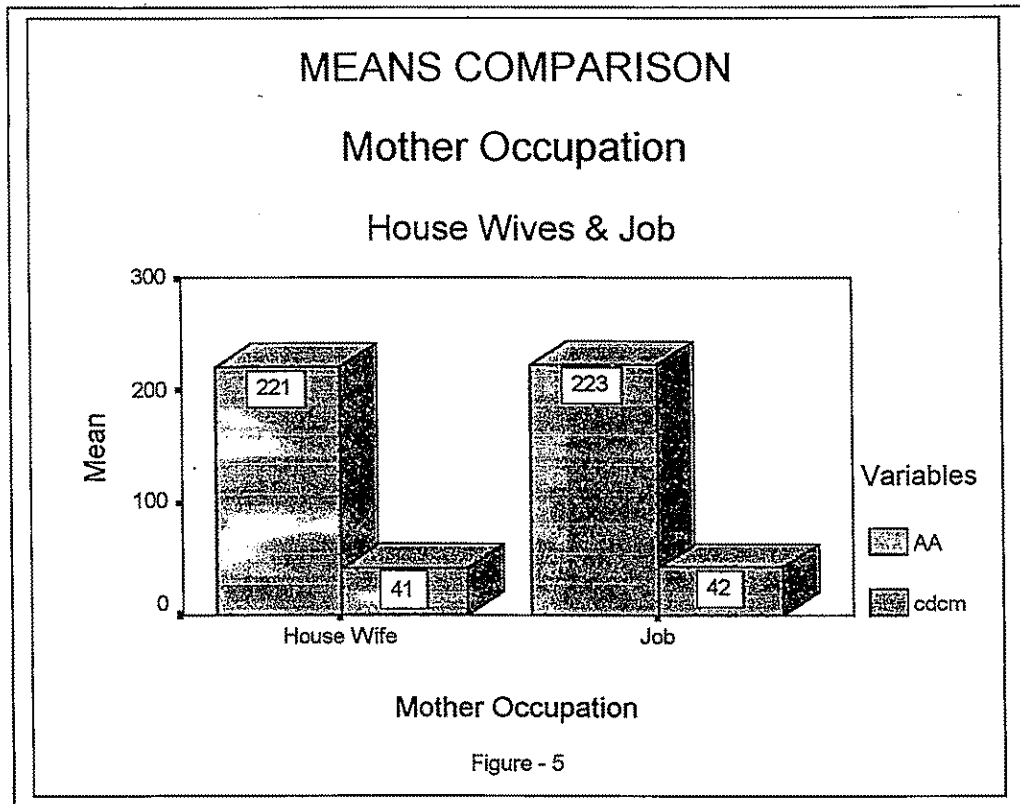
Father's Education :

Ho[9]:

The ninth hypothesis states that there is no significant difference between different categories of father's education in respect of c.d.c.m and a.a. This hypothesis is split into two for the convenience of verification as follows:

1. There is no significant difference between different categories of father's education in respect of c.d.c.m.

2. There is no significant difference between different categories of father's education in respect of a.a.

Father's education has been classified into four categories as follows : (Illiterate-1, Schooling-2, Graduate-3 & Post Graduate-4), respectively.

These hypotheses are verified and shown in table 9.1, 9.2, 9.3 and 9.4, respectively.

Table 9.1: Significance of 'F' between categories of f's education in respect of cdcm.

	Sum of Square	Mean Squares	df	't'	Sig.
Between Group	620.820	310.410	2		
Within Group	7698.761	80.195	96	3.871	.024
Total	**8319.581**		**98**		

The value of 'F' is found to be significant and hence hypothesis is rejected. This shows that there is a significant difference between different categories of father's education in respect of c.d.c.m. From this it may be inferred that father's education do influence c.d.c.m. ability of students.

Table 9.2: Value of 'F' between categories of father's education in respect of components of c.d.c.m.

Components	'F'	Sig.
Lang.	.583	.560
Maths	1.848	.163
Science	4.946	.009
S.St.	3.559	.032
Culture	.074	.929
Rep.	2.522	.086
C.M.	3.753	.027
Env. Att.	1.301	.277

When the values of 'F' between categories of father's education in respect to different components of c.d.c.m. were compared it was found that Science, S. St. and C.M. have significant values.

Table 9.3: Significance of 'F' between categories of f's education in respect of a.a.

	Sum of Square	Mean Squares	df	't'	Sig.
Between Group	60737.99	30368.99	2		
Within Group	514584.74	5360.25	96	5.66	.005
Total	**575322.74**		**98**		

The value of 'F' is found to be significant and hence hypothesis is rejected. This shows that there is a significant difference between different categories of father's education in respect of a.a. From this it may be inferred that father's education do influence a.a. of the students.

Table 9.4: Value of 'F' between categories of father's education in respect of components of a.a.

Components	'F'	Sig.
S. Lang.	2.974	.056
S. Maths	3.052	.052
S. Science	5.285	.007
S. S.St.	7.117	.001

The values of 'F' between categories of f's education in respect of different components are significant. This shows that there is significant difference between different categories of f's education in respect to different components of a.a.

MEANS COMPARISON

Father Education

Figure - 6
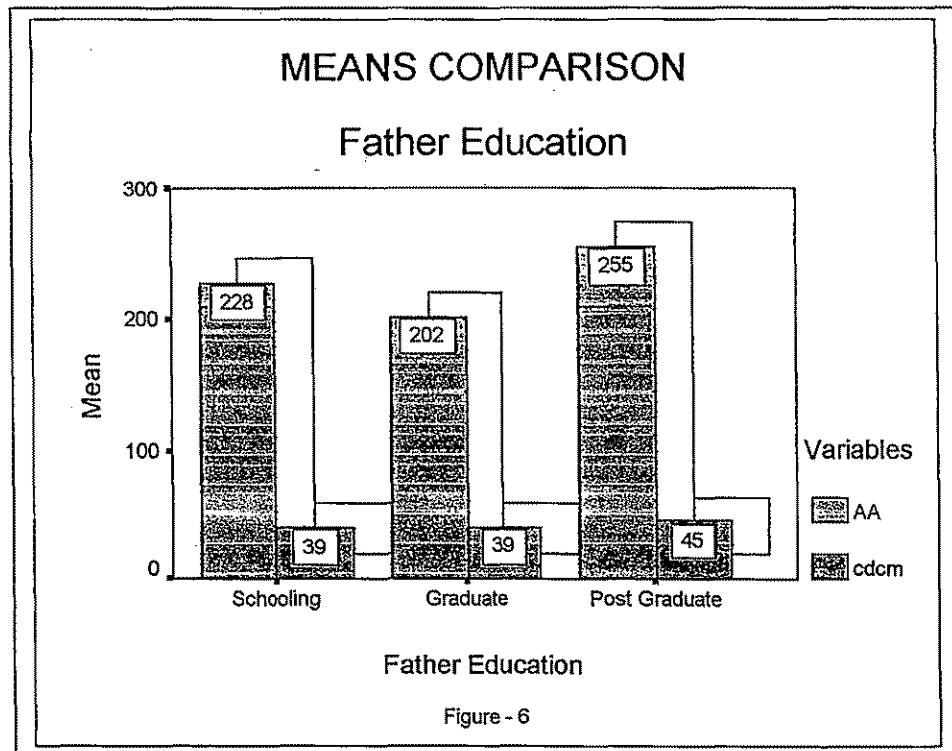
Mother's Education :

Ho^{10}:

This hypothesis states that there is no significant difference between different categories of M's education in respect to c.d.c.m. and a.a. This hypothesis is split into two for the convenience of verification as follows:

1. There is no significant difference between different categories of mother's education in respect of c.d.c.m.

2. There is no significant difference between different categories of mother's education in respect of a.a.

Mothers education is also classified into four categories. Illiterate-1, Schooling-2, Graduate-3, Post Graduate-4.

These hypotheses are verified and the results are shown in the following tables:

Table 10.1: Significance of 'F' between categories of m's education in respect of c.d.c.m.

	Sum of Square	Mean Squares	df	'F'	Sig.
Between Group	490.25	245.12	2		
Within Group	7829.33	81.55	96	3.006	.054
Total	**8319.581**		**98**		

The value of 'F' was found to be significant and hence the hypothesis is rejected. This shows that there is a significant difference between different categories of mother's education in respect of c.d.c.m. ability.

Table 10.2: Value of 'F' between categories of m's education in respect of components of c.d.c.m.

Components	F	Sig.
Lang.	2.502	.087
Maths	2.597	.080
Science	1.157	.319
S.St.	2.841	.063
Culture	1.327	.270
Rep.	2.017	.139
C.M.	5.083	.008
Env. Att.	.406	.667

On comparing all the values except c.m. were found to be significant. This shows that c.m. plays a major role in c.d.c.m^{ng} ability.

Table 10.3: Significance of 'F' between categories of m's education in respect of a.a.

	Sum of Square	Mean Squares	df	'F'	Sig.
Between Group	74935.93	37467.96	2		
Within Group	500386.81	5212.36	96	7.188	.001
Total	**575322.74**		**98**		

The value of 'F' was found to be significant and hence the hypothesis is rejected. This shows that there is a significant difference between different categories of m's education in respect of a.a.

Table 10.4: Value of 'F' between different categories of m's education in respect of components of a.a.

Components	'F'	Sig.
Lang.	3.957	.022
Maths	4.077	.020
Science	7.489	.001
S.St.	7.127	.001 '

The values of 'F' between different categories of m's education in respect of different components are significant. This shows that there is a significant difference between different categories of m's education in respect of components of a.a.

MEANS COMPARISON

Mother Education

Figure - 7
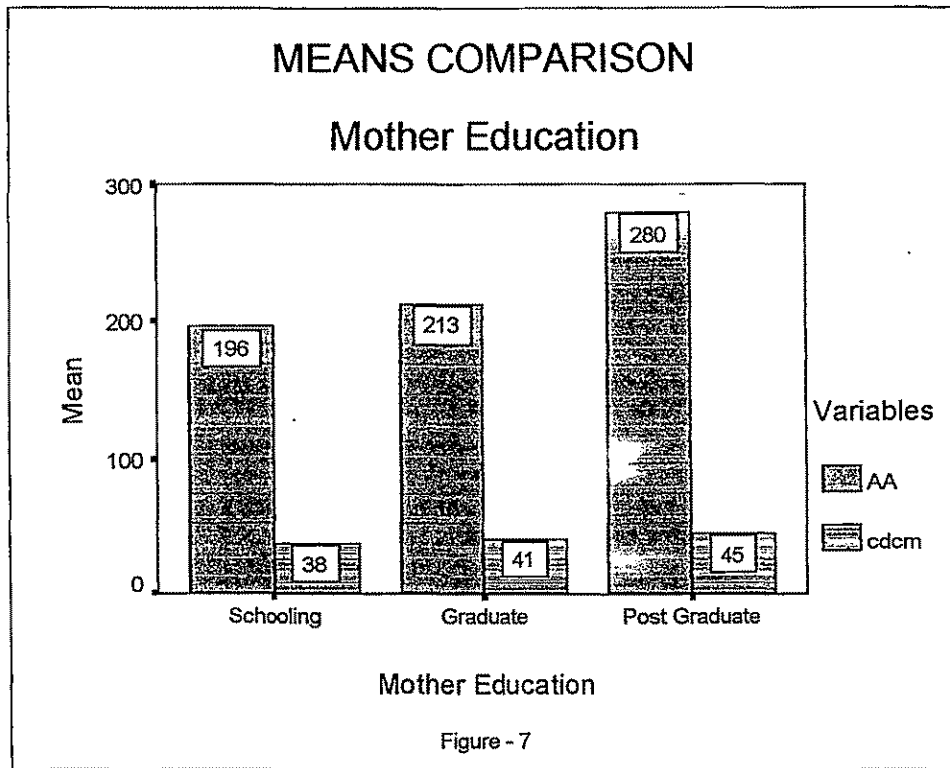
Father's Occupation :

Ho[11]:

This eleventh hypothesis states that there is no significant difference between different categories of f's occupation in respect of c.d.c.m. and a.a. This hypothesis is split into two for convenience as follows:

1. There is no significant difference between different categories of f's occupation in respect of c.d.c.m.

2. There is no significant difference between different categories of f's occupation in respect of a.a.

These hypotheses are verified and shown in table 11.1, 11.2, 11.3 and 11.4, respectively.

For convenience f's occupation has again been divided into two categories Service & Business respectively.

Table 11.1: Significance of 'F' between categories of f's occupation in respect of c.d.c.m.

	Sum of Square	Mean Squares	df	'F'	Sig.
Between Group	75.24	75.24	1		
Within Group	8244.33	84.99	97	.885	.349
Total	**8319.58**		**98**		

The value of 'F' is not found to be significant and hence hypothesis cannot be rejected. This shows that there is no significant difference between different categories of f's occupation in respect of c.d.c.m^{ng} ability.

Table 11.2: Value of 'F' between categories of f's occupation in respect of components of c.d.c.m.

Components	f	Sig.
Lang.	2.772	.099
Maths	1.043	.310
Science	.015	.903
S.St.	1.355	.247
Culture	1.121	.292
Rep.	.184	.669
C.M.	2.880	.093
Env. Att.	.594	.443

The values of 'F' between different categories of f's occupation in respect of different components are not sicnificant, it can be inferred that there is no significant difference between different categories of f's occupation in respect to different components of c.d.c.m.

Table 11.3: Significance of 'F' between categories of f's occupation in respect to a.a.

	Sum of Square	Mean Squares	df	'F'	Sig.
Between Group	16096.97	16096.97	1		
Within Group	559225.77	5765.21	97	2.792	.098
Total	**573322.74**		**98**		

The value of 'F' is not found to be significant and hence the hypothesis cannot be rejected. This shows that there is a significant difference between different categories of f's occupation in respect of a.a. From this it may be further inferred that father's occupation do not influence a.a. of eighth graders.

Table 11.4: Value of 'F' between categories of f's occupation in respect of components of a.a.

Components	'F'	Sig.
S. Lang.	4.047	.047
S. Maths	4.842	.030
S. Science	.238	.627
S. S.St. '	1.594	.210

When different values of 'F' between categories of f's occupation in respect of different components of a.a. were compared the values of Lang. & Maths were found to be significant and Science and S.St. were found to be not significant. From this it can be further inferred that Lang and Maths form an important part of a.a.

MEANS COMPARISON

Father Occupation

Service & Business

Figure - 8
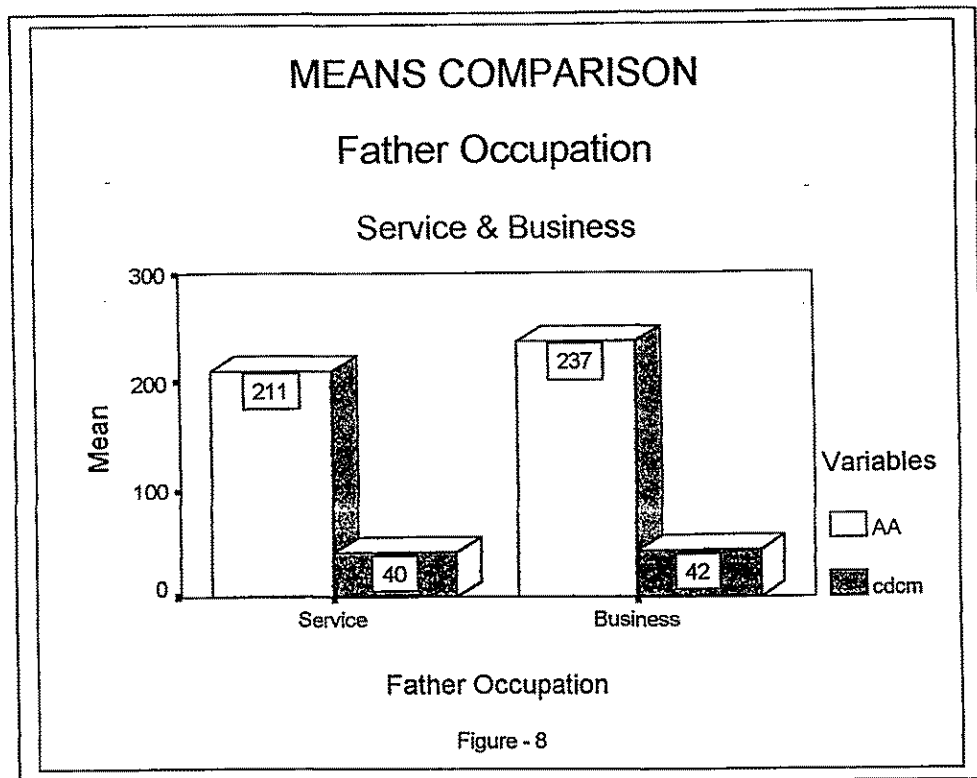
REGRESSION:

The hypothesis stating that the components of cross domain concept mapping ability do not act as predictors of a.a. is verified and shown in following tables.

Table 12: Showing the multiple regression on dependent variable a.a. Variables entered in Step-1: Culture.

			Df	Sum of Sq.	Mn. Sq.		Sig.
Multiple R	0.533	Anova					
R Square	0.284	Regression	1	163178.37	163178.37	38.41	0.0
Adjusted R	0.276	Residual	97	412144.38	4248.91		
St. Error of the estimate	65.18	Total	98	575322.75			

Variables in the Equation :

Variables	B	SEB	Beta	t	Sig.
Culture	40.16	6.48	0.53	6.2	0.00
Constant	75.32	24.4		3.09	0.003

The obtained multiple 'R' is 0.533, which is significant as per the Analysis of variance conducted. The 'f' value is 38.41, which is significant at 0.01 level. As the 't' value of B coefficient of culture is significant at 0.01 level, there is significant multiple correlation between culture, and academic achievement.

The B coefficient is 40.16 and it can be interpreted that for every unit increase of culture, the a.a. is increasing by 40.2 units. As the R square is 0.284, the variance explained by the culture in the criterion a.a. is 28%. As such the culture is influencing a.a. and the regression equation is as follows:

Academic Achievement = 40.16 x Culture + 75.32.

Table 13: Showing multiple regression on dependent variable a.a. variables entered in Step-2, Culture & Concept Map.

			Df	Sum of Sq.	Mn. Sq.		Sig.
Multiple R	0.638	Anova					
R Square	0.406	Regression	2	233855.81	116927.91	32.87	0.0
Adjusted R	0.394	Residual	96	341466.94	3556.95		
St. Error of the estimate	59.6401	Total	98	575322.75			

Variables in the Equation :

Variables	B	SEB	Beta	t	Sig.
Culture	30.576	6.307	.405	4.848	0.00
Concept Map	17.027	3.82	0.373	4.458	0.00
Constant	86.165	22.454	0.405	3.837	0.00

The obtained multiple 'R' is .0.638, which is significant as per the Analysis of variance conducted. The 'F' value is 32.87, which is significant at 0.01 level. As the 't' value of B coefficient of culture and concept map is significant at 0.01 level, there is significant multiple correlation between culture, concept mapping, Language and a.a.

The B coefficient is 30.576 (culture) and 17.027 (concept map) it can be interpreted that for every unit increase of culture, C.M. and Language the a.a. increases by 30.6 units and for every unit increase of concept map, the a.a. increases by 17.02 units. As the R square is 0.406 the variance explained by the culture in the criterion a.a. is 40%. As such the culture and concept map and lang. are influencing a.a. The regression equation is as follows:

a.a.: 30.57 x Culture + 17.027 x Concept map + 86.165.

Table 14: Showing the multiple regression on dependent variable a.a. Variables entered in Step-3: Culture, Concept Map & Language. ,

			Df	Sum of Sq.	Mn. Sq.		Sig.
Multiple R	0.667	Anova					
R Square	0.445	Regression	3	256117.549	85372.516	25.40	0.0
Adjusted R	0.428	Residual	95	319205.199	3360.055		
St. Error of the estimate	57.966	Total	98	575322.747			

Variables in the Equation :

Variables	B	SEB	Beta	t	Sig.
Culture	29.459	6.145	.391	4.794	0.000
Concept Map	12.798	4.060	.280	3.152	0.002
Language	14.826	5.760	.220	2.574	0.012
Constant	50.928	25.762		1.977	.051

The obtained multiple 'R' is .667, which is significant as per the Analysis of variance conducted. The 'F' value is 25.41 which is significant at 0.01 level. As the 't' value of B coefficient of culture and concept mapping and Language is significant at .01 level, there is significant multiple correlation between culture, concept mapping, Language and a.a.

The B coefficient is 29.45 (culture) and 12.798 (concept map) 4.826 (Language) and therefore it can be interpreted that for every unit increase of culture, C.M. and Language, the a.a. increases by 29.45 units, 12.89 units, and 14.9 units, respectively. As the R square is 0.445 the variance explained by the culture in the criterion a.a. is 44%. As such the culture, concept map and lang. are influencing a.a. The regression equation is as follows:

a.a.: 29.5 x cul.+ 12.898 x c.m. + 14.9 x Lang. + 50.928.