

LEARNING OUTCOMES IN ELEMENTARY EDUCATION IN RURAL INDIA: AN INTER-STATE COMPARISON

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ABSTRACT

An investigation is done on learning outcomes among children in different States of India at elementary level. Here, 24 major States of India are considered. The exercise is done on the basis of different Annual Status of Education Report (ASER) from 2010, whose information is rural-specific. Learning outcome index of the students of each State are calculated both at standard III and standard V level. It is observed that in most of the States, the learning achievement of the children at elementary level is deteriorating, but not rapidly. It has also come out that higher literacy among parents, availability of some school related factors like Mid-day Meal, proper drinking water, sanitation and playground facility can play a positive role to improve the learning achievement of the rural Indian children at elementary level.

Keywords: Elementary Education, Inter-State Comparison, Panel Data Regression Model.

Introduction

Education is a process of imparting knowledge and developing powers of reasoning and judgement of an individual. It is one of the pillars of Human Development Index (HDI). Without successful investment in human capital, a nation cannot achieve sustainable economic development. It was identified that if marginal year of schooling rises, the enterprise income also raises by 5.5 per cent point (Sluis

D.V Justin et al, 2004). Education not only provides knowledge and skills to children, youth and adults to be active citizens and to fulfil themselves as individuals, but literacy in particular, contributes directly to poverty reduction. It has been estimated that global poverty can be decreased by 12 per cent point if all children in less developed countries can get access to elementary education (Education for All Global Monitoring Report, 2009). The

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vicious circle of poverty of a less developed country can be broken through investment in human capital formation which will result in overall development of the economy and that can be done through improving the quality of elementary education. Better learning outcome at elementary level can help the future citizens to be capable to work as skilled workers in their adult hood and can fetch higher salaries. This can play an important role to remove the incidence of poverty of that economy.

Since Independence, Government of India has taken several initiatives to improve literacy rate in India. It is worth mentioning that Sarva Shiksha Abhiyaan (SSA) aims to provide universal elementary education to children between the age group of 6-14 years. SSA has its roots back to 1993-94 when the District Primary Education Programme (DPEP) was launched. It is actually a primary vehicle for implementing the Right to Free and Compulsory Education Act (RTE). Right to Education Act enacted by the Parliament of India, extended to the whole of India except Jammu and Kashmir, aims to provide free and compulsory education to all children of the age between 6-14 years. This Act is also known as 'Fundamental Child Right', enshrined in Article 21A of the Constitution (Ministry of Law and Justice, 2009).

Overview of Existing Literature

Investment in education gives the maximum return than investing in any other resources. For example, every \$1 spent on an individual's education yields \$10.15 to economic growth over the persons working

age (EFA Global Monitoring Report, 2009). Ambrish Dongre, *et. al.* (2016) mentioned that the launch of the Sarva Shiksha Abhiyaan (SSA) in 2001 has resulted in a significant increase in Government of India's (GoI) funding for elementary education. At the Central and at the State level, allocation on elementary education increased more than two fold from ₹ 68,853 crore in 2007-08 to ₹ 1,47,059 crore in 2012-13. Budgets for specific initiatives aimed at improving learning quality, accounts for less than one per cent of Sarva Shiksha Abhiyaan budget [PAISA Report, 2012]. In the due course of time, school enrolment is approaching towards 100 per cent. According to Planning Commission report (2011), there is a gradual enhancement of both Gross Enrolment Rate (GER) and Net Enrolment Rate (NER) at elementary level, in most of the Indian States. India is open to 'Schooling for All', but no proper enquiry has been done to identify the learning outcomes of the children at elementary level. Here, it will be investigated after considering the 24 major States of India¹.

Research Objective

This paper will try to investigate the scenario of learning outcome among the children at elementary level in different States of India after implementation of SSA. Learning outcome is the best indicator of learning because it shows what learners have actually learnt after completion of the class. If we intend to remove vicious circle of poverty of an economy, we should generate more skilled labour and that can be materialised if children can enhance their knowledge from elementary

level. Besides that, we will also try to investigate the possible factors which can influence learning outcome of the children at elementary level in rural India.

Data Source

Annual Status of Education Report (ASER) is an annual household survey to assess children's schooling status and basic learning levels in terms of reading and mathematical ability. ASER survey has provided a mirror image of rural public education system. It collects data for a representative sample of children from every State and almost every rural district in India. On an average, ASER survey had reached over 560 districts each year, surveying on average of 6,50,000 children in more than 16,000 villages and 30 randomly selected villages in each district in the country². This is about twice the size of the rural sample of the NSS survey. Data on reading and basic mathematical ability were collected every year for all States in India, using household survey methodology. In ASER report, education achievement in different States has been portrayed using two scale i.e., reading ability and mathematical ability.

Reading ability has been tracked using two parameters and they are:

- (i) Percentage of children in standard III who can read a standard II level text.
- (ii) Percentage of children in standard V who can read standard II level text.

Mathematical ability of the students at elementary level is represented in ASER data in the following way:

- (i). Percentage of children who can do at least subtraction of the standard III level.
- (ii). Percentage of children who can do at least division of the standard V level.

The present study is solely based on ASER report, but we have considered the time period from 2010, the time period from which the Right to Education Act was implemented.

Methodology

Initially, we have arranged the State level data on reading ability and mathematical ability obtained by the ASER household survey over the years (from 2010 to 2016). Then, to get a proper indicator of learning outcome of the children at elementary level in different States and in different years, the Learning Outcome Index at standard III and standard V level were calculated. This Index is a composite Index obtained after taking the geometric mean of reading ability and mathematical ability of the children (in percentage term) in rural public schools in each State. Relative picture of learning outcome of the children in elementary education among 24 major States of India³ is shown by the Rank Analysis method. We have also calculated the Average Growth Rate (in per cent) at standard III level and standard V level among the different States of India. Later on, we intend to investigate possible family related and school related factors which may influence learning outcomes of the children in rural India on the basis of Panel Data Regression Analysis.

Learning Outcome Index (LOI)

It is already mentioned that this index is an indicator of the learning ability among

children enrolled in rural public school at standard III and standard V level. LOI_i = Learning Outcome Index for standard III level children of the i^{th} State is calculated by using the following method:

$$LOI_i = \sqrt{A_i B_i} \text{ where, } A_i \text{ indicates}$$

percentage of children of the i^{th} State who can read at least standard II level text in standard III and B_i indicates percentage of children of the i^{th} State who can do at least subtraction of standard III⁴. Higher value of LOI_i means better learning outcome among children at standard III level.

Table 1: The Values of LOI_i (in percentage) of Different States in Different Years

States	LOI_i 2010	LOI_i 2012	LOI_i 2014	LOI_i 2016
Andhra Pradesh	27.22	36	25.86	27.22
Arunachal Pradesh	22.7	31.7	19.9	12.25
Assam	20.96	12.53	12.92	15.92
Bihar	31.49	18.8	16.76	16.67
Chhattisgarh	16.97	13.78	12.16	17.94
Gujarat	17.21	15.3	14.77	19.88
Haryana	31.22	17.15	22.82	26.37
Himachal Pradesh	36.93	35.99	42.07	46.67
Jharkhand	18.84	13.89	10.26	11.97
Karnataka	20.51	23.75	18.95	22.01
Kerala	49.84	40.66	36.3	36.94
Madhya Pradesh	18.78	6.9	6.67	9.26
Maharashtra	35.23	28.02	24.34	30.45
Manipur	17.33	28.46	30	34.13
Meghalaya	16.82	25.73	23.15	19.11
Mizoram	51.2	38.65	39.35	20.15
Nagaland	22.35	28.65	20	23.55
Odisha	26.7	24.3	26.17	30.64
Punjab	36.08	36.88	27.81	33.33
Rajasthan	15.48	20.98	9.65	12.89
Tamil Nadu	11.19	11.06	18.51	22.11
Tripura	34.95	21.85	30.7	30.15
Uttar Pradesh	11.77	6.6	6.3	7.54
West Bengal	33.31	25.6	32.95	34.95
All India	23.61	18.18	17.2	19.74

Source: Calculated by the authors on the basis of the data given in ASER Report in different years.

The above Table shows that at all India level, LOI_i (overall India) marked a fall from 23.61 per cent in 2010 to 18.18 per cent in 2012, and further to 17.2 per cent in 2014, though it increased very slightly in 2016 by 2.54 per

cent as obtained by our calculation, based on ASER household survey over the years⁵. All the States except Andhra Pradesh, Arunachal Pradesh, Karnataka, Manipur, Meghalaya, Nagaland and Rajasthan marked a fall in their

LOI₁, while moving from 2010 to 2012. Similarly, while moving from 2012 to 2014, all the States except Haryana, Himachal Pradesh, Manipur, Odisha, Tamil Nadu, Tripura and West Bengal marked a fall in learning ability of the children in elementary education at standard III level. On the other hand, while moving from 2014 to 2016, all the States except Arunachal Pradesh, Meghalaya, and Mizoram marked a rise in the

value of Learning Outcome Index⁶.

Next we shall look at the learning outcome of the rural children at standard V level⁷ on the basis of LOI₂.

$LOI_{2i} = (A_i B_i)^{1/2}$ where, A_i indicates percentage of children in standard V who can read a standard II level text and B_i indicates percentage of children in standard V who can do at least division.

Table 2: The Values of LOI₂ (in percentages) of 24 Major States of India in Different Years

States	LOI ₂ 2010	LOI ₂ 2012	LOI ₂ 2014	LOI ₂ 2016
Andhra Pradesh	48.66	51.72	46.41	43.25
Arunachal Pradesh	34.1	47.6	39.5	14.2
Assam	31.03	17.21	16.59	17.14
Bihar	54.34	35.96	37.42	33.14
Chhattisgarh	48.02	24.01	25.77	30.8
Gujarat	29.2	23.96	24.9	27.54
Haryana	55.36	33.24	40.74	40.54
Himachal Pradesh	68.4	53.83	52.06	55.63
Jharkhand	44.05	25.56	22.63	25.06
Karnataka	28.32	28.66	27.62	26.85
Kerala	56.47	47.71	39.61	41.42
Madhya Pradesh	45.8	15.64	16.58	21.88
Maharashtra	53.22	33.42	29.3	34.88
Manipur	34.31	35.25	43.1	55.09
Meghalaya	51.26	31.79	16.5	21.7
Mizoram	62.5	48.4	42.1	33.15
Nagaland	33.85	34.8	22.85	25.4
Odisha	37.74	28.16	31.26	34.08
Punjab	69.74	58.12	47.53	52.24
Rajasthan	33.37	18.16	20.32	25.75
Tamil Nadu	20.87	17.03	35.74	32.51
Tripura	37.95	28.5	33	33.15
Uttar Pradesh	25.95	15.26	18	15.9
West Bengal	45.44	37.39	40.27	37.82
All India	41.457	29.09	29.55	29.62

Source: Calculated by the author on the basis of the data given in ASER Report in different years.

If we look at the all India picture, it is observed that the value of LOI₂ among children has marked a fall from 41.457 per cent in 2010

to 29.09 per cent in 2012⁸. It has increased very slightly in 2014 by 0.46 per cent only i.e., from 29.09 to 29.55 per cent, but later in 2016, it

remained more or less stagnant as obtained by our calculation based on ASER household survey over the years. All the States except Andhra Pradesh and Arunachal Pradesh marked a fall in their Learning Outcome Index, while moving from 2010 to 2012. Similarly, while moving from 2012 to 2014, all States except Bihar, Chhattisgarh, Haryana, Manipur, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh, Tripura and West Bengal marked a fall in LOI₂. On the other hand, while moving from 2014 to 2016, States except Andhra Pradesh, Arunachal

Pradesh, Bihar, Mizoram, Tamil Nadu, Uttar Pradesh and West Bengal have marked a rise in the value of the LOI₂.⁹

To draw a comparative analysis of learning outcomes among children in different States of India over the time, we have considered the Rank Analysis Method. For the Rank Analysis, we have arranged the data of Learning Outcome Index of standard III and standard V children over the years and then drawn an inter-state comparison taking the highest level as rank 1 and so on.

Table 3: Ranking of Different States in Terms of LOI₁ in Different Years (for Standard III Level Children)

States	LOI ₁ 2010	LOI ₁ 2012	LOI ₁ 2014	LOI ₁ 2016
Andhra Pradesh	10	4	9	9
Arunachal Pradesh	12	6	14	21
Assam	14	21	19	19
Bihar	8	16	17	18
Chhattisgarh	20	20	20	17
Gujarat	19	18	18	15
Haryana	9	17	12	10
Himachal Pradesh	3	5	1	1
Jharkhand	16	19	21	22
Karnataka	15	13	15	13
Kerala	2	1	3	2
Madhya Pradesh	17	23	23	23
Maharashtra	5	9	10	7
Manipur	18	8	6	4
Meghalaya	21	10	11	16
Mizoram	1	2	2	14
Nagaland	13	7	13	11
Odisha	11	12	8	6
Punjab	4	3	7	5
Rajasthan	22	15	22	20
Tamil Nadu	24	22	16	12
Tripura	6	14	5	8
Uttar Pradesh	23	24	24	24
West Bengal	7	11	4	3

Source: Calculated by the author on the basis of the data given in ASER Report in different years.

From the above Table it is observed that:

- (i) Mizoram attains the highest rank in LOI₁ in 2010 and in 2012 and 2014, its position falls to the second highest position, but its position falls badly in 2016 and its rank in LOI₁ falls to 14.
- (ii) Himachal Pradesh marked a rise in rank and attains the highest position in 2014 and maintains this position later on. Andhra Pradesh and Arunachal Pradesh, both the States marked a remarkable rise in its rank from 2010 to 2012, but it is a temporary improvement. Manipur marked an improvement in its position over the years. Meghalaya marked an improvement in its rank from 2010 to 2012 by 11 points and then its rank deteriorated slightly by one point and later on its position again deteriorated by five points. West Bengal marked a remarkable rise in its rank from 2012 to 2014 by seven points, later on in 2016, its position as shown by rank in LOI₁ improved by one point.
- (iii) Assam marked a remarkable fall in its rank in LOI₁ by seven points in 2012. Later on, its rank improved by two points and maintained its position till 2016. Bihar's rank in LOI₁ also fell by eight points from 2010 to 2012. Haryana also marked a fall in its rank by eight points from 2010 to 2012, but later it marked a rise in rank by four points and again a rise in rank by two points.

**Table 4: Ranking of Different States in Terms of LOI₂ in Different Years
(for Standard V Level Children)**

States	LOI ₂ 2010	LOI ₂ 2012	LOI ₂ 2014	LOI ₂ 2016
Andhra Pradesh	9	3	3	4
Arunachal Pradesh	17	6	9	23
Assam	20	21	22	21
Bihar	6	8	10	11
Chhattisgarh	10	18	16	13
Gujarat	21	19	17	14
Haryana	5	12	6	6
Himachal Pradesh	2	2	1	1
Jharkhand	13	17	19	17
Karnataka	22	14	15	15
Kerala	4	5	8	5
Madhya Pradesh	11	23	23	19
Maharashtra	7	11	14	8
Manipur	16	9	4	2
Meghalaya	8	13	24	20
Mizoram	3	4	5	10

(Contd.....)

Table 4 (Contd.....)

States	LOI ₂ 2010	LOI ₂ 2012	LOI ₂ 2014	LOI ₂ 2016
Nagaland	18	9	18	18
Odisha	15	16	13	9
Punjab	1	1	2	3
Rajasthan	19	20	20	16
Tamil Nadu	24	21	11	12
Tripura	14	14	12	10
Uttar Pradesh	23	24	21	22
West Bengal	12	7	7	7

Source: Calculated by the authors on the basis of ASER Report in different years.

Next, the ranking of different States-based on LOI₂ in different years will be considered.

From the above Table, we can observe the following facts:

- (i) Punjab attains the highest rank in LOI₂ in 2010 and 2012 and later on, Himachal Pradesh occupied this position in 2014 and 2016.
- (ii) Andhra Pradesh marked a remarkable rise in its rank from 2010 to 2012 by six points and maintains this improved position till 2014. Later on, in 2016, its rank fell slightly by one point. Arunachal Pradesh had marked an improvement in its rank from 2010 to 2012, but it is a temporary improvement. Nagaland had also marked a temporary improvement in rank from 2010 to 2012. Karnataka had shown a remarkable rise in its rank of LOI₂ from 2010 to 2012. Similarly, Manipur had shown a remarkable rise in its rank of LOI₂ from 2010 to 2012 by seven points and then again its rank rose by five points in 2014 and later on by two points in 2016. Tamil Nadu had also

shown a remarkable rise in its rank of the learning outcome index from 2012 to 2014. Similarly, West Bengal had also marked a remarkable improvement in its rank from 2010 to 2012 and maintains this improved position in the latter year.

- (iii) Chhattisgarh marked a remarkable fall in rank from 2010 to 2012 by eight points, but then in 2014, its rank has improved by two points and later by three points in 2016. Madhya Pradesh had shown a remarkable fall in its rank in LOI₂ from 2010 to 2012 by 12 points. Meghalaya had shown a remarkable fall in its rank from 2010 to 2014.

From Table 3 and Table 4, it is observed that there is a fluctuation of ranks of the States, both of LOI₁ and LOI₂, in different years. Further, we have to investigate whether there is any average enhancement of LOI₁ and LOI₂ of different States over the years. This will indicate whether the learning outcome of the children in different States at elementary level are improving or not over the years. The Average Annual Growth rate of LOI₁ and LOI₂ reflects how LOI₁ and LOI₂ have changed over time within

Table 5: Change of Average Growth Rate while Moving from Standard III Level Children to Standard V Level

States	Children	
	Average Growth Rate of LOI ₁ between 2010 to 2016 (AGR ₁)	Average Growth Rate of LOI ₂ between 2010 to 2016 (AGR ₂)
Andhra Pradesh	3.116	-3.595
Arunachal Pradesh	-12.006	-13.825
Assam	-4.629	-14.941
Bihar	-17.228	-13.733
Chhattisgarh	5.659	-7.717
Gujarat	6.678	-1.14
Haryana	1.183	-5.961
Himachal Pradesh	8.427	-5.910
Jharkhand	-11.913	-14.233
Karnataka	3.911	-1.738
Kerala	-10.301	-9.306
Madhya Pradesh	-9.253	-9.291
Maharashtra	-2.832	-10.162
Manipur	27.8	17.609
Meghalaya	8.498	-18.187
Mizoram	-23.830	-18.944
Nagaland	5.248	-6.791
Odisha	5.262	-1.785
Punjab	-0.842	-8.324
Rajasthan	5.033	-2.322
Tamil Nadu	28.548	27.474
Tripura	0.41	-2.885
Uttar Pradesh	-9.596	-11.635
West Bengal	3.877	-5.365
All India	-4.540	-9.337

Source: Calculated by the author on the basis of the data given in ASER Report in different years.

discussing time period. It may take positive or negative value. It is very much useful because it reflects the trend of the variable.

1. It is found that all India average growth rate in terms of learning outcome for both standard III (4.540) and standard V (-9.337) have marked a fall over time.
2. For standard III children, it is observed that Arunachal Pradesh, Assam, Bihar,

Jharkhand, Kerala, Madhya Pradesh, Mizoram, Uttar Pradesh marked a fall in their average growth rate over time. Similarly, for standard V children in rural India, it has been observed that all the States except Manipur and Tamil Nadu marked a fall in their Average Growth Rate.

3. The highest fall in the average growth rate is shown in Mizoram i.e., fall of (-23.830) for standard III children and (-18.944) for standard V children, similarly the highest growth in the average growth rate is shown in Tamil Nadu i.e., (28.548) for standard III children and (27.474) for standard V children.

Thus, it can be concluded that despite the fall in Average Growth Rate of learning ability, there are few States which marked a rise in it over the years.

Possible factors (both household and school related) which may influence the learning outcome of the rural children of India in elementary education:

Coleman (1966) claimed that the learning outcomes of the children are very much dependent on family background. Kundu and Dutt (2015) also observed that 'motivation' of the parents play a significant role on learning outcome of their children. 'Motivation' is very much dependent on the education level of the parents and economic condition of the households in which the children belong. It is observed that despite 96 per cent enrolment in primary education, India's education system fails to capitalise on providing quality education to their children even at the elementary level. According to Filmier and Pritchett (1998), household wealth and parent's education have a positive correlation with children's educational outcome. As we are analysing on

the basis of ASER data, we have to consider the State-specific family and school related factors which are available in ASER report only. Caste and gender factors are not reflected in ASER data. These two factors here are not considered. Hence, the possible factors which can influence the Learning Outcome Index are as follows:

1. Mother's Education (ME):

Literate women play a major role in socio-economic development. With the passage of time, the literacy rate amongst women in India has gone up from 0.69 per cent in 1901 to 24.82 per cent in 1981 (Census report 1981). But still in Twentieth century, nearly three-fourths of women in rural areas are illiterate (ASER, 2014). There is a possible positive correlation between parental education, especially mothers' education and offspring education (Chevalier and Arnaud, 2004). If mother is able to read, then the child born to that mother is 50 per cent more likely to survive to the age of five as educated mothers are more likely to immunise their children compared to illiterate mothers (UN Millennium Project, 2006). This is important because there is a high positive relationship between child's health and learning ability.

Mother's education is divided here into four sections:

1. Percentage of mother's of the i^{th} State who are illiterate (MEI_i).
2. Percentage of mother's of the i^{th} State that has attained school education till standard V (MEV_i).

3. Percentage of mother's of the i^{th} State that has attained school education till standard X (MEX_i).
4. Percentage of mother's of the i^{th} State who have achieved education qualification above Standard X (MEX_{+i}).

Data here are collected in a particular time period.

2. Fathers' Education (FE):

Studies have found that there is a strong link between the education as well as earnings of the father and his offspring. For example, the inter-generational correlation in earnings between father and son varies between 0.40 & 0.50 in the U.S. and 0.60 in U.K. (Chevalier Arnaud *et.al.* 2005).

Father's education is also divided here into four classes:

- (i). Percentage of father's of the i^{th} State who are illiterate (FEI_i).
- (ii). Percentage of father's of the i^{th} State who have attained school education till standard V (FEV_i).
- (iii). Percentage of father's of the i^{th} State who have attained school education till standard X (FEX_i).
- (iv). Percentage of father's of the i^{th} State who have achieved education qualification above standard X (FEX_{+i}).

Besides parental education, there are few other household-specific factors which may influence the learning outcome of the children. These are as follows:

3. Percentage of Households of the i^{th} State who have Pucca House (PH_i):

Pucca household may be an important parameter determining education quality in rural areas. It elevates financial status of the family. House is a 'turning point' in the lives of the poor, which leads towards a better life and so 'Housing for All' scheme is launched in June, 2016. It gives security to a child, particularly to a girl child. It is expected that a child in pucca house can devote more concentration in his/her studies.

4. Percentage of Households of the i^{th} State who have Electric Connection (EC_i):

Without electric connection, children face obstacles in completing their homework and preparing their lessons. Studying under kerosene lamp or candle light also causes stress to the child's vision. In India, students whose households are electrified are more likely to complete grade-appropriate tests successfully as compared to their counterparts whose households are not electrified (Kanagawa and Nakata, 2008). Thus, proper electric connection provides a better ambiance for children in pursuing their education.

5. Percentage of Households of the i^{th} State who have Proper Sanitation (PS_i):

Without proper sanitation, human waste goes into the water of the ponds, lakes or rivers. This water is further used for washing clothes, dishes or even used for drinking purpose in rural areas. Thus, many people are prone to many water-borne diseases like diarrhoea,

dysentery, cholera, etc. Globally, nearly five thousand children die every day because of the lack of sanitation facility (Unitarian Universalist Association, 2001). Swachh Bharat Abhiyan (Clean India Movement) is a campaign by the Government of India to reduce or eliminate open defecation through construction of individual, cluster and community toilets, but India has failed to achieve 100 per cent in availability of proper sanitation facility. To maintain hygiene, toilet facility at home is essential which can reduce the possibility of illness among children.

As information about income level of the sample household is not available, here we consider pucca household, electric connection and proper sanitation as a proxy variable of household asset as well as financial condition. Children from financially disadvantaged families appear to be less well prepared for the transition to school due to the impact of financial stress on family relationships, which affect children's social/emotional readiness (Smart et al., 2008).

Next, we consider possible school related factors which may influence the learning outcome of the rural children of India in elementary education.

Pupil-Teacher Ratio (PTR_{it}) : Pupil-teacher ratio is the number of students who attend a school divided by the number of teachers in the institution. It is an indicator of the amount of individual attention any single child is likely to receive keeping in mind that not all class sizes are going to be the same. Teachers who

have fewer students in their classrooms will be able to spend more attention to individual students which may improve his/her chances for academic success. Thus, it is a tool to measure teacher workload as well as allocation of resources. RTE mandates an optimal pupil-teacher ratio of 30:1 for primary schools and 35:1 for pre-primary schools for all the Indian schools.

Percentage of Schools of the i^{th} State who have Playground Facility (P_{it}) : Schools which have playground will enable the children to be physically and mentally active which will in turn affect the intellectual and social well-being of the children. It is important for children to have fun and relaxation for good health. For many children, school playtime is the most active part of their day. Improvement in the physical and mental health of children occurred as a result of play facilities in the school premises may affect the quality of education achievement.

Percentage of Schools of the i^{th} State who have Availability to Proper Drinking Water (DW_{it}) : Availability of proper drinking water in schools will help to increase student's overall water consumption, maintain hydration, reduce the possibility to get affected in various water-borne diseases. Proper hydration can also improve academic and physical performance of the students.

Percentage of Schools of the i^{th} State in the t^{th} Period who have Proper Toilet Facilities Available and Useable (TS_{it}) : Lack of sanitation facility may increase the possibility to get infected by water borne diseases like diarrhoea,

dysentery, cholera, etc. Availability of proper sanitation in educational institutions can create improved learning environment, also facilitating increased attendance and retention of students, mainly girl students.

Percentage of Schools of the i^{th} State in the t^{th} Period where Mid-day Meal is Served on the Day of Visit(MTM_{it}) : This scheme is important for improving enrolment, attendance and retention of primary school children. Students with improved nutrition are more active in class which leads to improved learning outcome among themselves. Poor rural people are so poor that they are unable to provide two-time meal to their children and so Mid-day Meal scheme will work as a catalyst to drive children to school.

Model 1

The Static Panel Regression model can be explained in the following way:

$$LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, EC_{it}, PS_{it}, PTR_{it}, P_{it}, DW_{it}, TS_{it}, MTM_{it}\} \dots \dots \dots \text{Eq. (1)}$$

$$LOI_{2it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, EC_{it}, PS_{it}, PTR_{it}, P_{it}, DW_{it}, TS_{it}, MTM_{it}\} \dots \dots \dots \text{Eq. (2)}$$

Where $i = (1 \text{ to } 24)$ and $(t = 1 \text{ to } 4)$. Here $t=2010, 2012, 2014, 2016$ and 24 States of India is considered as cross sectional unit. Here we have considered a gap of two years as children need two years to get promoted from standard III level to standard V level as there is no retention policy.¹⁰

Table 6: Descriptive Statistics of Both the Explained and Explanatory Variables

Statistic/ Year	2010	2012	2014	2016
Learning Outcome Index for standard III student (LOI_1)				
Mean	26.045	23.467	22.015	23.420
Cv	0.4099	0.4198	0.4448	0.4121
Median	22.525	24.025	21.41	22.06
Min	11.19	6.6	6.3	7.54
Max	51.2	40.66	42.07	46.67
Min State	Tamil Nadu	Uttar Pradesh	Uttar Pradesh	Uttar Pradesh
Max State	Mizoram	Kerala	Himachal Pradesh	Himachal Pradesh
Learning Outcome Index for standard V student (LOI_2)				
Mean	43.747	32.974	32.075	32.463
Cv	0.3005	0.3786	0.3316	0.3454
Median	44.745	32.515	32.13	32.825
Min	20.87	15.26	16.5	14.2
Max	69.74	58.12	52.06	55.63
Min State	Tamil Nadu	Uttar Pradesh	Meghalaya	Arunachal Pradesh
Max State	Punjab	Punjab	Himachal Pradesh	Himachal Pradesh

(Contd.....)

Table 6 (Contd.....)

Percentage of households who have a pucca house(PH)				
Mean	28.754	32.895	39.170	40.895
Cv	0.6781	0.7047	0.6682	0.6280
Median	21.4	26.05	34.55	35.3
Min	2.4	2	5.9	5.4
Max	61.5	78.3	90.4	84.6
Min State	Tripura	Tripura	Mizoram	Mizoram
Max State	Tamil Nadu	Kerala	Kerala	Tamil Nadu
Percentage of households who have electric connection (EC)				
Mean	79.462	82.462	87.4	88.95
Cv	0.2339	0.1876	0.1510	0.1221
Median	85.65	86.2	91.9	93.35
Min	38.2	39.8	49.8	56.9
Max	99.1	98.4	99.2	99.3
Min State	Bihar	Bihar	Bihar	Uttar Pradesh
Max State	Himachal Pradesh	Punjab	Punjab	Punjab
Percentage of households who have proper sanitation (PS)				
Mean	52.712	54.175	59.762	67.320
Cv	0.4461	0.4815	0.4515	0.3287
Median	51.7	53.65	57.65	65.2
Min	15	10.6	9.7	21.7
Max	96	97	97.8	97.8
Min State	Jharkhand	Jharkhand	Jharkhand	Jharkhand
Max State	Kerala	Kerala	Kerala	Kerala
Percentage of schools complying with pupil-teacher ratio (PTR_{it})				
Mean	50.12	53.308	58.654	60.579
Cv	0.494	0.4605	0.382	0.3537
Median	50.65	52.45	60.35	60.05
Min	8.8	8.5	12.7	11.7
Max	91.9	93	96.6	97.1
Min State	Bihar	Bihar	Bihar	Bihar
Max State	Nagaland	Nagaland	Kerala	Nagaland
Percentage of schools with playground facility (P_{it})				
Mean	61.625	59.954	63.88	64.383
Cv	0.2351	0.2672	0.236	0.237
Median	61.35	58.75	65.2	66.8
Min	37.9	31.4	32.4	29.2
Max	89.5	92	88.3	89.9
Min State	Jharkhand	Odisha	Odisha	Odisha
Max State	Tripura	Tripura	Maharashtra	Maharashtra

(Contd.....)

Table 6 (Contd.....)

Percentage of schools with availability of proper drinking water (DW _{it})-				
Mean	65.041	66.229	68.829	67.7458
Cv	0.3109	0.3340	0.3079	0.3056
Median	72.05	73.8	77.3	75.55
Min	5.1	7.1	15.7	15.3
Max	85.7	85.1	90.4	89.5
Min State	Manipur	Manipur	Manipur	Manipur
Max State	Kerala	Kerala	Bihar	Bihar
Percentage of schools with proper toilet facilities available and useable (TS _p)-				
Mean	46.162	55.108	64.283	68.05
Cv	0.2781	0.2315	0.2352	0.2049
Median	46	52.5	63.75	69.3
Min	24.5	31.7	33.7	40
Max	67.9	75.7	84.8	85.5
Min State	Meghalaya	Meghalaya	Mizoram	Mizoram
Max State	Haryana	Kerala	Kerala	Haryana
Percentage of schools where Mid-day meal is served on the day of visit (MTMit)				
Mean	80.987	81.595	78.745	82.283
Cv	0.2516	0.259	0.270	0.2440
Median	93.15	91.75	87.2	91.75
Min	31.9	30.5	24.1	24.6
Max	100	99.8	99.8	99.5
Min State	Nagaland	Meghalaya	Nagaland	Nagaland
Max State	Kerala	Tamil Nadu	Tamil Nadu	Andhra Pradesh
Mother Schooling Over Time (ME)				
Percentage of mother's who are illiterate (ME I)				
Mean	39.308	39.3125	37.616	35.329
Cv	0.4335	0.4447	0.4941	0.4847
Median	40.9	39.45	36.65	34.65
Min	1.0	1.4	0.9	1.3
Max	68.9	71.2	69.7	68
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Percentage of mothers who have attained school education till standard V (ME V)				
Mean	19.379	17.679	16.895	16.120
Cv	0.2245	0.3194	0.3309	0.3161
Median	19.5	17.2	16.35	15.05
Min	5.3	5	3.4	3.7
Max	26.7	30.1	27.6	28.7
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Meghalaya	Mizoram	Mizoram	Mizoram

Table 6 (Contd.....)

Percentage of mothers who have attained school education till standard X(ME X)				
Mean	33.25	34.245	35.291	36.991
Cv	0.3720	0.3425	0.3336	0.3055
Median	32.6	35.55	37.15	38.85
Min	12.9	13.2	14.5	15.3
Max	61.2	57.5	53.8	54.7
Min State	Rajasthan	Rajasthan	Rajasthan	Rajasthan
Max State	Kerala	Kerala	Mizoram	Kerala
Percentage of mothers whose education qualification is above standard X (ME X ₊)				
Mean	8.075	8.775	10.204	11.5875
Cv	0.8210	0.8088	0.8499	0.7483
Median	6	6.6	7.35	8.1
Min	3	2.5	3	3.4
Max	32.5	36.1	42.7	40.3
Min State	Chhattisgarh	Rajasthan	Jharkhand	Rajasthan
Max State	Kerala	Kerala	Kerala	Kerala
Father Schooling Over Time (FE)				
Percentage of fathers who are illiterate (FE I)				
Mean	24.491	23.662	23.083	22.325
Cv	0.4519	0.4231	0.4995	0.4546
Median	26.05	25.1	22.8	24.5
Min	0.4	1.3	1.1	1.6
Max	42	41	51	41.2
Min State	Kerala	Kerala	Kerala	Kerala
Max State	Meghalaya	Meghalaya	Arunachal Pradesh	Meghalaya
Percentage of fathers who have attained school education till standard V (FE V)				
Mean	16.666	16.666	15.483	14.866
Cv	0.2731	0.3178	0.3367	0.3029
Median	16.9	16.4	14.7	14.05
Min	5.6	7.7	6.9	6.9
Max	24.5	27.6	28.2	24.2
Min State	Manipur	Manipur	Kerala	Kerala
Max State	West Bengal	Tripura	West Bengal	Mizoram
Percentage of fathers who have attained school education till standard X (FE X)				
Mean	41.675	42.295	42.725	43.433
Cv	0.2126	0.1850	0.1896	0.1557
Median	39.65	39.85	40.55	41.05
Min	29.1	28.2	26.6	31.7
Max	68	63.9	62.1	62.7
Min State	Meghalaya	Meghalaya	Arunachal Pradesh	Meghalaya
Max State	Kerala	Kerala	Kerala	Kerala

(Contd.....)

Table 6 (Contd.....)

Percentage of fathers who have achieved education qualification above standard X (FE X ₊)				
Mean	17.191	17.379	18.729	19.395
Cv	0.3628	0.3377	0.3830	0.3808
Median	15.15	15.85	16.9	17.05
Min	9.1	9.3	9	8.0
Max	35.8	30.3	34.6	38.5
Min State	Jharkhand	Meghalaya	Arunachal Pradesh	Meghalaya
Max State	Manipur	Himachal Pradesh	Himachal Pradesh	Himachal Pradesh

Source: Calculated by the author on the basis of the data given in ASER Report in different years.

LOI_{it} represents the Learning Outcome Index of the State i in the tth year at two different levels in both the equations.¹¹

Before moving to regression result, Table-6 will concentrate on summary statistics of the variables.

Result of Panel Regression Model

Before going for regression analysis, it is required to check whether there exists any problem of multi-collinearity among the explanatory variables mentioned in Eq.(1) and Eq.(2).

It is observed that 'EC and 'PS'¹² & 'DW' and 'MDM'¹³ are highly collinear.

Hence, equation (1) can be expressed in the following ways to rule out the problem of multi-collinearity:

$$\emptyset \quad LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, EC_{it}, PTR_{it}, P_{it}, TS_{it}, DW_{it}\} \dots \dots \dots Eq(1a)$$

$$\emptyset \quad LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, EC_{it}, PTR_{it}, P_{it}, TS_{it}, MTM_{it}\} \dots \dots \dots Eq(1b)$$

$$\emptyset \quad LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, PS_{it}, PTR_{it}, P_{it}, TS_{it}, MTM_{it}\} \dots \dots \dots Eq(1c)$$

$$\emptyset \quad LOI_{1it} = f\{MEI_{it}, MEV_{it}, MEX_{it}, MEX_{+it}, FEI_{it}, FEV_{it}, FEX_{it}, FEX_{+it}, PH_{it}, PS_{it}, PTR_{it}, P_{it}, DW_{it}, TS_{it}\} \dots \dots \dots Eq(1d)$$

Similarly, Eq (2) representing the variables which might affect LOI_{2it}. It can also be expressed in this way.

Before moving towards panel regression, it is necessary to check whether fixed effect or random effect technique is necessary in the regression. The Hausman test suggests rejecting the null hypothesis. Hence fixed effect panel regression is appropriate¹⁴.

Table 7: Regression Results (LOI₁)

Dependent variable	LOI ₁ (Excluding electric connection and drinking water)	LOI ₁ (Excluding electric connection and Mid-day meal availability on day of visit)	LOI ₁ (Excluding household sanitation and availability of drinking water in school)	LOI ₁ (Excluding household sanitation and Mid-day meal availability on day of visit)
Name of the Independent variable	Value of Coefficient	Value of Coefficient	Value of the Coefficient	Value of Coefficient
No schooling (mother)(MEI)	-2.217449* (0.6147986)	-2.190251* (0.6162269)	-2.057299* (0.5991574)	-2.041881* (0.5987349)
Standard I-V (mother)(MEV)	-1.272604** (.6263927)	-1.251943* (0.6328464)	-1.165876* (0.613621)	-1.176305* (0.618469)
Standard V-X(mother)(MEX)	-2.245936* (0.6892552)	-2.175471* (0.673576)	-2.000497* (0.7348698)	-1.94784* (0.7202709)
Above standard (mother)(MEX ₊)	0.1514887** (0.0874134)	0.11566391* (0.089552)	0.1562912* (0.0869988)	0.1554143* (0.0888805)
No schooling (father) (FEI)	7.799128 (10.99383)	7.694323 (10.9978)	9.326585 (11.08655)	9.471761 (11.22587)
Standard I-V (father)(FEV)	6.168898 (11.15464)	6.096178 (11.1468)	7.761001 (11.25848)	7.927864 (11.38614)
Standard V-X(father)(FEX)	8.44787 (10.99077)	8.32146 (11.00353)	9.878858 (11.06527)	9.99473 (11.1996)
Above standard X (father)(FEX ₊)	6.363298 (11.06542)	6.232522 (11.07864)	7.913081 (11.16351)	8.056242 (11.30761)
Pucca Household(PH)	-0.3854666* (0.1353877)	-0.3710789 (0.1321503)	-0.3571798* (0.1378951)	-0.3470202* (0.1352846)
Household Sanitation(PS)/ Electric Connection(EC)	-0.0164532 (0.1002912)	-0.0202467 (0.098163)	-0.0131698 (0.1235555)	-0.0957797 (0.1288569)
Pupil-Teacher Ratio (PTR)	0.0484265 (0.0891258)	0.0448304 (0.084831)	0.0540296 (0.0887622)	0.0445774 (0.084522)
Playground facility(P)	0.02388779* (0.0962931)	0.02377814* (0.0958585)	0.0226244* (0.0930407)	0.02348659* (0.0900434)
Toilets available and useable (TS)	-0.104484 (0.0764595)	-0.039372 (0.1471428)	-0.0787138 (0.0791915)	0.0004404 (0.1547687)
Mid-day Meal served in school on day of visit (MDM)/ availability of drinking water in school(DW)	0.0166075 (0.0954837)	-0.1005626 (0.0782615)	0.0326762 (0.095844)	-0.0834525 (0.0781487)
R ² (within)	0.4805	0.4808	0.4802	0.4810

*=> significant at 1% level, **=> significant at 5% level and ***=> significant at 10% level.

Discussion

On the basis of the results shown in Table 7, we can mention the following observations:

1. High percentage of illiteracy among mothers creates a negative impact on learning achievement of the children in standard III. Learning achievement of the children in standard III will be much better if mothers have at least studied till standard X. Mothers with education qualification till standard X fail to create any impact on standard III level children.
2. Schools with playground enabled the children to be physically and mentally active which results in the intellectual and social well-being of children. Improvement in the physical and mental health of children as a result of play facilities in the school premises has a positive impact on the quality of education achievements in standard III.
3. Availability of pucca house which is an indicator of rural economic condition fails to create any impact on standard III level children. It has been found that better drinking water facility, sanitation facility at school, and even availability of mid-day meal and better pupil-teacher ratio cannot create any positive outcome on the learning achievement of the children in standard III.

Table 8: Regression Results(LOI₂)

Dependent variable	LOI2 (Excluding electric connection and drinking water)	LOI2 (Excluding electric connection and Mid- day Meal availability on day of visit)	LOI2 (Excluding household sanitation and availability of drinking water in school)	LOI2 (Excluding household sanitation and Mid- day Meal availability on day of visit)
Name of the independent variable	Value of Coefficient	Value of Coefficient	Value of Coefficient	Value of Coefficient
No schooling (mother) MEI	-1.902861* (0.888957)	-1.909612* (0.9165121)	-2.101004* (0.8775242)	-2.010852* (0.896374)
Standard I-V (mother)(MEV)	1.062289 (0.9056588)	0.6281015 (0.9412301)	0.9066571 (0.8987076)	0.5259236 (0.9259183)
Standard V-X (mother)(MEX)	-3.153653* (0.9965475)	-2.762899* (1.001807)	-3.123501* (1.076288)	-2.625144* (1.078327)
Above standard X (mother)(MEX ₊)	0.0130776 (0.1263852)	-0.0528098 (0.1331936)	0.0248741 (0.1274181)	-0.0442485 (0.1330642)
No schooling (father) (FEI)	-26.69636** (15.89524)	-20.13659 (16.35699)	-24.77906 (16.23733)	-17.34738 (16.8064)
Standard I-V (father) (FEV)	-30.93406 (16.12774)	-24.29682 (16.57859)	-29.02496** (16.48915)	-21.49329 (17.04634)
Standard V-X (father)(FEX)	-25.20741 (15.89081)	-19.13476 (16.36551)	-23.46944 (16.20616)	-16.56101 (16.76707)
Above standard X (father) (FEX ₊)	-21.25525 (15.99874)	-20.68589 (16.47722)	-25.80187 (16.35005)	-18.28209 (16.92877)
Pucca Household(PH)	-0.471094* (0.195748)	-0.3925863** (0.1965466)	0.4152367* (0.2019608)	0.3325004*** (0.205363)
Household Sanitation(PS)/Electric Connection(EC)	0.1427649 (0.1450042)	0.1163107 (0.1484564)	-0.0657032 (0.180959)	-0.1153127 (0.1929133)
Pupil-Teacher Ratio (PTR)	0.092365 (0.1288609)	-0.0362582 (0.1262612)	0.0909022 (0.1300009)	-0.0363567 (0.126539)
Playground facility(P)	0.3264113* (0.1392237)	0.5539213* (0.1825701)	0.3707046* (0.1362672)	0.5018124* (0.1848052)
Toilet available and useable (TS)	0.03225243* (0.1105477)	0.3956822* (0.116398)	0.2613341* (0.1159837)	0.3824887* (0.1303251)
Mid-day meal served in school on day of visit (MDM)/availability of drinking water in school(DW)	0.3989553* (0.1380535)	0.4768589* (0.218845)	0.3924303* (0.1403734)	0.3313121* (0.1169974)
R ² (within)	0.5933	0.5699	0.5874	0.5680

*=> significant at 1% level, **=> significant at 5% level and ***=> significant at 10% level.

Discussion

On the basis of the results shown in Table-8, we can mention the following observations:

1. High percentage of illiteracy among mothers and fathers creates a negative impact on learning achievement of the children in standard V. Mothers with education qualification till standard X fail to create any positive impact on standard V level children.
2. Schools with playground facility have positive impact on the quality of education achievement in standard V.
3. Availability of proper drinking water, sanitation facility and Mid-day Meal in school leads in overall well-being of the children which results in better academic achievement for standard V children.
4. Availability of pucca household which is an indicator of rural economic condition fails to create any impact on standard V children. It has also been found that better pupil-teacher ratio at school and household electric connection and sanitation i.e., assets of household economic condition cannot create any positive outcome on the learning achievement of the children even at elementary level.

Concluding Statements and Policy Implications

From the ASER data, it is found that parental education has a positive impact on

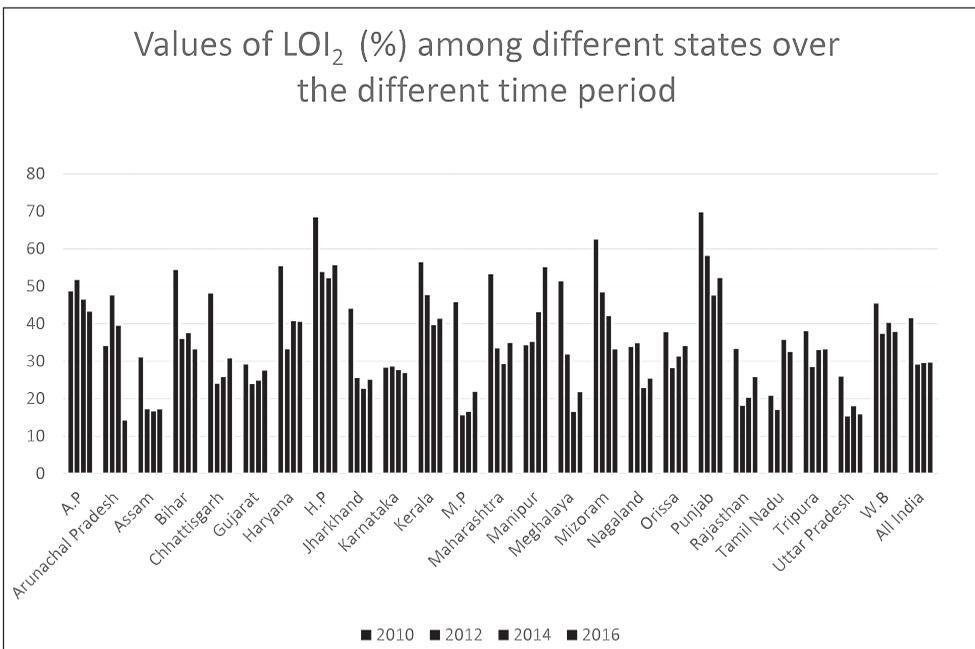
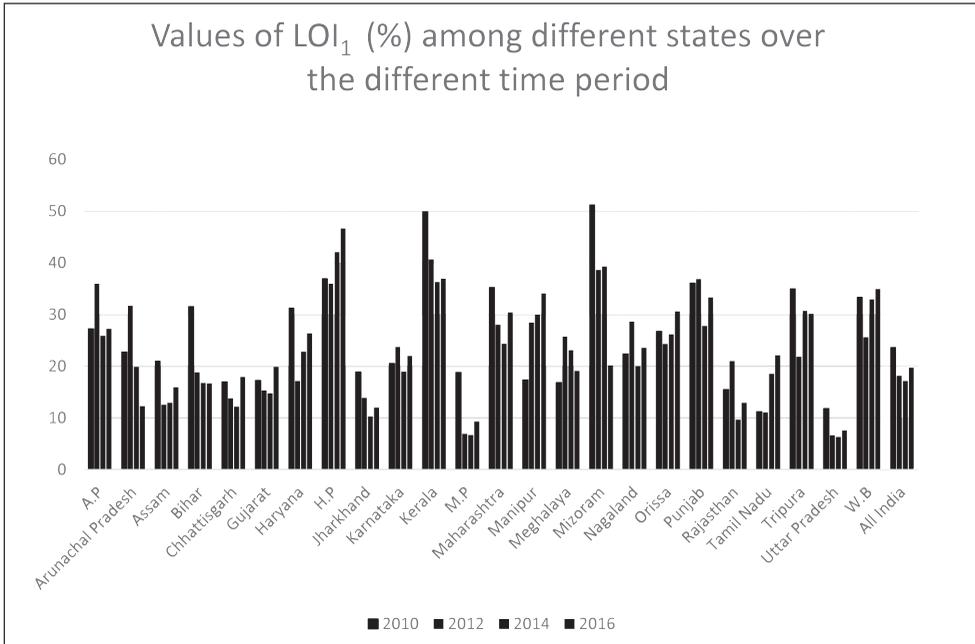
child's education. Hence to improve the learning outcome of the children at elementary level, expansion of education among the parents is important. Availability of playground facility in the school, availability of mid-day meal, drinking water and proper sanitation at school creates a positive impact on standard V level children to improve their quality of education.

According to last NSSO Employment-Unemployment Report 2011-12, more than 80 per cent workers of India are informal in nature. Their wage /salary income is not very high and a major part of their income is spent for consumption purpose. Very few amount of money is left to bear the direct cost of education for their children. Poor family inherits less, has to work as unskilled and fewer bequests/leaves for their next generation. Thus, they are trapped in the vicious circle (Galor Zeira, 1993). Government of India has taken many initiatives to reduce the direct cost of education through different types of subsidised programmes, both at elementary level and secondary level. India follows strategy of decentralisation of educational management through Central, State and Panchayati Raj. Central government has taken many policies like National Programme for Education of Girls at Elementary level (NPEGEL) for encouraging female literacy and reducing the Gender Parity Index. Similarly, various programmes are also undertaken by the State government like Kanyashree, Sikhashree, programme implemented in West Bengal to increase female literacy, etc. Other programmes like Balika Samruddhi Yojana, Ladli Scheme, Beti Hai Anmol

Yojana, etc., are implemented in different States of India to promote girl's education. If a girl receives education, then in her next generation, i.e., motherhood she tends to send her child to school to become educated because educated parents know the importance of education so they are more involved in their child's education. Every child's first education begins at home, then after attaining a certain age, they take admission to school and their school-based education starts. It is found that some of the inter-generational effects of education may be transmitted through parents. More educated parents provide an environment which improves their children's opportunities and decision process. A mother knows best and the amount of education she attains can predict her children's success in reading and mathematical skills. So, government apart from giving importance on child education, should also give more stress on adult education, mainly

education among mothers. That can be done through local Panchayat or NGOs. Government needs to take strong steps in this matter so that girls get proper education, thus their next generation receives proper schooling and can work as skilled worker in their adult age by improving their learning abilities. According to RTE guidelines, a school must have playground, proper drinking water, sanitation, Mid-day Meal facility, but unfortunately some places are still lacking these amenities. These facilities in school can make a child more attractive to school and thus can devote more quality time in school education. It is required to find out whether the benefit of this policy reaches to every corner of the society. The demographic dividend of India's population can be achieved if and only if the learning outcomes of the children improve so that in their adulthood, they can work as skilled worker.

Appendix



Notes

1. Sikkim is not considered due to unavailability of necessary data.
2. In each district, 30 villages are sampled from the census 2001 village list using Probability Proportional to Size (PPS) sampling technique. The sample design employs a rotation panel of villages. Each year, 10 villages from three years ago are dropped and 10 new villages are added.
3. Here, out of 24 considered States, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh, Himachal Pradesh and Tripura are under special assistance of Central government, but special assistance from Central government may not reflect better learning achievement of the children at elementary level.
4. Here, a gap of two years is considered. The basic logic behind taking this time gap is to get a better picture of change in learning ability among the children at elementary level in a particular State over time.
5. Right to Education Act is not very successful to improve learning achievement of Indian children at elementary level.
6. The diagrammatic representation of this table through clustered column chart is shown in the appendix.
7. In India, at standard V, the student has completed four years of education at elementary level. Though LOI_2 , one can get a better picture of learning achievement scenario of children in different States after completion of four initial years of schooling. Higher value of LOI_2 of a State indicates better learning achievement of the children in that State after completion of primary education.
8. Learning achievement among Indian children after completion of four years of schooling is deteriorating.
9. The diagrammatic representation of this table through clustered column chart is shown in the appendix.
10. It is assumed that a student will take two years to be promoted to class V from class III. There may be few dropouts. But as the data is state level, we ignore this dropout assuming that majority of the students are moving to class V from class III in two years.
11. There are few family related factors and school related factors which may be changed significantly after a gap of two years. Besides that we may get a proper trend of the learning outcome index of 24 selected states if a gap of at least two years is considered.
12. Value of the correlation co-efficient is 0.69.
13. Value of the correlation co-efficient is 0.7548.
14. It is also appropriate because the States are not taken randomly. We have considered all the States of India.

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