

**Gendered Impact of Computer Literacy of
Disadvantaged Children and Adolescents (CLDCA)**

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with

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ICT and Gender: MIMAP – Gender Network (Phase III)

ICT and Gender under phase three of the MIMAP- Gender Network (GN) seeks to study the nature and extent of gender differentiation, if any, which is taking place within the context of technological changes in the area of ICT, which are sweeping the South Asian and South East Asian Regions. The objective is to study the gendered impact of the ICT revolution at the micro, meso and macro levels with explicit emphasis on the policy relevance of research. The project is conceived by Prof. Swapna Mukhopadhyay, Director GN Project and Prof. Malvika Kapur of National Institute of Advanced Studies, Bangalore who acted as an expert consultant. The survey data were collected by the ISST research team comprising of Dr. Rajib Nandi, Amita Joshi, Shambhu Ghatak, Suchi Pande, Deepa Rautela and Shanta Gururani.

A background document of the entire project titled 'ICT and Gender with special reference to the Developing Countries' was presented at the Annual Gender Network conference held at the Habitat Centre from Jan 31 to Feb 2, 2004. A review of literature shows that the new technology is neither class nor gender neutral.

An instance of the lack of gender neutrality can be found in situations of firm closures: women employees are usually the first ones to be retrenched. Further, women often do not have as much access to information about new jobs as men do, nor can they move out of their hometowns in search of work with the kind of ease with which their male counterparts can. Indeed, physical mobility appears to be a significant barrier to work participation in ICT, especially for married women. With respect to skill acquisition, a major entry barrier faced by girls in the ICT sector is the reluctance of parents in expending effort and money towards educating their daughters. Often

young girls are led to the belief that computer technology is far more suitable for boys.

However, ICT has one advantage for women over some other kinds of paid work because it gives them an opportunity to work from home. But this might work in two directions: on the one hand it might increase women's actual work participation but on the other hand, it could lead to an increase in the informalisation of woman's work. Another plus point is that generally, work conditions in ICT firms have been found to be usually better than other alternatives and have also been found to be generally conducive towards women.

Apart from providing background documentation and other inputs to the partner organizations, and carrying out sector and country level work with the help of secondary data, the Indian team is currently involved in Gender Impact Analysis of two innovative projects on ICT in the country. One is the Akshaya Project, which is a state government initiative in Kerala designed to spread e-literacy and encourage e-entrepreneurship and e-governance and the other is the CLDCA Project, which assesses Computer Literacy programmes for Disadvantaged Children and Adolescents. This paper is a report on the CLDCA Project.

About the CLDCA Project

This study involves a gendered assessment of the impact of exposure to the new technology among children and young adults in poor communities, using psychometric tests. The Project selected the Computer Literacy program at the India Habitat Centre (IHC), which provides children of disadvantaged communities in Delhi exposure to computer literacy and is partnered by various non – governmental organizations (NGO's) working

among poor communities. The Habitat Literacy Centre (HLC) offers basic exposure training in computers, free of cost, to poor children and young adults in communities where the partner NGOs work and it also provides free training to community based trainers. A few of these NGOs were later used as Extension Centres of the Program. The Community Centre of ISST is located in a slum area in East Delhi, and has been involved in efforts to impart basic knowledge of computers to children and young adults in non-formal and remedial education activities. It has had some of its batches of children trained at the HCL. Currently it is also operating as one of the several Extension Centres of HLC.

The Pilot Phase

Samples for the study were drawn from 13 partner NGO's¹, the ISST community centre and extension centres of HLC, which have been working with children and youth in the slums of Delhi. Children exposed to computer literacy were compared to those who were not, in order to examine the effects of exposure to computer literacy. In order to evaluate the impact a group of psychometric measures which were likely to be sensitive to the anticipated changes were selected. Initially 7 tests² were considered and there was a 5 day training workshop for the ISST research team to understand the nature of the tests, to translate and try out some questionnaires and to administer and score the tests.

¹ Action India, Amba, Baliga Memorial Trust, CASP, Datamation, Deepalaya, Kutumb, Prerna, Steer Foundation, Swati, Raasta, Prerna, YMCA

² The tests initially considered were,

- ? Number Cancellation test to assess attention and concentration. (S.D. Kapoor)
- ? Raven's Progressive matrices (colored and standard) to assess intelligence
- ? Creativity Test (Indian modification to assess visual creativity by Mehdi)
- ? Preadolescent Adjustment inventory (Pareek et al, translated by ISST into Hindi).
- ? Self-Esteem Inventory to assess in general, academic, peer and family spheres (Battle, translated by ISST into Hindi) and a Lie Scale to gauge defensiveness and thereby accuracy of test scores.
- ? Vocabulary Test (Prepared by ISST)
- ? Arithmetic Test (Prepared by ISST)

A pilot study was conducted to examine the feasibility, logistics and time frame of the main study. 12 children under the ISST and CASP programmes were provided computer training and evaluated on the psychological tests before and after such exposure. The lessons drawn from the pilot phase was that (1) all the tests could not be administered in one session, and more than one session was not permitted by the NGOs due to logistic reasons and (2) it was difficult to access the same group before and after exposure due to time and other logistic constraints. It was thus decided that the number of tests be reduced and to have the control (without computer training) and experimental (with computer training) groups separately and match them on relevant variables. The results of the pilot study i.e. the psychometric test performance before and after computer exposure in 12 children are summarized in **Table 1** below:

Table 1: The Results of the Pilot Study

Study Parameters	Before (Mean ? SD)	After (Mean ?SD)	P value
Attention			
Right	50.75? 11.09	51.58? 14.09	0.685
Wrong	9.58?17.09	9.58?11.75	P>0.05
Total	41.17? 19.99	37.08? 20.02	0.436
Creativity			
Originality	19.92? 8.09	20.69?7.38	0.756
Self Esteem			
General	12.42? 2.27	11.83?1.27	0.482
Social	5.67?1.23	6.00? 1.27	0.529
Academic	5.92?1.24	5.83?0.94	0.820
Parents	5.25? 1.28	5.42? 1.24	0.732
Lie-Scale	5.83? 1.50	5.58? 2.07	0.709
Total	22.67? 2.39	22.83? 2.82	0.834

The tests of Attention and Creativity showed that there were improvements in these counts with computer literacy. Total score in the attention test is derived by deducting wrong cancellations from the right ones. The number

of right cancellations improved though not significantly. The total number of errors in the attention test and score dispersion reduced significantly. Performance in the test of Creativity after exposure had not improved to a statistically significant level.

The five subscales of self esteem do not record statistically significant difference in the scores before and after the training. Increases were noted on the Social and Parental scales as well as the total scores. On the General and Academic scales the scores have decreased and there is no explanation possible for this from the current extent of psychological knowledge. A decrease in the Lie Scale indicates reduced defensiveness in the self report of self esteem. The base line of the pilot study group is comparable to that of normal school children in the study by Vinutha, et al (1998).

Results from the Main study

There were 129 children in the experimental group (computer literates) and 148 children in the control group (computer illiterates), together constituting the sample for the main study. Various factors are taken into account while examining the impact of computer exposure since psychometric data tends to be influenced by multiple variables. In the present study age, years of schooling and gender besides computer literacy influence the test performance. Some of the findings are clear while others are not in their directionality and meaning.

Socio-Demographic Details

The mean age in both groups differ with mean ages 14.42 and 15.47 of the computer illiterate and computer literate groups respectively. The age distribution is given in the table below.

Table 2: Age distribution

Group	Age in years (Mean ? SD)
Control	14.42 ? 2.31
Experimental	15.47 ? 2.55
Significance	t=3.609, p<0.001

The sex distribution is such that there is near gender parity in terms of numbers of boys and girls within each group (see figures 1a and 1b below).

Table 3: Sex distribution

Sex	Control	Experiment	Total
Male	70 (47.29)	65 (50.38)	135 (48.74)
Female	78 (52.70)	64 (49.61)	142 (51.26)
Total	148 (100.0)	129 (100.0)	277 (100.0)
Inference	Samples are sex matched P>0.05		

Figures in Parentheses are percentages

Figure 1a

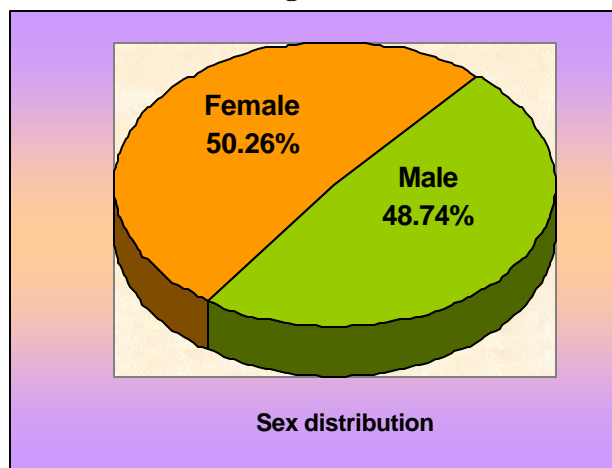
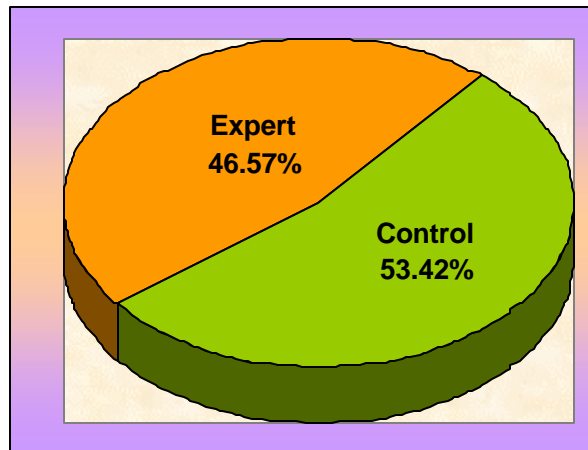


Figure 1b



Family structures are such that the total members, total earning members and total number of brothers in the family in the control and the experimental groups do not differ. However the total numbers of sisters in the family the 2 groups differ at the statistically significant level of 1%. The number of sisters in the experimental group is larger (see table 4 below).

Table 4: Characteristics Of Family Structure

Background Characteristics	Control (Mean ? SD) (148)	Experimental (Mean ? SD) (124)	P value
Total members in the family	6.49? 1.94 (148)	6.63? 1.83 (128)	0.564
Total earning members in the family	1.68? 0.78 (148)	1.66? 1.10 (127)	0.854
Total number of brothers in the family	2.15? 0.99 (144)	2.23? 1.04 (124)	0.520
Total number of sisters in the family	2.17? 1.29 (144)	2.60? 1.59 (110)	0.021*
Total number of years studied	7.46? 2.56 (93)	8.64? 2.66 (90)	0.003**

Note: Figures in parenthesis are sample sizes.

Similarly there is parity across both groups with reference to the education and occupation of parents. The tables below illustrate the similarity in patterns of occupation of the father (Table 5) and of the mother (Table 6) in both groups, as well as in the patterns of education for both parents (Tables 7-9).

Table 5: Occupation of father

Occupation of father	Control (n=141)	Experimental (n=121)	Total (n=262)
A	16 (11.35)	13 (10.74)	29 (11.07)
B	39 (27.66)	43 (35.54)	82 (31.29)
C	59 (41.84)	32 (26.45)	91 (34.73)
D	27 (19.15)	33 (27.27)	60 (22.90)
Significance	$\chi^2=7.694, P=0.054$		

Note: Figures in parenthesis in Tables 5-9 are percentages.

Table 6: Occupation of mother

Occupation of mother	Control (n=144)	Experimental (n=128)	Total (n=272)
A	2 (1.4)	1 (0.78)	3 (1.10)
B	20 (13.89)	8 (6.25)	28 (10.29)
C	21 (14.58)	7 (5.47)	28 (10.29)
D	86 (59.72)	97 (75.78)	183 (67.28)
E	15 (10.42)	15 (11.72)	30 (11.03)
Significance	$\chi^2=12.239, P=0.016$		

Table 7: Education of father

Education of father	Control (n=130)	Experimental (n=111)	Total (n=241)
A	86 (66.15)	77 (69.36)	163 (67.63)
B	11 (8.46)	11 (9.90)	22 (9.13)
C	6 (4.62)	6 (5.41)	12 (4.98)
D	27 (20.76)	17 (15.32)	44 (18.26)
Significance	$\chi^2=1.280, P=0.734$		

Table 8: Father able to read and write

Father able to read & write	Control (n=144)	Experimental (n=121)	Total (n=265)
Yes	112 (77.78)	98 (80.99)	210 (79.25)
No	32 (22.22)	23 (19.01)	55 (20.75)
Significance	$\chi^2=0.413, P=0.520$		

Table 9: Mother able to read and write

Mother able to read & write	Control (n=146)	Experimental (n=126)	Total (n=272)
Yes	63 (43.15)	65 (51.59)	128 (47.05)
No	83 (56.85)	61 (41.78)	144 (52.94)
Significance	$\chi^2=1.932, P=0.165$		

Effects of Computer Exposure:

Comparing the computer literate and computer illiterate groups on their performance in the psychometric tests show more or less similar results to the pilot study (See Table 2). The computer literate group's performance on the creativity test was significantly better with a mean score of 16.87 as compared to that of the computer illiterate group at 14.52. The difference in the two groups is significant at 1% for both Creativity and Attention. The Attention tests had computer literates scoring a mean 42.70 and computer illiterates 36.55.

Table 10: Effect of Computer literacy on Creativity, self-esteem and attention

Parameters	Control (Mean ? SD) (n=148)	Experimental (Mean ? SD) (n=129)	P value
Creativity	15.15? 6.48	17.40? 7.79	0.011*
Self-esteem (General)	6.65? 2.48	6.34? 2.65	0.316 ^{NS}
Self-Esteem (Social)	4.56? 1.52	4.34? 1.46	0.236 ^{NS}
Self-esteem (Academic)	2.25? 1.69	1.77? 1.51	0.013*
Self-esteem (Parents)	3.57? 1.57	3.18? 1.44	0.037*
Self-esteem (Lie -scale)	6.49? 1.48	6.05? 1.81	0.030*
Self-esteem (Total)	25.53? 5.36	21.68? 5.05	0.004**
Attention Right	36.55? 11.31	42.70? 11.38	0.000**
Attention Wrong	7.61? 9.14	8.60? 8.95	P>0.05
Attention Total	28.73? 14.01	34.11? 14.69	0.003**

* Significance at 5% ** Significance at 1% ^{NS} Not significant

Note: For attention, sample size varies for control n=136 and for case n=127

Attention is an important aspect of cognitive functioning and hence these gains made through computer training illustrate a positive impact. The results of the Self-Esteem tests are rather ambivalent and need to be explored further. The difference across the two groups on the General and Social sub scales is not significant but on the Academic and Parental scales, it is significant at 5%. The interesting thing is that it is the Computer Illiterate group that scores higher on these scales indicating a negative direction on these scales. However the Lie-Scale score indicating defensiveness is less in the computer literate group indicating that they are more truthful. Since a high Lie-Scale score more or less indicates that children have lied to display inflated self-esteem, this seems to be the case with the computer illiterate group. A high self-esteem score with a low Lie scale profile is expected to give a more accurate profile.

Effects of Computer exposure across Gender

Comparing the performance of boys and girls on the psychometric tests in the computer literate and computer illiterate groups throw light on how the gender of a child might affect his/her performance. Tables 11 and 12 present separately the effects of computer training on boys and girls respectively. Figures 2a and 2b present the results graphically for boys and girls, respectively.

Table 11 : Effect of Computer literacy on Creativity, self-esteem and attention in Boys

Parameters In boys	Control (Mean ? SD) (n=70)	Experimental (Mean ? SD) (n=65)	P value
Creativity	15.54? 6.64	17.63? 7.61	0.091*
Self-esteem (General)	6.49? 2.59	6.54? 2.73	0.921 ^{NS}
Self-Esteem (Social)	4.68? 1.44	4.42? 1.59	0.312 ^{NS}
Self-esteem (Academic)	2.45? 1.78	2.08? 1.74	0.224 ^{NS}
Self-esteem (Parents)	3.62? 1.61	3.66? 1.47	0.886 ^{NS}
Self-esteem (Lie -scale)	6.52? 1.47	5.88? 1.94	0.031*
Self-esteem (Total)	23.77? 5.45	22.57? 5.02	0.189 ^{NS}
Attention Right	34.56? 9.99	41.85? 12.01	0.000**
Attention Wrong	6.66? 5.30	8.32? 8.68	0.191 ^{NS}
Attention Total	28.17? 11.30	32.57? 16.62	0.082 ^a

*NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant*

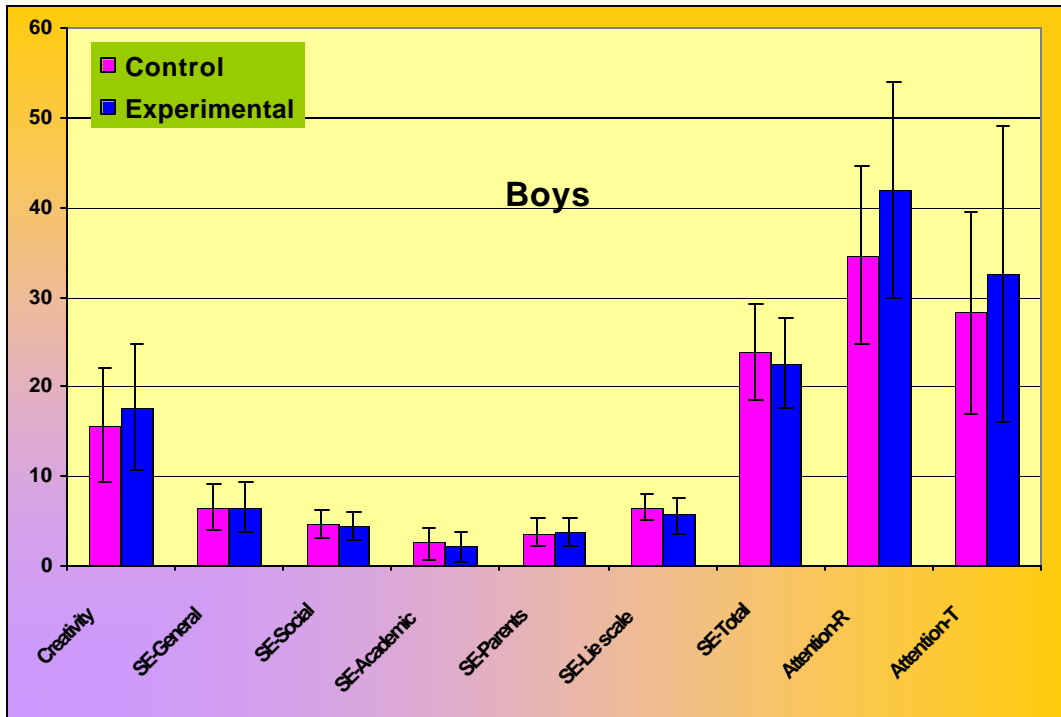
Table 12
Effect of Computer literacy on Creativity, self-esteem and attention in Girls

Parameters In girls	Control (Mean ? SD) (n=78)	Experimental (Mean ? SD) (n=64)	P value
Creativity	14.78? 6.35	17.16? 8.04	0.050*
Self-esteem (General)	6.81? 2.37	6.14? 2.58	0.177 ^{NS}
Self-Esteem (Social)	4.44? 1.59	4.27? 1.31	0.494 ^{NS}
Self-esteem (Academic)	2.07? 1.59	1.45? 1.15	0.012*
Self-esteem (Parents)	3.52? 1.54	2.69? 1.37	0.001**
Self-esteem (Lie -scale)	6.47? 1.51	6.23? 1.67	0.396 ^{NS}
Self-esteem (Total)	23.30? 5.29	20.78? 4.96	0.005**
Attention Right	38.40? 12.19	43.56? 11.15	0.001**
Attention Wrong	8.51? 11.63	8.90? 9.29	0.836 ^{NS}
Attention Total	29.25? 16.23	35.75? 12.25	0.012*

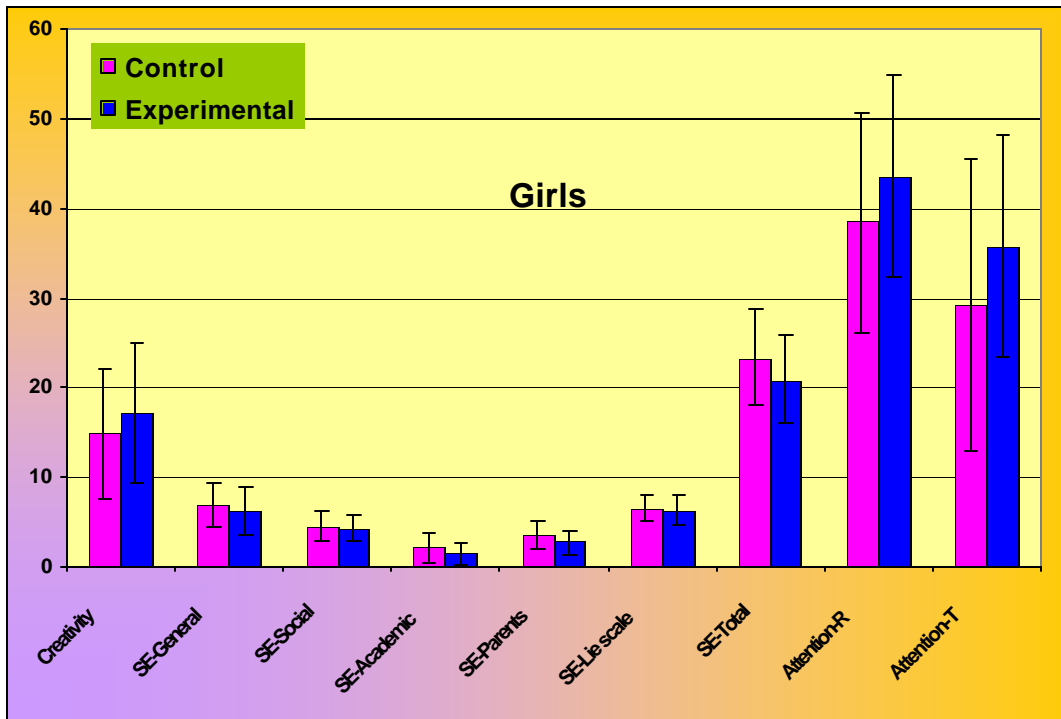
NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Computer literate boys have a higher mean score of 17.09 on the test of **Creativity** and the corresponding figure for computer illiterate boys is 14.83 and the difference is statistically significant at 1%. Among girls, computer literates also have a higher mean score at 16.66 as compared to 14.23 of computer illiterate girls, with the difference significant at 5%. The base line performance of computer literate boys and girls are more or less similar.

Figure 2a



Figures 2b.



In the tests of **Attention** among boys, the computer literate group has a mean right answer score of 41.85 significantly better than the mean right answer score of 34.56 of the computer illiterate group. The corresponding figures for girls are 43.56 and 38.40, with difference again being statistically significant at 1%. It is interesting to note that even among the computer illiterates, girls have a higher mean right answer score than boys indicating that the girls have better attention skills. However, the computer literate boys show larger gains than the computer literate girls.

The impact of gender on the performance in the **Self-Esteem** tests remains puzzling. Boys in the computer literate and illiterate group remain similar with the execution of Lie score which is significantly less in the computer literate group, indicating reduced defensiveness and hence higher accuracy.

Girls' performance is intriguing and needs further exploration. The academic and parental self esteem is significantly lower among computer literate group girls, perhaps as a result of a belief in conventional expectations. However, the computer literate girls though marginally less defensive, the difference is not significant. Thus computer literacy may reduce the differences in the boys but not in the girls.

Since the Lie scale shows us that the veracity of the self esteem scores is only partial, a comparison of norms found in the self-esteem list in a study by Vinutha et al (1989) with the performance in the present sample would help clarify our results. In this study by Vinutha et al, the self esteem scores' of 184 boys and 184 girls from mainstream schools (English medium) and in the 9th std (i.e. around 13 years old) were compared.

Boys in the mainstream group had a general SE score of 12.49 whereas the boys in the control group in the present study scored 6.49. Under the subscales of self-esteem mainstream boys and boys in the control group from our sample scored in the following way: Social SE 5.59 and 4.68, Academic SE 7.57 and 2.45 and Parental SE 7.54 and 3.64, respectively. The mainstream boys have better self esteem in the general, academic and parental scales than boys in our control group. A similar comparison of girls' scores show that compared to mainstream schoolgirls, girls in our study score far below in all aspects of Self-Esteem. The scores on Self Esteem for mainstream girls and girls in the control group in the present sample are as follow: General Self Esteem 5.13 and 4.44, Academic SE 6.87 and 2.07 and in Parental SE 7.69 and 3.52, respectively.

The Lie scores among the mainstream children were such that the girls were found to be marginally more defensive than the boys and also displayed greater variability in scores. Boys have a mean score of 4.22 (with SD ± 1.94) and girls have 4.70 (SD ± 2.20). In the present study boys (control group) had a mean lie score of 6.52 (SD of ± 1.47) and the girls (control group) scored 6.47 (SD of ± 1.51). Both the boys and girls from present study record much higher scores on the Lie Scale. As the children coming from disadvantaged back grounds tend to be defensive, their test scores are not as reliable as those in the Vinutha et al study.. Reduction in differences may be one of the outcomes of computer literacy especially among boys. The persistence of differences among girls from disadvantaged back grounds highlight the need for (1)psychological counseling (2)better ways of assessing self-esteem and (3) enhancing self esteem itself by going beyond computer literacy as the sole method of intervention.

Considering that the age of the girls in both studies is above 12 years, that is the vulnerable phase of adolescence. It is not surprising that, just as reported in the Rogers and Gilligan study (1988), there appears to be a lowering of self confidence, expressed through a negative body image, low self esteem and depression. The low self esteem may be a characteristic of adolescent girls from disadvantaged population.

Further, the American Association of University Women (AUW) Report of 1992 states that although boys and girls have equal abilities at time of entry into university; by the time girls leave school, they are deficient in mathematical abilities and self esteem. This could be due to the lesser attention from teachers and that schools emphasize male achievement, especially in areas like mathematics.

NGO variable and computer literacy

The NGO a child is getting his/her computer training from, in terms of its size, financial status, gender sensitivity, attitudes towards computer training and whether it provides computer training itself may also factor into the impacts of the computer training itself.

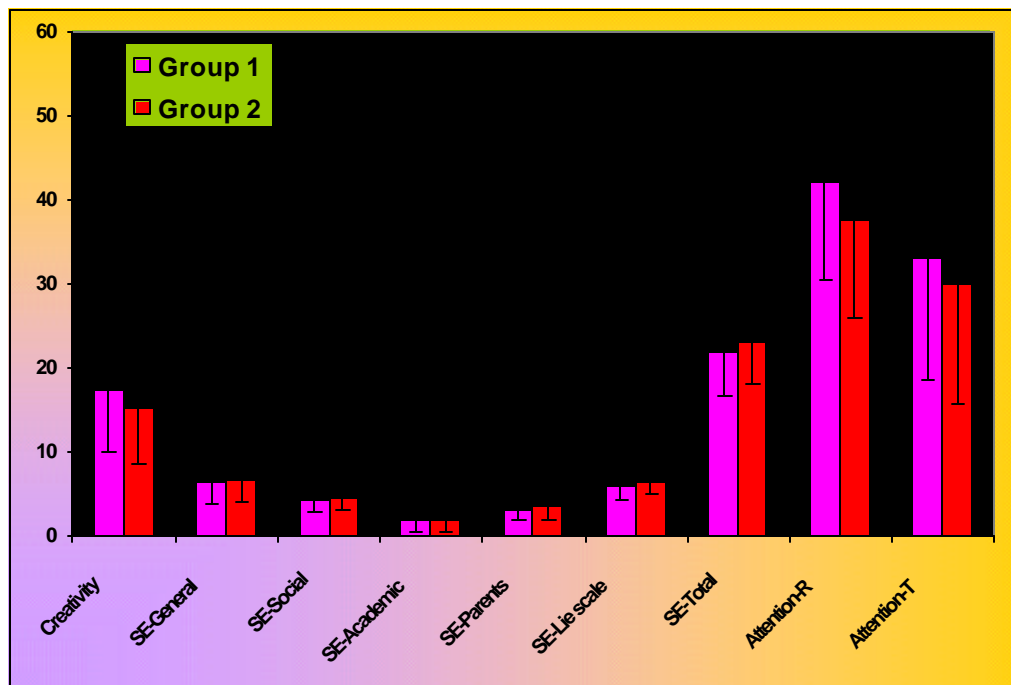
With respect to gender sensitivity, two groups were determined among the NGO's in the study with the first group consisting of 4 NGO's that were identified to be gender sensitive to a greater extent than the second group (consisting of 8 NGO's) that was identified as moderately gender sensitive. Disaggregating the results of the psychometric tests on the basis of these two groups (See Table 13) we find that the difference is almost significant for creativity and is significant at 1% for attention. The total self-esteem scores for the gender sensitive group (GI) were higher at the statistically

significant level of 5%. However, the lie-scores were still high with differences being significant.

Table 13 : Effect of Computer literacy on Creativity, Self-esteem and Attention in Gender sensitive and moderately-sensitive groups

Parameters In girls	Group I (Mean ? SD) (n=116)	Group II (Mean ? SD) (n=161)	P value
Creativity	17.42? 8.02	15.40? 6.51	0.029*
Self-esteem (General)	6.40? 2.69	6.58? 2.48	0.577 ^{NS}
Self-Esteem (Social)	4.31? 1.43	4.55? 1.53	0.187 ^{NS}
Self-esteem (Academic)	1.99? 1.61	2.04? 1.63	0.794 ^{NS}
Self-esteem (Parents)	3.20? 1.46	3.51? 1.58	0.106 ^{NS}
Self-esteem (Lie -scale)	5.99? 1.79	6.48? 1.54	0.016*
Self-esteem (Total)	21.89? 5.24	23.17? 5.27	0.050*
Attention (Right)	42.17? 11.86	37.64? 11.61	0.002**
Attention (Wrong)	8.28? 7.32	7.97? 10.13	0.786 ^{NS}
Attention (Total)	33.15? 14.80	30.07? 14.32	0.094 ^a

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significance



Looking at only boys (see Table 14), it is seen that the gender sensitive group have higher creativity and attention, as well as lower lie scale scores. Among girls only, although the creativity and attention scores are higher in the gender sensitive group, the difference is not statistically significant. What is rather inexplicable is that the girls in the gender sensitive group have lower parental and total self-esteem, with this difference being statistically significant.

Table 14: Effect of Computer literacy on Creativity, self-esteem and attention between the two groups (Boys)

Parameters In boys	Group I (Mean ? SD) (n=51)	Group II (Mean ? SD) (n=84)	P value
Creativity	18.56? 7.78	15.36? 6.55	0.020*
Self-esteem (General)	6.78? 1.50	6.36? 2.48	0.375 ^{NS}
Self-Esteem (Social)	4.52? 1.78	4.57? 1.53	0.850 ^{NS}
Self-esteem (Academic)	2.44? 1.48	2.17? 1.76	0.388 ^{NS}
Self-esteem (Parents)	3.66? 1.86	3.63? 1.58	0.916 ^{NS}
Self-esteem (Lie -scale)	5.66? 5.35	6.54? 1.59	0.004**
Self-esteem (Total)	23.06? 12.05	23.26? 5.24	0.831 ^{NS}
Attention Right	42.04? 9.75	35.76? 10.67	0.002**
Attention Wrong	8.42? 17.33	6.91? 5.02	0.250 ^{NS}
Attention Total	32.48?	29.06? 12.02	0.181 ^{NS}

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Table 15 : Effect of Computer literacy on Creativity, self-esteem and attention between the two groups (Girls)

Parameters In girls	Group I (Mean ? SD) (n=65)	Group II (Mean ? SD) (n=77)	P value
Creativity	17.12? 8.29	15.44? 6.50	0.178 ^{NS}
Self-esteem (General)	6.08? 2.45	6.82? 2.48	0.086 ^a
Self-Esteem (Social)	4.13? 1.35	4.53? 1.54	0.115 ^{NS}
Self-esteem (Academic)	1.62? 1.35	1.91? 1.49	0.238 ^{NS}
Self-esteem (Parents)	2.82? 1.71	3.38? 1.59	0.031*
Self-esteem (Lie -scale)	6.27? 4.99	6.43? 1.49	0.555 ^{NS}
Self-esteem (Total)	20.92? 11.44	23.06? 5.33	0.017*
Attention Right	42.28? 4.36	39.66? 12.29	0.204 ^{NS}
Attention Wrong	8.16? 12.35	9.14? 13.70	0.600 ^{NS}
Attention Total	33.72?	31.18? 16.53	0.334 ^{NS}

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

The results of the tests according to the size, financial status, attitude of NGO towards computer training and whether computer training is provided or not, are given in the following tables 16-19.

Table 16: Effect of Computer literacy on Creativity, self-esteem and attention between Different sizes of NGO

Parameters In girls	NGO			P value
	Small (Mean ? SD) (n=59)	Medium (Mean ? SD) (n=162)	Big (Mean ? SD) (n=56)	
Creativity	17.21? 7.31 ^a	16.81? 7.85 ^a	14.43? 5.07 ^b	0.050*
Self-esteem (General)	6.68? 2.47	6.32? 2.70	6.84? 2.26	0.365
Self-Esteem (Social)	4.17? 1.46 ^a	4.41? 1.46 ^a	4.88? 1.55 ^b	0.034*
Self-esteem (Academic)	2.10? 1.65	1.89? 1.56	2.30? 1.76	0.241
Self-esteem (Parents)	3.31? 1.39	3.29? 1.53	3.71? 1.70	0.199
Self-esteem (Lie -scale)	6.08? 1.76	6.28? 1.63	6.80? 1.63	0.409
Self-esteem (Total)	22.34? 5.24 ^a	22.20? 5.25 ^a	24.23? 5.21 ^b	0.041*
Attention (Right)	36.81? 11.27	41.28? 10.89	37.27? 14.02	0.014*
Attention (Wrong)	6.62? 5.39	9.10? 11.12	6.88? 3.80	0.116
Attention (Total)	29.81? 13.16	32.11? 15.18	30.94? 14.43	0.582

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Table 17: Effect of Computer literacy on Creativity, self-esteem and attention between NGO's by Financial Status

Parameters In girls	NGO's by Financial Status			P value
	Paid (Mean ? SD) (n=193)	Partially Paid (Mean ? SD) (n=59)	Unpaid (Mean ? SD) (n=25)	
Creativity	16.07? 7.46	16.66? 6.92	18.60? 6.83	0.255
Self-esteem (General)	6.45? 2.65	6.49? 2.42	6.96? 2.17	0.647
Self-Esteem (Social)	4.58? 1.46	4.14? 1.58	4.24? 1.42	0.100
Self-esteem (Academic)	2.11? 1.59	1.73? 1.52	2.08? 1.98	0.291
Self-esteem (Parents)	3.43? 1.56	3.37? 1.44	3.08? 1.71	0.572
Self-esteem (Lie -scale)	6.44? 1.64	6.00? 1.78	5.80? 1.41	0.065
Self-esteem (Total)	23.01? 5.39	21.73? 4.72	22.16? 5.61	0.241
Attention (Right)	39.61? 12.74	38.81? 10.01	40.13? 8.54	0.865
Attention (Wrong)	8.66? 9.30	6.60? 4.45	7.40? 13.64	0.312
Attention (Total)	30.48? 16.08	32.40? 11.38	35.32? 7.26	0.250

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Table 18: Effect of Computer literacy on creativity, self-esteem and attention between NGO's according to provision of comp. training.

Parameters In girls	NGO's by Provision of CT		P value
	CT provided (Mean ? SD) (n=235)	CT not provided (Mean ? SD) (n=42)	
Creativity	16.58? 7.46	15.55? 6.36	0.400
Self-esteem (General)	6.55? 2.57	6.29? 2.57	0.547
Self-Esteem (Social)	4.43? 1.51	4.60? 1.42	0.505
Self-esteem (Academic)	1.98? 1.62	2.24? 1.62	0.349
Self-esteem (Parents)	3.35? 1.53	3.55? 1.63	0.4546
Self-esteem (Lie -scale)	6.19? 1.66	6.79? 1.62	0.033*
Self-esteem (Total)	22.50? 5.29	23.45? 5.27	0.285
Attention (Right)	40.45? 11.97	34.10? 9.42	0.001**
Attention (Wrong)	8.24? 9.56	7.28? 5.33	0.543
Attention (Total)	32.28? 14.84	26.18? 11.91	0.016*

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Table 19: Effect of Computer literacy on Creativity, self-esteem and attention between NGO's according to attitude towards computer training.

Parameters In girls	NGO's by Attitudes			P value
	Very Enthusiastic (Mean ? SD) (n=68)	Enthusiastic (Mean ? SD) (n=142)	Indifferent (Mean ? SD) (n=67)	
Creativity	15.25? 7.24	17.37? 7.59	15.60? 6.56	0.081 ^a
Self-esteem (General)	6.74? 2.62	6.54? 2.69	6.21? 2.22	0.486
Self-Esteem (Social)	4.81? 1.42	4.42? 1.54	4.21? 1.42	0.068 ^a
Self-esteem (Academic)	1.94? 1.45	2.10? 1.67	1.94? 1.69	0.719
Self-esteem (Parents)	3.45? 1.63	3.42? 1.49	3.25? 1.59	0.722
Self-esteem (Lie -scale)	6.44? 1.44	6.20? 1.81	6.33? 1.53	0.623
Self-esteem (Total)	23.37? 5.62	22.67? 5.26	21.94? 5.00	0.308
Attention (Right)	39.63? 12.79	37.83? 11.47	42.84? 11.06	0.016*
Attention (Wrong)	7.72? 6.15	7.24? 6.25	10.29? 14.57	0.082 ^a
Attention (Total)	32.00? 12.65	30.05? 14.34	33.54? 16.59	0.272

NS: Not significant * Significant at 5% ** Significant at 1% a Near Significant

Self-Reports by Children

There were two kinds of self reports by the children. The first consisted of answers to questions regarding schools by all children (both the 148 in the control and 129 in the experimental group). The second consisted of answers to questions on computer literacy by 70 children in the experimental group who had computer exposure. The results suggest that the children consider computer literacy to be an essential aspect of education.

The results of the self reports about schools by all children are as follows:

1. 86.48% of children in the control group and 82.95% in the experimental group were positive that their teachers encouraged them in their studies.
2. 55.4% in the control group were not shy of their teacher asking questions whereas the proportion was 65.89% in the experimental group.
3. 18.92% in the control group do not clearly understand what the teacher teaches whereas 29.45% in the experimental group have the same problem. This is suggestive of the fact that despite the poor quality teaching in government schools, computer literate children are able to group classroom instruction better.
4. Among the control group 46.62% replied in the affirmative that although they studied well at home, they would forget everything when with their teacher, whereas 37.21% replied in the affirmative for the same.

70 computer literate children were asked 4 questions regarding the impact of computer literacy on enhanced self-respect, better job prospects and respect from society. The results revealed the following:

1. All children wanted to be computer literate
2. An overwhelming majority believed that computer literacy enhanced their self-respect. Only 10% did not think so.
3. Three quarters of them believed that greater respect from society resulted with 23% who did not think or know so.
4. Only 24% did not think that better job prospects were possible with computer literacy.

Conclusion:

To sum up the results of the main study; Computer Literacy is associated with better performance in the tests of attention and creativity but the impact on self-esteem is inconclusive. The variables effecting self-esteem maybe age, years of schooling, gender sensitivity of the participating NGO's and most importantly the defensiveness of the children as evidenced by high lie scale scores.

Considering that there is evidence to show that the biological invulnerability of girls in their childhood turns to psychological invulnerability at adolescence, gender studies should have a developmental focus. Assessing the impact of IT should be broad based taking into account economic factors, psychological (both cognitive and emotional) factors, parameters related to society, family and peers, as well as socio-economic parameters like education and health. In addition,

the combined and interacting effects of these factors must be taken into account to bring in a holistic approach to social science research. Normatively speaking, the research should accrue benefits to the subjects of research --- psychological, social, economical, educational and even in health.

The policy implication that arise from this study is that the younger the children are, the more effective the impact of computer literacy. Indian Girls tend to be older than the optimum when introduced to computers and an early introduction would prove more beneficial. The levels of achievements of boys and girls exposed to computer training may vary and this needs to be examined further, in order to be remedied. Eventually outcomes in terms of creation of job opportunities need to be provided as an intervention.

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