



Scrutinizing the Inclusiveness of Education at the Grass-Root Level in Madhya Pradesh Region of India

Onkar Nath MISHRA¹, Saurabh GUPTA²

^{1,2}Junior Research Fellow, Faculty of Management Studies, Banaras Hindu University, India, E-mail: abhi.mcpr@gmail.com

Abstract *The primary motivation of this study is to explore the field of elementary education in the Madhya Pradesh region of India from gender perspective. With only 3 years in hand to achieve the goal of universal education for all as per Dakar declaration, it assesses the extent to which the basic education has been equitable and inclusive. It uses 15 indicators of the elementary education as input for the Principle Component Analysis to identify the factors that govern the primary school enrolment in case of girl students. The study resulted in four factors that determine the primary enrolment. The study exposes the utter failure of the elementary education system in general and the economic reforms in particular to make basic education equitable and universal. It has important policy implications. The study also contributes to the existing scanty literature on the gender dimensions of elementary education in India.*

Key words:

Primary education, incentives, schooling infrastructure, principle component analysis, hierarchical multiple regression

JEL Codes:

I 20, I 28, O 15

1. Introduction

There has been an explosion in literature on developmental issues in the past two decades and gender issues have garnered much attention. The capability approach to development and women empowerment as enunciated by Amartya Sen views certain entitlements as precondition for the enlargement of agency and opportunity, and education is one of them. This is so because education has both an intrinsic value and an instrumental value. No society can develop sustainably without increasing and transforming the distribution of opportunities, resources, and choices and primary education is the key to all these. Being educated is an important valued functioning in itself. Elementary education being the very basic functioning and even fundamental right of the children is not free from sex bias. Millions of girl child are devoid of their basic fundamental right which ultimately lowers their well being. A firm commitment to the widespread and equitable provision of basic education is the first requirement of rapid progress in eradicating educational deprivation in India (Dreze and Sen, 2002). In reviewing empirical studies of agency, Sabina Alkire concluded that 'Education emerges as an invariable correlate of empowerment in nearly all settings'.

Driving on the fast lane of economic reforms India has been able to generate a higher growth rate, but the extent to which its benefits have trickled to those at the bottom of pyramid has been a highly contested issue. It

has been now well researched and documented that millions of Indians are connected to the internet but millions more are yet not connected to school. The fruits of the development have not been shared equally especially with the socially vulnerable and disadvantaged groups, of which women are the main constituent. The inferior position of Indian girls and women in terms of some of the most elementary functioning and capabilities seem to be confirmed by a number of studies. The sex bias permeates across all spheres and elementary education is one of them.

Madhya Pradesh, which is one of the largest state as well as one of the most backward states of India, performs poorly on literacy fronts. Furthermore, there exist vast differences in literacy rates across different districts and gender. The education system in Madhya Pradesh consists of four stages - lower primary (class 1-5), upper primary (class 6-8), secondary (class 9-10) and higher secondary (class 11-12). Being the first stage of formal education, elementary education automatically becomes the crucial determinant of developing and equipping the children with the basic knowledge of reading - writing and for that one of the Millennium Development Goal is the universalization of Elementary education. Elementary education is not only a goal in itself but is also a powerful driver towards other MDGs. However, it is still a distant dream in the state of Madhya Pradesh as well as in India.

This study makes a serious attempt to explore, measure, and scrutinize the extent to which elementary

education in Madhya Pradesh has been inclusive in character within a gender perspective. To achieve its objective, it builds upon the arguments of capability approach which views development as an expansion of agency and freedom. Universalizing and providing an equitable access to elementary education is the first step towards strengthening female entitlements in various other domains. The study has been carried out at the grass root level in two senses; first it analyses the data at district level rather than state or country level and second, it studies elementary education which is the beginning of the formal education system. What this paper argues is that, universalizing and providing an equitable access to elementary education is still a daunting task.

The paper is structured as follow. Having discussed the background of the study in the first section, we move to the next section which presents an overview of the literature related to the study. Section 3 documents the methodological aspects of the study and has been split into 2 sub sections. First sub section i. e. 3.1 discusses the objectives, scope and hypothesis of the study and sub section 3.2 explains the data source and technique used in the study. An account of findings and discussion follows immediately in the fourth section. Last section of the paper summarizes and concludes.

2. Lessons from literature

We are surprised by the dearth of literature on the determinants, magnitude and impact of gender inequity in basic education and accordingly, we are convinced that this topic merits attention. The empirical studies on the gender inequality in basic education in Madhya Pradesh and developing countries in general, is almost non - existent. The reason being that historically, girls' education/gender disparity in education has not been a very popular topic among policy-makers, donors and researchers. However, the trend is reversing and recently many related areas related to gender inequity in primary education is being actively researched.

The beneficial impact of education is well documented in literature. More equitable distribution of education is correlated with lower poverty and inequality and faster economic growth (Birdsall and Londono, 1998). Greater education for girls has strong positive impacts on the health of infants and children, immunisation rates, family nutrition and the next generation's schooling attainment (World Bank, 2001). As Mehrotra (2006) notes, low levels of education significantly affect the health and nutritional status of women.

The lack of female teachers, concerns about safety, and social norms that promote early marriage for girls are powerful contributory factors inhibiting the females from attending schools. The failure of the supply side in providing accessible quality schooling is attributed to

the gap between parental desire for some female schooling and action in terms of sending girls to school (Ramachandran, 1998). A detailed study of schooling in communities across 10 districts of India shows the continued belief in the importance of marriage for girls at an early age, and of maintaining asymmetries between men and women in educational attainment as a marker of relatively greater male social status. Sexual harassment and violence also continue to be major constraining factors preventing parents from freely sending their girls to school (Jha and Jhingran, 2002).

It is now well established that gender inequality in education and enhancing the access of girls to basic education are influenced by three interlocking set of issues – systematic, content and process of education and economy, society and culture (Ramchandran, 2003). The 'snakes and ladders' analysis equally points to the supply side factors that push girls out of school (Ramachandran, 2003). Structural changes in aspirations for salaried occupations and the marriage market are likely to have attendant changes in the demand and length of female schooling (Subrahmanian, 2003). If parents in poor rural households perceive the quality of their children's schooling to be poor (for example, the building is unsafe or teachers do not show up) they may be reluctant to send their children (White, 2004). A World Bank report (World Bank, 2003) stated that in India gender, regional, community and income disparities are still serious issues in elementary education participation and attainments.

Although existing research on girls' education may have covered many areas, it suffers from the lack of adequate evidence. The research evidence gathered so far is not convincing and solid enough to categorically confirm the reasons that have kept millions of girls out of school. This study adds to the existing literature by identifying the factors that may make the field of basic education a level playing field in India.

3. Methodology of research

3.1. Objective, scope and hypothesis of the study

This study mainly aims at exploring and measuring the gender inequity prevalent in the elementary education in the state of Madhya Pradesh in India. Specifically, the objectives of the study are:

- To explore and extract the determinants of primary and upper primary enrolments in the state of Madhya Pradesh.
- To find out the extent to which gender inequity persists in elementary education.
- To study the impact of incentives provided by the govt. in elementary education enrolment particularly for girl students.

- To assess the importance of basic educational and schooling infrastructure in promoting elementary education.

This study as mentioned earlier analyses the status of elementary education at the grass root level and is invariably larger in scope. We have taken all the 50 districts of the state under the ambit of our study. Thus, it takes a comprehensive view of the basic education system in the state by taking into account various indicators. It analyses the data pertaining to schools, enrolment, and basic demographic indicators.

We list down the following six hypotheses to be analyzed and tested in the study:

H₀: Basic Amenities in the school is an important determinant of girls' primary enrolment.

H₀: Incentives in the form of free text books, uniforms and stationary is an important determinant of girls' primary enrolment.

H₀: Total Grossness in primary education is more influenced by female literacy rather than male literacy

H₀: Basic amenities in schools are an important determinant of girls' upper primary enrolment.

H₀: Total primary enrolment is significantly determined by incentives in the form of free text books, uniforms and stationary.

H₀: Total primary enrolment is significantly determined by basic amenities.

3.2. Data Sources and Techniques

This study is based on secondary data. The relevant data for the purpose of the study has been taken from the latest issue of *District Information System for Education 2008-09* which happens to be the most recent one. This data is collected jointly by the NUEPA and NCERT and represents the most comprehensive database about elementary education at the district level.

This is an empirical study which follows a quantitative research design. Henceforth, quantitative techniques aligning to the purpose of study have been used. The data has been processed using the statistical software EVIEWS and SPSS. It uses principle component analysis to determine the factors that govern the total primary grossness. Various descriptive measures and linear parametric models like hierarchical multiple regressions have been used to test the hypothesis and derive the result. The indicators and variables used in the study have been summarized *ut infra*:

Table 1. List of indicators

Category	Indicators / Variables With Notation
Literacy	Female literacy (FL), Male literacy (ML).
Primary and Upper primary	Gross enrollment ratio in primary (GERP), Girls enrollment in primary

Education	(GLEP), Total grossness in primary (TGrP), Total grossness in upper primary (TGrUP), Girls enrollment in upper primary (GLEUP).
Schooling Infrastructure	Total school with drinking water (TSDW), Total school with blackboard (TSB), Total school with girls toilet (TSGT), Total Govt. schools (TGS), Total classrooms in good condition (TCGC), Total school with common toilet (TSCT).
Incentives	Textbook to primary boys (T1), textbook to primary girls (T2), Textbook to upper primary boys (T3), textbook to upper primary girls (T4), Stationary to primary boys (S1), Stationary to primary girls (S2), Stationary to upper primary boys (S3), Stationary to upper primary girls (S4), Uniform to primary boys (U1), Uniform to upper primary girls (U2).

4. Empirical analysis and discussion

The status of elementary education and literacy in the state has been summed up in terms of some key indicators and is displayed in the table number 2.

Table 2. Descriptive Statistics

VARIABLES	No. of Districts	Mean	Std. Deviation
Female Literacy	50	44.39	17.55
Male Literacy	50	68.47	24.53
Total Literacy	50	57.84	19.30
GERP	50	118.87	53.56
GERUP	50	76.66	35.42

The table clearly exposes the gender divide on literacy front. The overall female literacy is less by 24.08% than the overall male literacy. Similarly, the gross enrolment ratio for primary and upper primary are also not much impressive. The high values of standard deviations for all the 5 key indicators reveal the inter district variations. The highest value of standard deviation has been recorded for GERP which is enough to suggest that primary education is not equally accessible to all students across all districts.

The total grossness in primary education is an important indicator of the efficiency of the primary education system. In order to explore the factors that determine the total grossness in primary education we have used the technique of principle component analysis. We have taken 15 variables on a priori basis that are supposed to govern the total grossness in primary education.

Table 4. Rotated Component Matrix^a

Factor & Variance explained	Variables	Component				Cumulative Variance
		1	2	3	4	
Textbook & Blackboard (30.92%)	T3	0.906				(30.92%)
	T1	0.896				
	T2	0.885				
	T4	0.866				
	TSB	0.725				
Stationary (25.57%)	S3		0.978			(56.50%)
	S1		0.977			
	S2		0.970			
	S4		0.969			
Schooling Infrastructure (22.51%)	TSGT			0.945		(79.02%)
	TSCT			0.864		
	TCGC			0.703		
	TSDW			0.690		
Uniform (12.15%)	U1				0.949	(91.17%)
	U2				0.907	

Extraction Method: Principal Component Analysis.
 Rotation Method: Equamax with Kaiser Normalization.
 a: Rotation converged in 6 iterations.

In order to judge the suitability of the technique of principle component analysis KMO and Bartlett test statistic has been used with former being a test of sample adequacy and latter testing the factorability of the used data. The result of the test is reproduced below:

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.722
Bartlett's Test of Sphericity	Approx. Chi-Square	1270.509
	D.f	105
	Sig.	0.000

The KMO statistic is more than 0.6 as well as the Bartlett test of sphericity is significant at 5% level. Clearly, the test indicates that principle component analysis (PCA) can be used to extract the factors. The result of the PCA has been presented below:

The PCA has resulted in four factors that determine the total primary grossness in the state. The first factor is Textbook and blackboard which is composed of five variables T1, T2, T3, T4 and TSB, explaining 30.92% of the total variance. The second factor is Stationary which is composed of four variables S1, S2, S3 and S4 and it explains 25.57% of the total variance. The third factor is the Schooling Infrastructure available and it has four variables TSGT, TSCT, TCGC and TSDW, explaining 22.51% of the total variance. The fourth factor is Uniform consisting of two variables U1 and U2 and accounting for 12.15% of the total variance. All the four factors that have emerged from the PCA taken together explain 91.17% of the total variance. From the above findings, it is clear that the basic amenities and incentives have emerged as an important factor determining the total primary grossness.

Table 5. Model Summary (GLEP)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.819 ^a	0.671	0.657	18809.97369	0.671	47.862	2	47	0.000
2	0.890 ^b	0.792	0.773	15289.60580	0.121	13.067	2	45	0.000
3	0.890 ^c	0.793	0.769	15415.49344	0.001	0.268	1	44	0.607

a Predictors: (Constant), TSCT, TSDW
 b Predictors: (Constant), TSCT, TSDW, TCGC, TGS
 c Predictors: (Constant), TSCT, TSDW, TCGC, TGS, TSB

The variables TSDW and TSCT form one block of variable and they explain 65.70% of the total variance in GLEP and is significant at 5%. In the second step

variables TCGC and TGS have entered as second block and this increases the total variance explained by

In the last one decade, the GER has been mainly driven by these factors and it is going to become more important in coming years.

Next, we analyze the empirical results related to the role of incentives in the form of free textbook, stationary and uniform and the provision of basic amenities in the schools in promoting girls enrollment in primary education (GLEP).

For this purpose we have used the hierarchical multiple regression whereby the variables have been entered block wise. The model specification for the analysis is:

$$GLEP = \alpha + \beta_0 TSDW + \beta_1 TSCT + \beta_2 TGS + \beta_3 TCGC + \beta_4 TSB + u$$

13.06% taking the total explained variance to 77.30%. Still the model as a whole is significant at 5% level. Finally, the addition of TSB lowers the total variance explained by a negligible amount of 0.26% and the model no longer remains significant.

Thus, only four variables TSDW, TSCT, TGS and TCGC have been found to be effectively contributing to GLEP. Clearly, our hypothesis one is accepted. All the variables except TSB are individually significant at 5% level. Next, linear parametric models have been used to explain the variances in the dependent variable.

Table 7. Model Summary

Model Specification	Variance Explained	P-Value	Sig. Level
$GERP = \alpha + \beta_0 ML + \beta_1 FL + u$	60.4%	.000	5%
$TGrUP = \alpha + \beta_0 ML + \beta_1 FL + u$	21.9%	.001	5%
$GLEP = \alpha + \beta_0 T_2 + \beta_1 S_2 + \beta_2 U_2 + u$	88.1%	.000	5%
$GLEUP = \alpha + \beta_0 TSDW + \beta_1 TSB + \beta_2 TSGT + \beta_3 TGS + \beta_4 TCGC + \beta_5 TSCT + u$	55.5%	.000	5%
$TGrP = \alpha + \beta_0 T_1 + \beta_1 T_2 + \beta_2 U_1 + \beta_3 U_2 + \beta_4 S_1 + \beta_5 S_2 + u$	56.9%	.000	5%
$TGrP = \alpha + \beta_0 TSDW + \beta_1 TSB + \beta_2 TGT + \beta_3 TGS + \beta_4 TCGC + \beta_5 TSCT + u$	74.1%	.000	5%
$TGrUP = \alpha + \beta_0 TSDW + \beta_1 TSB + \beta_2 TGT + \beta_3 TGS + \beta_4 TCGC + \beta_5 TSCT + u$	65.3%	.000	5%
$TGrUP = \alpha + \beta_0 T_3 + \beta_1 T_4 + \beta_2 U_3 + \beta_3 U_4 + \beta_4 S_3 + \beta_5 S_4 + u$	49.40%	.000	5%

The important findings that emerge from the analysis of the above table are:

- All the models are significant at a significance level of 5%
- Male and Female literacy alone account for 60% of the variance in gross enrolment ratio in primary education.
- Total Grossness in primary is more significantly determined by female literacy than male literacy. Hence, hypothesis three is accepted. It is so as the

beta 2 (0.563) is much larger in value than the beta 1 (0.066)

- Free textbooks, uniforms and stationary are the major factors driving girls' primary enrolment as they account for 88.1% of the total variance. Thus, hypothesis two is accepted at 5% level.
- Basic amenities in the schools, however is the main factor behind the girls enrolment in upper primary, explaining 55.5% of the total variance and leading to acceptance of our fourth hypothesis

Table 6. Coefficients of the Model

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13460.708	8530.877		1.578	.121
	TSDW	27.292	5.992	.696	4.555	.000
	TSCT	5.493	5.902	.142	.931	.357
2	(Constant)	12181.513	6979.410		1.745	.088
	TSDW	-39.974	14.031	-1.020	-2.849	.007
	TSCT	13.755	5.359	.356	2.567	.014
	TGS	49.509	10.184	.979	4.861	.000
	TCGC	8.134	1.927	.772	4.222	.000
3	(Constant)	11765.075	7082.698		1.661	.104
	TSDW*	-46.840	19.390	-1.195	-2.416	.020
	TSCT*	13.947	5.415	.361	2.575	.013
	TGS*	44.800	13.718	.886	3.266	.002
	TCGC*	7.564	2.232	.718	3.388	.001
	TSB	11.127	21.493	.304	.518	.607

a Dependent Variable: GLEP

* sig at 5 % level

The dependent variables are *GERP*, *TGrUP*, *GLEP*, and *TGrP*. Each of them has been estimated by using a set of independent variables and the significance of the model have been tested using the F ratio. The summary of all the models appear in the table no. 7.

- *Total Grossness in primary as well as upper primary is more responsive to basic amenities rather than incentives.*

- *Since the model number five and six is significant at 5% level our fifth and sixth hypothesis is accepted.*

The above findings have important policy implications as well as they throw light on the obstacles in the way of making primary education a valued functioning for all. The reason why the total grossness is more being conditioned by the basic amenities rather than incentives may be due to the fact that the incentives might not be flowing to the needy students while the amenities are such that they can be utilized by all students once provided. The converse is true in case of girls' enrolment in primary classes. It is more responsive to incentives in the form of free textbooks, uniforms and stationary than basic amenities. The reason may be traced to the reluctance of the parents to spend on girls' education as well as the poor economic conditions.

5. Conclusions

Although India has made giant strides in many spheres, and many gender gaps have narrowed over the past six decades since independence, substantial inequalities remain across many sectors and elementary education is one of them. This study analysed the gender dimension of elementary education in Madhya Pradesh region of India within the capability approach. There is a strong and mutually enhancing relationship between Sen's capability approach and education. It directly and indirectly enhances the capability of the individuals to increase their well being and this is of even greater value for those who are disempowered.

The findings of the study readily provide the conclusion that gender inequity is still deep rooted in elementary education system. The study points to a continuing failure of the state's educational interventions to take serious stock of gender inequality in basic education. While rapid expansion in the number of government schools have helped in merging the demand and supply in case of female access to schooling, the high dropout rate is of grave concern. The finding that female literacy has more pronounced effect on increasing the total primary enrolment is of particular significance for the backward states like Madhya Pradesh. Therefore, the policy measures should be directed towards increasing the female literacy.

Furthermore, the findings also confirm the role of incentives, better amenities and schooling infrastructure

in achieving the goal of primary education for all. However, these incentives are of paramount value for the economically weaker sections of the society, as they are reluctant to spend on the education of the girl child. The gender-sensitivity of the infrastructure of schooling – notably provision of toilets, water and better security – is a particular dimension that requires immediate attention. Monitoring and improving the distribution of scholarships and incentives, strengthening community mobilization, advocacy and communication for promoting gender education, improving the quality of teacher training, creating a gender-friendly school environment and strengthening educational planning, implementation and monitoring are the important policy implications underpinning the study. Sustained access to meaningful learning in the form of basic education that has value is critical to long term improvements in productivity, the reduction of inter-generational cycles of poverty, demographic transition, preventive health care, the empowerment of women, and reductions in inequality. What we argue is that, since primary education is one of the most basic functioning and it has very significant spillover effects no stone should be left unturned to make it more inclusive, more equitable, more efficient and more valuable. All that is needed is a clear strategic vision focused on the gender dimension of basic education coupled with a strong social and political commitment.

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