

IMPACT OF EDUCATIONAL INSTITUTION ON LITERACY AND GENDER GAP: CORRELATION AND REGRESSION MODELING IN MURSHIDABAD, WEST BENGAL

Nrinmoy Kumar Roy* and Dr. Krishnendu Gupta**

ABSTRACT

This paper tries to highlight the literacy rate and relevant gender gap in the light of different categories of educational institutions in the district Murshidabad which is considered as one of the backward district in West Bengal if its Human Development Index rank is taken into consideration. Henceforth, educational institutions are grouped into separate three stage i.e. - i) Primary School, ii) Middle/High/Higher secondary School, and iii) College/ University/ Others. Various correlation coefficient methods have been applied to detect the correlation of literacy rate with gender gap across the blocks, subdivisions and municipalities. It has been examined that literacy rate in the district of Murshidabad has positive correlation with the number of different categories of educational institutions.

Key words: Literacy, Gender Gap, correlation, Educational intuition

INTRODUCTION

Education is the mirror of our modern society. It is inevitable truth that “Higher the education facility, better the literacy rate and lesser the education facility, Lower the literacy rate.” The government policy- “Literacy for all” has always enlightened the human beings in our present society. Literacy is one of the most important parts to measure Human Development Index (HDI) at international, national and regional levels. High rate of literacy will always ensure and increase the progress of any modern human society. According to UNESCO literacy as the ability to identify, understand, interpret, create, communicate, compute and use printed and written materials associated with varying context”. Education does not only mean literacy but also transfer of knowledge to improve communication skills, and capability to improve the environment and to utilize the scarce resources for the development of the nation”. In spite of being countrywide Govt. literacy programmes such as National literacy Mission launched in 1988, Sarva Shiksha Abhiyan launched in 2001 and International literacy Day, the literacy rate of India has not fulfilled expected condition till the present day at national, state or district levels because of concentration of bulk percentage of illiteracy in rural sectors. As per census of 2001, literacy rate of India in rural and urban sector is 58.7% and 79.9% respectively where as in West Bengal such rate is 63.42% and 81.25% respectively. In comparison to the national and state level, the referred district falls into considerable low rate of literacy in rural and urban sector i.e. 52.99% and 69.03% respectively (census of India, 2001). Besides these, there is also prominent gender gap in literacy which is the main impediment for the advancement of socio-economic progress of any nation.

STUDY AREA

The present study is confined within the district of Murshidabad lying between 24°50'20" N to 23°43'30" N and 88°46'00" E to 87°49'17" E. It is surrounded by Bangladesh in the east, Birbhum district and Jharkhand state in the west, Malda in the north and Bardhaman and Nadia district in the south. The entire area of the district is 5341sq.km. Murshidabad, being situated in the bank of river Ganga, experiences monsoonal moderate climatic features followed by heavy rainfall in the rainy season.

OBJECTIVES

The objectives of the present paper are –

- i) To find out the micro-level regional disparity in literacy and relevant gender gap in respect of socio-economic conditions in Murshidabad district.
- ii) To examine the nature of correlation between educational institutions and literacy rate.
- iii) To suggest some policy measures for the development of literacy level as well as to minimize the gender gap.

METHODOLOGY

The study has been made based on the secondary sources of data. Various statistical techniques have been evolved to analyze and acquire the accuracy of the data with the help of spearman's Rank correlation, Pearson's Product-Moment and Regression line by Least Square method. The secondary data has been collected from census of India, district statistical hand books and human development reports.

LITERACY RATE IN MURSHIDABAD DISTRICT

According to Census of India -2001, Murshidabad district ranks 17 out of 19 districts achieving average literacy rate 54.35% in 2001(Table:1). The census of India also reveals that there has been an increasing trend in literacy rate in the district Murshidabad from 38.28% in 1991 to 54.35% in 2001 and 54.35% in 2001 to 67.53% in

* Research Scholar, Department of Geography, Visva-Bharati

**Assistant Professor, Department of Geography, Visva-Bharati

2011 i.e. an increase of 16.07% and 13.18% respectively. In case of rural areas, it has increased from 35.52% in 1991 to 52.30% in 2001, i.e. a growth of 16.78% and it has increased from 60.80% (1991) to 68.80% (2001) in the urban areas i.e. an extent of 7.5%. The block-wise literacy rate (2001) expresses that Berhampur achieved highest literacy rate of 63.70% slightly lower than the state average (68.84%, 2001), followed by Burwan (59.10%), Nabagram (57.90%), Beldanga-I (55.80), Hariharpara (55.80), Jalangi (55.80), which are higher than the district average. These six blocks in murshidabad district recorded highest literacy rate than the district average. Because of some positive contributing factors i.e. high concentration of educational institutions, awareness of mass education etc.

Table-1: Block wise literacy rate and Gender Gap in Murshidabad District

Name of the Blocks	2001			
	Male literacy	Female literacy	Total literacy in %age	Gender Gap
Berhampore	69.40	57.50	63.70	11.90
Beldanga-I	61.00	50.10	55.80	10.90
Beldanga-II	57.80	45.20	51.80	12.60
Nowdda	56.10	50.40	53.30	5.70
Hariharpara	59.00	52.30	55.80	6.70
Kandi	62.10	42.20	52.50	19.90
Khargram	62.70	43.20	53.20	19.50
Burwan	68.30	49.20	59.10	19.10
Bharatpur-I	58.70	42.90	51.10	15.18
Bharatpur-II	61.20	46.80	54.10	14.44
Farakka	57.00	37.50	47.50	19.50
Samsanganj	50.10	30.00	40.10	20.10
Suti-I	52.90	35.60	44.40	17.30
Suti-II	52.60	32.50	42.80	20.10
Raghunathganj-I	58.20	42.00	50.10	16.20
Raghunathganj-II	56.50	40.00	48.00	16.50
Sagardighi	58.80	46.20	52.60	12.60
Lalgola	55.20	45.80	50.60	9.40
Bhagwangola-I	53.40	46.70	50.10	6.70
Bhagwangola-II	49.60	44.50	47.20	5.10
Msd-Jiaganj	59.70	46.90	53.50	12.80
Nabagram	66.50	48.90	57.90	17.60
Domkal	54.70	48.20	51.50	6.50
Jalangi	60.40	50.90	55.80	9.50
Raninagar-I	57.10	49.10	53.20	8.00
Raninagar-II	54.40	45.60	50.10	8.80

Source: Census of India - 2001,

The blocks belong to literacy rate slightly lower than the district average are BharatpurII (54.10), MsdJiaganj (53.50), Nowda (53.30), RaninagarI (53.20), Sagardighi (52.60), Kandi (52.50). The factors contributing to such literacy rate are large number of educational institution, Government's education policy, consciousness of people, concentration of educated family, and expansion of urban area in some blocks. The remaining blocks of the concerned district are suffering from poor rate of literacy because of poverty, low number of educational institution and failure of Government's education policy.

Male-Female literacy and Gender Gap

As per census of India, it is seen that the proportion of male literate in the district is comparatively higher than the female literate (Table: 1). According to 1991 census, male literate was 46.42% where as female literate was 29.57% with exhibiting gender gap 16.85%. There has been an increasing trend in male and female literacy rate in between 1991 and 2001. On the basis of 2001 census, male literate has got increased up to 60.70% while female literate increased up to 47.60% with gender gap 13.1% which is in reducing trend. Among the 26 blocks in the district, Samsanganj recorded highest gender gap in literacy with 20.10% while Bhagabangola-II has lowest gender gap with 5.10%. The blocks i.e. Kandi, Khargram, Burwan and Farakka are portraying their rank in the vicinity of the owing highest gender gap block. From the block level analysis, it is found that there is a

spatial disparity in the distribution of literacy in male and female. After analyzing the block level data of 2001, it is revealed that the gap in literacy is in decreasing trend in comparison to 1991 and most of the blocks have more than 10% gender gap in literacy.

Table 2: Rank Correlation between Literacy and Gender Gap across the blocks of Murshidabad District

Blocks	2001			
	Rank in Literacy(X)	Rank in Gender Gap(Y)	d=Rank Difference (X-Y)	d ² =(X-Y) ²
Berhampore	1	16	-15	225
Beldanga-I	4	17	-13	169
Beldanga-II	14	14	0	0
Nowdda	9	25	-16	256
Hariharpara	5	22	-17	289
Kandi	13	3	10	100
Khargram	10	6	6	36
Burwan	2	6	-4	16
Bharatpur-I	16	11	5	25
Bharatpur-II	7	12	-5	25
Farakka	22	5	17	289
Samserganj	26	1	25	625
Suti-I	24	8	16	256
Suti-II	25	2	23	529
Raghunathganj-I	18	10	8	64
Raghunathganj-II	21	9	12	144
Sagardighi	12	15	-3	9
Lalgola	17	19	-2	4
Bhagwangola-I	19	23	-4	16
Bhagwangola-II	23	26	-3	9
Msd-Jiaganj	8	13	-5	25
Nabagram	3	7	-4	16
Domkal	15	24	-9	81
Jalangi	6	18	-12	144
Raninagar-I	11	21	-10	100
Raninagar-II	20	20	0	0

Source: Calculated by Author

$$\sum d^2=3452$$

According to spearman's Rank correlation coefficient-

$$R_{\pm} = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

Where, R= Rank correlation of coefficient.
 d²= Sum of the squares of the differences of two ranks.
 n = No. of observation.

Therefore,

$$R_{\pm} = 1 - \frac{20712}{17550}$$

Or, R_± = 1 - 1.18
 Or, R_± = - 0.18 (i.e. Negative Correlation)

To find out level of significance test

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

$$= -0.18 \sqrt{\frac{26-2}{1-(-0.18)^2}}$$

$$= -0.90$$

The critical value of 't' at .05 Significance level with 24 degree of freedom is 1.711

From the above, it is understood that computed value is lower than tabulated value, so the null hypothesis is accepted and alternative hypothesis is rejected. It also explains that there is no statistical relationship between the variables.

In subdivision level (Table-2) highest gender gap is found in Jangipur(19.40%) with total literacy rate 48.10% and lowest gender gap is in Sadar subdivision(8.60) with literacy rate 60.90%. The gender gap of Kandi, Lalbag, Domkol is of moderate rank.

Table-2: Sub-division wise literacy rate and Gender Gap in Murshidabad District

Sub-Divisions	2001						Total
	Rural			Urban			
	Male Literacy	Female Literacy	Gender gap	Male Literacy	Female Literacy	Gender gap	
Sadar	61.30	51.30	10.00	89.10	80.50	8.60	60.90
Kandi	63.00	45.00	18.00	81.70	68.60	13.10	55.10
Jangipur	54.00	37.20	16.80	65.00	45.60	19.40	48.10
Lalbag	57.50	46.60	10.90	81.30	69.00	12.30	54.20
Domkal	56.30	48.30	8.00	81.30	71.20	10.10	52.70

Source: District Statistical Handbook-2005

On the contrary, if study across the urban level is considered (Table-3), it is found that literacy rate is higher than the block level because of availability of educational infrastructure, developed socio-economic condition, consciousness to literacy and concentration of educated family in urban areas. Comparing across the urban areas, the highest gender gap is recorded in Dhulian (21.00%) with literacy rate 48% and Berhampur achieved lowest gender gap (8%) with literacy rate 85.80%. All municipalities or urban areas gained highest literacy rate except Dhulian municipality.

Table-3: Municipality wise literacy rate and Gender Gap in Murshidabad District

Urban Areas (Municipalities)	2001			Total Literacy in %age
	Male Literacy	Female Literacy	Gender Gap	
Berhampur	89.80	81.80	8.00	85.80
Beldanga	81.90	70.00	11.90	76.20
Kandi	81.70	68.60	13.10	75.40
Jangipur	80.10	66.20	13.90	73.30
Dhuliyān	58.60	37.60	21.00	48.10
Murshidabad	80.60	68.50	12.10	74.70
Jiaganj-Azimganj	81.80	69.54	12.26	75.70

Source: District statistical handbook- 2005

Educational institutions in Murshidabad district

Educational infrastructure of the district resembles the formal education system of the west Bengal state. In the purpose of micro-level clarification, the educational sectors has been bifurcated into three categories namely i) Primary, ii) Middle, Secondary and Higher Secondary, and iii) College, University and others. The table: 4, 5 and 6 are showing the block-wise distribution of educational facilities of different categories for the concerned district.

Primary sectors being treated as “The Base of educational Structure” have presented major impact of literacy in the district. The total number of primary institutes is about 3147 including municipality areas (District Statistical Handbook-2005) in the district among which the block i.e. Berhampore ranks highest for the presence of primary educational institute (240), followed by Burwan (174), Sagadighi (154), Nabagram (150), Khargram (147), Domkol (143), Lalgola (132), Kandi (125), Beldanga-I (113), Jalangi (112), Nowda (109), Msd-Jiaganj (108), Beldanga (104). Gradually, smaller numbers of primary sectors are visible in the rest of the blocks of which Suti-I owing to lower most rank (730). To identify the correlation between the primary institutions and literacy rate for the concerned area with the help of Pearson’s Product-moment analysis at block level, it is seen that there is a moderate positive correlation ship between the two variables i.e. independent variable (primary institution) and dependent variable (literacy rate).

Table-4: Perason’s Correlationship between Primary sectors and Literacy rate across the blocks in Murshidabad

Blocks	No. of Pry. School(X)	Total Literacy in %age (Y)	XY	X ²	Y ²
Berhampore	240	63.70	15288	57600	4058
Beldanga-I	113	55.80	6305	12769	3114
Beldanga-II	104	51.80	5387	10816	2683
Nowda	109	53.30	5809	11881	2840
Hariharpara	75	55.80	4185	5625	3114
Kandi	125	52.50	6562	15625	2756
Khargram	147	53.20	7820	21609	2830
Burwan	174	59.10	10283	30276	3492
Bharatpur-I	101	51.10	5161	10201	2611
Bharatpur-II	94	54.10	5085	8836	2927
Farakka	89	47.50	4227	7921	2256
Samsrganj	83	40.10	3328	6889	1608
Suti-I	73	44.40	3241	5329	1971
Suti-II	84	42.80	3595	7056	1832
Raghunathganj-I	84	50.10	4208	7056	2510
Raghunathganj-II	97	48.00	4656	9409	2304
Sagardighi	154	52.60	8100	23716	2766
Lalgola	132	50.60	6679	17424	2560
Bhagwangola-I	81	50.10	4058	6561	2510
Bhagwangola-II	75	47.20	3540	5625	2228
Msd-Jiaganj	108	53.50	5778	11664	2862
Nabagram	150	57.90	8685	22500	3352
Domkal	143	51.50	7364	20449	2652
Jalangi	112	55.80	6249	12544	3114
Raninagar-I	77	53.20	4096	5929	2830
Raninagar-II	89	50.10	4459	7921	2510
	∑X=2913	∑Y=1345.8	∑XY=154148	∑X ² =363231	∑Y ² =70290

Source: Calculated by Author

According to Pearson’s Product-moment correlation coefficient,

$$r \pm = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n\sum x^2 - (\sum x)^2] [n\sum y^2 - (\sum y)^2]}}$$

r± = 0.69 (Positive correlation)

To find out the t-value

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

= 4.76

The critical value of ‘t’ at .05 Significance level with 24 degree of freedom is 1.711 In this case, computed value is larger than tabulated value. It signifies that there is statistical relationship, null hypotheses rejected and alternative hypothesis accepted.

In case of second category of educational institution, the number of middle, secondary and higher secondary schools are comparatively less in number as compared to Primary institutions. Numbers of such institutions in the district are about 518 including municipality areas of which Berhampore (32), Burwan (30), Domkol (30), Khargram (29), Saghardigi (27), Nabagram (27), Beldanga-I (20) retain higher number of educational institutions and the re3maining blocks belong to less than 20 number of educational institutions which are comparatively lower than the former. From the calculation the correlation between the two variables i.e. educational institution (independent variable) and literacy rate (dependent variable) with the help Pearson’s

Product-moment analysis, it is obtained that there are low positive correlation between the two variables in Murshidabad district.

In case of third category of educational sector, being less number of educational institutions at block level, sub-division-wise data has been picked up to analyze the nature of correlation ship between the two variables i.e. educational institution and literacy rate with the help of regression line by least square method. After examining across the sub-division level data, it is viewed that the highest average number of educational institutions are concentrated in Sadar subdivision (15) with literacy rate 60.90% and lowest average number of educational institutions are centralized in Jangipur (4), Lalbag (4) and Domkol (4) with literacy rate 48.10%, 54.20% and 52.70% respectively. From the statistical analysis, it is found that there is positive correlation ship between the variables across the sub-divisions in Murshidabad district.

Table-5: Perason’s Correlationship between the middle/Secondary/Higher Secondary sectors and literacy rate across the blocks in Murshidabad District

Blocks	No. of Middle/High/Higher Secondary School (X)	Total Literacy in %age (y)	XY	X ²	Y ²
Berhampore	32	63.7	2038	1024	4058
Beldanga-I	20	55.8	1116	400	3114
Beldanga-II	16	51.8	829	256	2683
Nowda	17	53.3	906	289	2841
Hariharpara	18	55.8	1004	324	3114
Kandi	15	52.5	788	225	2756
Khargram	29	53.2	1543	841	2830
Burwan	30	59.1	1773	900	3493
Bharatpur-I	13	51.1	664	169	2611
Bharatpur-II	21	54.1	1136	441	2927
Farakka	14	47.5	665	196	2256
Samserganj	12	40.1	481	144	1608
Suti-I	10	44.4	444	100	1971
Suti-II	10	42.8	428	100	1832
Raghunathganj-I	11	50.1	551	121	2510
Raghunathganj-II	11	48	528	121	2304
Sagardighi	27	52.6	1420	729	2767
Lalgola	19	50.6	696	361	2560
Bhagwangola-I	11	50.1	551	121	2510
Bhagwangola-II	9	47.2	425	81	2228
Msd-Jiaganj	17	53.5	910	289	2862
Nabagram	27	57.9	1563	729	3352
Domkal	30	51.5	1545	900	2652
Jalangi	19	55.8	1060	361	3114
Raninagar-I	12	53.2	638	144	2830
Raninagar-II	11	50.1	551	121	2510
	ΣX=461	ΣY=1345.8	ΣXY=24253	ΣX ² =29487	ΣY ² =70293

Source: Calculated by Author

Following the Pearson’s Product-moment Correlation Coefficient,

Where,

$$r_{\pm} = \frac{n\sum xy - \sum x \sum y}{\sqrt{[(n\sum x^2 - (\sum x)^2) (n\sum y^2 - (\sum y)^2)]}}$$

$$r_{\pm} = 0.43 \text{ (Positive Correlation)}$$

To find out level of significance test-----

$$t = r \sqrt{\frac{n-2}{1-r^2}}$$

$$= 2.33$$

The critical value of ‘t’ at .05 significance level with 24 degree of freedom is 1.711. After examining the degree of freedom (n-2), it is evident that, computed value is larger than tabulated value. It signifies that there is statistical relationship, null hypotheses rejected and alternative hypothesis accepted.

Table-6: Regreession line by least Square Method

Sub-Divisions	No. of College / University/Others(X)	Total Literacy in %age(Y)	Mean of X	X= X - 6.8	X ²	XY
Sadar	15	60.90	6.8	8.2	67.24	499.38
Kandi	7	55.10		0.2	0.04	11.02
Jangipur	4	48.10		-2.8	7.84	-134.68
Lalbag	4	54.20		-2.8	7.84	-151.76
Domkal	4	52.70		-2.8	7.84	-147.56
		∑Y=271			∑X=0	∑X ² =90.8

$$Y = a + b x, \quad \sum Y = a n + b \sum x, \quad \sum x y = a \sum x + b \sum x^2$$

Source: Calculated by Author, District Statistical Handbook-2005.

CONCLUDING REMARKS

From the above discussion, it is undoubtedly clear that middle portion of the district with respect to educational facility is more developed than the other part of the district and are enjoying low rate of Gender Gap. The blocks namely Samserganj, Suti-I, Suti-II, Farakka, Raghunathganj-II and Bhagwangola-II are backward on the basis of literacy rate as per 2001 census. An important attention is that maximum education facility is concentrated in the urban area than the rural area and representing high rate of literacy with low rate of Gender Gap in the concerned district. It is also noticed that there is higher correlation between literacy and gender gap in case of Primary institutions as compared to middle/secondary/higher secondary institution. On the other hand, subdivision level analysis also proves that there are positive correlation between the educational institution and literacy. The overall study stands that literacy rate in the light of educational sphere varies from poor positive correlation to moderate positive correlation in the district. Under these circumstances, the assistance of Government and Private sectors is the urgent need minimize the gender gap via increasing the number of educational institution of almost all the categories mentioned, which in turn will strengthen the overall socio-economic culture.

REFERENCES

1. Census of India 2001(*Murshidabad District*);
2. Bureau of applied Economics & statistics, Government of West Bengal;*District Statistical Hand Book 2005 , Murshidabad*;
3. Jea, Rong; j.l. and Su, c.t.(2005) *correlation and time interval in multiple regression models. European Journal of Operational Research, Vol. 162, pp. 433-441*
4. Neter, J; Wasserman, W and Kutner, M. H. (1989). *Applied linear regression models. Second Edition, Irwin Inc.*
5. Geographical Review of India, vol.-67, No. 1 March-2005
6. Henshall, M. & Townsend, J.G. eds. (1987). *Geography of Gender in The Third world.* New York, State University of New York Press.
7. Pillai, J.K. (1995). *Women and Empowerment.* New Delhi, Gyan Publishing House.
8. Tilak, B.G.J. eds (2007). *Women's Education and Development.* New Delhi, Oxford University Press.