Educational Development Index Based on DISE data for Districts of Uttar Pradesh

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August 2005

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I. Introduction

Educational development of a society depends upon, among other things, access to and quality of schooling which in turn involves the availability of schools and physical infrastructure and human resources in those schools, expenditure on education along with incentive scheme. The status of these facilities and resources in terms of their adequacy and efficiency determines the progress in the education towards achieving the goal of universal elementary education. In Indian context, it is well known that the progress of education is far from satisfactory levels especially when compared with the developed countries as well as some of the contemporary developing countries. One of the common reasons cited for the slow growth in education is inadequacy and inefficiency of schooling infrastructure.

While assessing the status of the schooling infrastructure, the evaluation at the aggregate level (at the national or state level) always conceals the geographical spread across sub-regions, and therefore ignores regional disparities. The laggard regions always bring down the overall performance at the state/national levels. In the planning process there should be differential emphasis where the laggards have to be focussed more than others. To get an understanding of performance at the regional levels, it requires a disaggregated analysis to facilitate micro level planning given the information availability at this disaggregated level. Such a disaggregated analysis is not only limited to exposing the regional scene of educational progress/development but also helps in identifying specific aspects/features associated with varying degrees of progress across regions. On this premise an attempt is made here towards evaluating the current status of the educational development in an Indian state (Uttar Pradesh) at the district level.

* Paper is based on the World Bank's Short-terms Assignment for three weeks. I am greatful to Deepa Shankar (World Bank) for her encouragement and giving the assignment and Dr. Uday S. Mishra for his encouragement and needful help in carrying out the assignment.
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Objective

The main purpose of this exercise is to examine the geographical spread of the educational infrastructure and identify the districts/regions lagging behind in this regard. In addition, an evaluation of the relationship between input indicators (schools, teachers, incentives) and the output indicator (enrolment, wastage, completion rate) is attempted to comment on whether given levels of inputs result in corresponding levels of output. Finally the sensitivity of the each input indicator to each output indicator is measured to designate/prioritise input indicators in terms of their bearing on the output indicators. Also, by grouping the indicators into certain categories in terms of indicators related to access/availability, human resources, physical infrastructure and incentives, the relation between these categories and each of their relation with output indicators will be examined.

Issues to be addressed

Specific issues that could be addressed here are the following. a) what kind/extent of relationship between input indicators and output indicators exist and the sensitivity of output indicators to each input indicators; b) is there any imbalance in the geographical spread of the educational infrastructure across regions of the state; c) possible contribution of private entrepreneurship in educational service to the educational development; d) whether social group disparity (gender, caste) in enrolment is associated with that of teachers; e) adequacy of school available, physical infrastructure and human resources in those schools.

The rest of the paper is arranged in the following manner. The next section (i.e. II) describes the data source and the specific methods used for the analysis. The results/observation from the analysis is presented in the third section. The final section ends with discussion and remarks based on the analysis and the findings.

II. Material and Method

A. Data

The data source used for this exercise, is the district report cards (DRC) published by National Institute of Educational Planning and Administration (NIEPA). The time reference for the data set is 2003-04. The information available in this data sheets (see Table 1 in Appendix for details) are related a) basic data on population, literacy and sex ratio; b) key data on elementary education in terms of schools (by category and management: Govt. or

Private), teachers (also by schools category and management, and by their sex and qualifications); c) ancillary facilities (like toilets, drinking water), and teaching equipment (like black boards); d) sex-wise number of beneficiaries under different incentive schemes (like free text books, uniform, stationery); e) physical infrastructure (school building type, availability of class rooms and their conditions); and f) enrolment figures (grade-wise, level-wise, sex-wise and caste-wise).

B. Method

i. Indicators/Variable/Dimension Construction

The DISE data provides a diverse set of information on varied dimensions of schooling and educational outcomes. Of which, we have used a selected set of information relating to specific dimensions of the educational development. In the process, first of all we have defined the indicators and converted the given data with a suitable transformation into indicator. For instance, school data is given as total number of schools in each district according to category of school. To make this information an useful indicator, we have transformed it into number of school available per lakh population or per village. Then, the information selected from the DISE data for the analysis, is categorised, firstly, into input and output indicator and then, within input indicators we grouped them into schools access, human resource, physical infrastructure, incentive and grants. We refer these groups as dimensions of educational development where each dimension consists of a set of component indicators relating to that particular dimension. The output dimension comprises of enrolment, promotion, repetition, drop out and learning achievement. The varied aspects of educational development are represented with specific dimensions, which are presented in Table 2 in Appendix.

The DISE data set is in a form where each of the information relating to inputs as well as outcomes are presented according to category of the schools (schools with primary sections only, upper primary sections only, primary schools with upper primary section, primary schools with upper primary and secondary sections, upper primary with secondary sections). In such circumstance, one may carry out a category-wise analysis. But in the present exercise we have simplified the analysis through combining the category-wise information and referring it as information on elementary schools.

ii. Evaluation of Relative Performance

While evaluating the performance in terms of educational development there is no absolute fixed level by which the position of each district has to be evaluated. Instead, what is in vogue, relates to assessment of performance of each district in relative terms. Here there are two ways: one is that of relative performance of the district in question with respect to the best and the worst-performing district. The other is relative performance of the district with respect to the state average. In this exercise we follow the first one. It allows us to normalise the selected indicators where the normalised values range between 0 and 1. This method is analogous to one that is adopted in computation of human development index (see UNDP, 2004). The variable is transformed as:

$$NVij = \left\{1 - \left[\frac{BestXi - ObservedXij}{BestXi - WorstXi}\right]\right\} \qquad \ldots\ldots (1)$$

NV_{ij} – normalised index of 'i'th indicator of 'j'th districts; X_i - orginal value of 'i'th indicator; i = 1,2 ….n

The best X_{ij} is decided subject to the concerned indicator's lower or higher value corresponding to the best situation.

Here the lower value represents lower status in relation to a higher value of the index. A simple computation of the index is made by transforming each of the indicator values as a ratio of the difference between each value and the available best value to the entire range of variation in each of these indicators (see HDR; 2001; Mishra and Dilip, 2004). It indicates the relative position of the districts with respect to each of the selected indicators in a range of value between 0 and 1.

iii. A Composite Index

Another task is constructing a composite index of all defined aspects of educational development individually as well as a common index of them (it will be constructed for input and outcome indicators separately) across districts. There could be different methods adopted in construction of these composite indices, the difference being the system of weighing each individual indicator while summarising them into a composite index. One may choose to construct either a simple-unweighted index which is nothing but average value of the selected

indicators where each indicator is equally weighed or weighted index by giving different weights to different indicators depending on their importance. The latter one involves complication in the sense that there could be varied principles behind determining the weight of each individual indicator. On one hand, one can follow ones' own (subjective) value judgement on the importance of particular indicator implying their weight. On the other hand, weights can be determined by the statistical significance of the indicators following different statistical methods

a. Principal Component Analysis

Principal Component Analysis[1] (PCA) is one of methods commonly adopted for this purpose. The method of PCA, in fact, seeks to reduce large number of variables into few categories known as Principal Components, which explains maximum amount of variance among a set of variable[2]. In other words PCA brings out a few non-correlated linear combinations of the original variables that accounts for the most of the variation in original variables[3].

In the present context, on one hand, one can reduce whole set of selected indicators into few factors (seen as dimension) and see the relationship between the factors. While on the other hand, by running PCA, one may construct dimension index using factor-loading values of the variable as the weight of that particular variable. One of the shortcomings of the PCA is that sometimes the factor extraction (i.e. discovering of the underlying dimensions) in the PCA may not conform to the theoretical reasoning or common sense understanding while assigning the individual variables to different factors (i.e. underlying dimensions). One may over come this problem if one has pre-defined dimensions according theoretical reasoning or common sense understanding and carry out PCA for each pre-defined dimension to get dimension index. In the present exercise we have followed this approach where a set of dimensions (i.e. school related, human resource, physical infrastructure, incentive, grants and enrolment related ones) are predefined and the indicators related to each dimension is brought to PCA to determine underlying sub-dimensions within the particular dimension. On the basis of this PCA, we could obtain the dimension index (DI) in the following manner.

$$DIx = \frac{\left(\sum_{i=1}^{n} Xi \left(\sum_{j=1}^{n} Lij.Ej \right) \right)}{\left(\sum_{j=1}^{n} Lij.Ej \right)} \qquad \ldots\ldots \quad (2)$$

Where $\mathbf{X_i}$ – 'i'th variable/indicators of Dimension X; $\mathbf{L_{ij}}$ - Factor loading value of 'i'th variable on the 'j'th factor for the dimension X; $\mathbf{E_j}$ – Eigen value of 'j'th factor

In the above equation dimension index is weighted average of the individual variables of the dimension. The weight of the variable in a dimension is determined by the sum of the products of factor loading of the variable multiplied by the *eigen* value of the factor[4]. In this method, all the principal components are consider in the analysis.

Another method of constructing composite index using PCA is one that is adopted by Filmer and Prichet (1998). Here the Index is a sum of the products of factor score of the 'i'th variable and the standardised value of the original variable (where first the original value of the variable is transformed to log base 10 and then standardised its value with the ratio of difference of the log transformed original value from its mean to the Standard deviation). For a dimension the composite index is estimated as follows:

$$DIx = \sum_{i=1}^{n} Fi \left[\frac{(Xi - Mi)}{SDi} \right] \qquad \ldots\ldots\ldots \quad (3)$$

$\mathbf{DI_x}$ – Composite Index Dimension X; $\mathbf{F_i}$ – Factors score of the 'i'th variable; $\mathbf{X_i}$ – original value of the 'i'th variable; $\mathbf{M_i}$ – Mean value of the 'i'th variable; $\mathbf{SD_i}$ – Standard Deviation of the 'i'th variable.

In this method, the weight of the variable is determined by its factor score only unlike the prior one presented in equation (2). Filmer and Pritchet (1998) used only the first principal component of the PCA. The factor scores of the variables are its loading on the first principal component. It is observed that the first principal component is the linear index of variable with the largest amount of information common to all of the variables (Filmer and Pritchet, 1998:6). The rest of the components are ignored while constructing the composite index.

One of the shortcomings of the PCA is that when the measurement of the variables vary in scale, the comparisons between factors becomes difficult (Field, 2000). In our variable construction, the scale of measurement for different variables is different (see Table 2A in

Appendix). In such a case it does not allow us to make a comparison between the factors within the dimension and between the different dimensions of the educational development. Only possibility is that we can make a comparison in terms of relative position of the district in each factor or dimension.

b. Alternative Method

In addition to PCA we propose an alternative method where the weights are determined by the reciprocal of the corresponding coefficient of variation in each of the indicator (see Mishra and Dilip, 2004). One may verify the resulting composite indices of the two methods in making sensible interpretation. In the alternative method, higher weight is assigned to the indicators having lower variation and vice versa. The reason being the output indicator responds relatively with better strength to the indicator that is having the relatively lower variability. The index value according to alternative method is:

$$DIx = \frac{\sum_{i=1}^{n} Di.Wi}{\sum Wi} \qquad \ldots\ldots. \quad (4)$$

DI – Composite index Dimension X; $W_i = 1/CV_i$; CV_i – Coefficient of Variation of the 'i'th variable; W_i – weight of the 'i'th indicator (it is reciprocal value of the coefficient of variation of the 'i'th indicator.

iv. Composite Variable Rank

Another way of interpreting the educational development across district in the state may be through ranking analysis. There are different methods in assigning rank orders[5]. The popular among them is the rank order method developed by the French mathematician Jean-Charles de Borda (referred to as Borda ranking). This approach involves simply assigning a rank order score to each unit (here district) being compared in terms of each indicator/component value/index (see Qizilbash, 2004: 360). Adding up the rank order scores across number of indicators/variables/dimensions gives the 'Borda score' and ranking the districts according to this score gives the 'Borda ranking', a composite rank of the district.

The ranking analysis in this exercise adopts Borda approach, where in each districts is assigned a rank according their relative position for each indicators and arrived at a dimensional rank (i.e. School, Human Resources, Physical Infrastructure, Incentive, Grants

and Enrolment) by combining the ranks of variables in each dimension and finally arrived at a composite rank of educational development by combining the ranks of all the dimensions specified.

v. Educational Progression Ratio

We have used another method to examine the educational progression (i.e flow) given the current enrolment pattern of children across various grades in the elementary cycle. This methods is borrowed from the demographic literature. It is used for the computation of *parity progression ratio* commonly used in fertility analysis[6] (Henry, 1976; Mishra et al, 1999: 8) and also in life table illustration of the progression to higher order births. The method not only depicts the distribution of enrolment in different grades but also estimates the expected number of years of schooling given the current status of enrolment. The Educational Progression Ratio (EPR) of order 'i' expresses the rate of progression of enrolment in a grade to any grade above it. Though EPR portrays the probability of the children moving from lower grade to any of the higher grade in the near future, it uses the information available at a point of time. The educational progression ratio (EPR) at each stage is calculated using the following formula:

$$EPR_1 = \Sigma^n_{i=2} e_i / \Sigma^n_{i=1} e_i;\ \ldots.EPR_2 = \Sigma^n_{i=3} e_i / \Sigma^n_{i=2} e_i;\ldots\ EPR_{n-1} = \Sigma^n_{i=n} e_i / \Sigma^n_{i=n-1} e_i \ldots (5)$$

$\mathbf{e_i}$ – enrolment in 'i'th grade; i = 1,2,… n grades (we are concerned about grades in elementary cycle i.e. up to VIII grade).

The average expected number of years of schooling (ES) for the children in elementary school is:

$$ES = (EPR_1 + (EPR_1 * EPR_2) + \ldots\ldots\ldots + (EPR_1 * \ldots\ldots.. * EPR_n)) \quad \ldots (6)$$

Following this method one get the information that once a certain number children entered into class one, how many of them will proceed to next classes and till the completion of primary cycle and elementary one.

vi. Correlation and Sensitivity Analysis

The final task is to examine the relationship between the outcome and input variables. Any commonly available outcome indicator may perhaps be associated with these individual indicators as well as dimension index values. The relationship between the composite index of input indicators and outcome indicators need to be examined. For this purpose the

correlation analysis is carried out among the variables relating to educational development as well as the other socio-economic variables. We also did 'association testing' between relevant variables[7].

III. Observations/ Results

A. Macro Scenario

Uttar Pradesh is the largest among the Indian states in terms of population size and also it is higher than many of the contemporary developing and developed countries. According 2001 Census figures the state consists of 166.2 million populations accounting for around 17 per cent of the population in India as whole. There are around one lakh (103407) villages spread over 980 block in 70 districts; four-fifth (i.e. 80 per cent) of population still live in villages and urbanisation (20.1 percent) in the state found to be below the national average. About 21 per cent of the population belonging to the Scheduled Castes (SC) and the proportion of population belonging to Scheduled Tribes (ST), is at negligible level (below 1 per cent). The sex ratio in the state is 898, which, in fact, is lower than the national average.

As regards the socio-economic development, the state is considered as one of the most backward states in India (see Dreze and Gazdar, 1997). About 47.2 millions comprising 28 per cent of the total population is the population in the age group 5-14 years. Out of the total child population about 81 per cent live in rural areas. The population in this age group are expected to be attending elementary schools. But, according District Information System for Education (DISE) survey for the year 2003-04, there are 25.3 million children enrolled in elementary school. Even if one ignores the reference year for the population and enrolment figures, the percentage of enrolled children in child population (5-14 age) is at 53.7 which indicates that the state remains far short of the goal of universal elementary education.

We describe below the educational development in terms educational infrastructure that relates to access/availability (Schools) of schools, physical infrastructure of the school, human resources (teachers) in the school and the presence of incentive scheme (incentives) and finally outcome indicator in terms of enrolment.

a. Schools

As regards the number of schools, Uttar Pradesh is reportedly having highest number of school among Indian states (Mehta, 2004). For the year 2003-04, there were about 1.3 lakh (exactly 1,34,225) schools providing elementary level teaching in the state. This statistics translates into one school per village and 81 schools serving one lakh population, on an average. Among them 80 per cent are having only primary level teaching (say independent primary schools) and another 16.5 per cent are with only upper primary sections. It is observed that among Indian state Uttar Pradesh is the only state having this highest percentage of primary school in the total elementary schools (Mehta, 2004). Out of the total schools found in the state, around 91 per cent are found in rural areas; this percentage is above national average. Management-wise, schools under private management account for around 19 per cent of the total schools in the state; in rural areas this share is lower (15 per cent). The ratio of UP schools to the primary ones stood at 1:4 which is well below the national average as well as the 1: 2 norm[8] that is envisaged in the Programme of Action (POA) 1992.

b. Human Resources: Teachers

There were about four lakh (exactly 399776) teachers in elementary schools in the state during the year 2003-04. On an average there are 249 teachers per lakh population and 3 teachers per school and each teacher has the burden to attend, on an average, 1.6 classes/grades. There are 9 per cent of the total schools running with single teacher. Gender division of teachers in the state indicates that men outnumber women; only 28 per cent of total teachers are females. Moreover, there are 43 per cent of schools providing elementary schooling, does not have a female teacher. Caste-wise distribution shows that only 13.6 per cent of the regular teachers are belonging to SC/ST categories; the proportion of SC/ST teachers is well below their population share (21 per cent). By the distribution of teachers according to their general academic qualifications, the proportion of teachers qualified below secondary level, secondary, higher secondary, graduation and post graduation are respectively 2.4, 11.8, 33.3, 31.3 and 20.5 per cent. Out of the total teachers available in the state, about 28 per cent are found in schools under private (aid/unaided) management. Among the total teachers in elementary education, 73 per cent are teaching in independent primary schools and another 19.7 per cent are in independent upper primary schools. Alarmingly, the teacher-pupil

ratio very high (1:66)in the state. Among other things, grades per teacher and teacher pupil ratio indicates the burden of teachers which may lead to poor quality of teaching.

c. Physical Infrastructure

It covers all infrastructures like school building, classrooms, playground facilities and electricity, toilets, drinking water and classroom equipment like black boards. Interestingly, out of the 1.3 lakh schools serving educational needs at elementary level, around 95 per cent of them have pucca building. The rest of schools have partially pucca or kutcha bulding or the tent and around two thousand schools are without any physical structure. All these schools together have around 4.5 lakh (exactly 4,53,613) classrooms. It is found that there are, on average, 3.4 classrooms per school and each classroom has to accommodate 1.4 grades/classes and 56 students. There are around 2 per cent of the schools in the state running with single classrooms. However, only one-fifth of the classrooms are in good condition and the rest requires major/minor repairs.

As regard the ancillary facilities like toilets and drinking water, 66.5 per cent of the schools with elementary section (i.e. primary or upper primary) are having common toilet facility but toilet specific for girl students is found in only 52 per cent of them. It seems availability of drinking water is not a problem in the elementary school of Uttar Pradesh. Above 90 per cent of the schools are having drinking water facilities. The most important instrument in teaching-learning process is the black board. In Uttar Pradesh only 3.6 per cent of the school are without Black Boards in their classrooms. This is relatively better compared with the national average which may be a feel-good factor for the state.

d. Incentive Scheme

Given the poor economic conditions of the parents, few incentive schemes like distribution of free textbooks, stationery, school uniforms have been implemented to encourage children of poor parents to be in school. Out of the 25.3 million children enrolled in elementary sections, 18.1 crores (74 per cent) of them are reportedly benefited through at least one of such incentive schemes. The most common scheme of incentive is the free text book scheme which benefited about 80 per cent of the beneficiaries. The beneficiaries under the rest of the schemes were minimal.

e. Grants

One of the important factors that determine the school functioning is availability of funds. We have information on number of school receiving grants like school development grants and TLM grants. It is observed that about 51 thousand and 40 thousand schools comprising 39 and 31 per cent of the total (1.3 lakh) schools are receiving school development grants and TLM grants respectively. Regarding its utilisation, it is found that above 95 per cent of the grant recipient schools utilised them.

f. Outcomes: Enrolment, Transition Rate and Learning Achievement

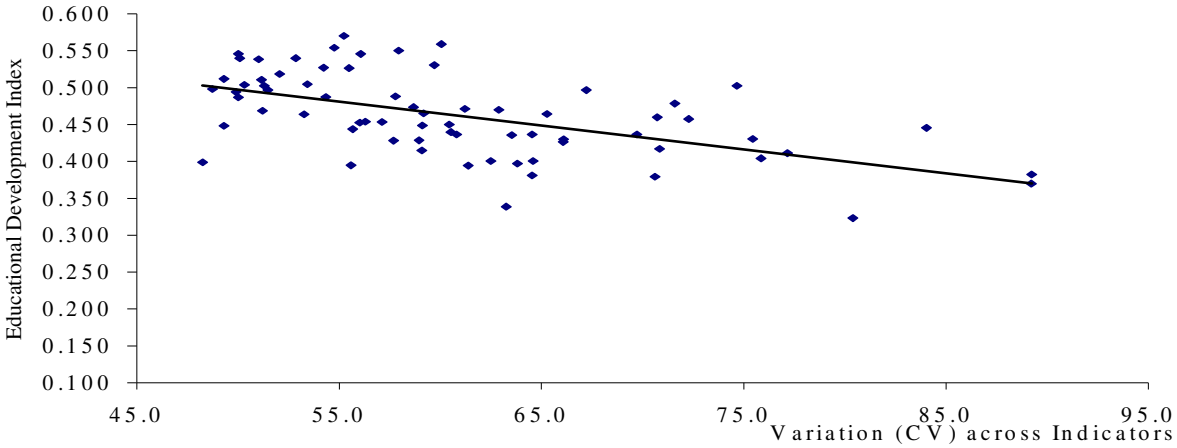
In Uttar Pradesh about 2.5 crore children (exactly 2,53,48,216) are found to be enrolled in elementary grades for the year 2003-04. One-fourth (23 per cent) of these children are enrolled in private schools. Rural children contribute 91 per cent of the total enrolment in the state. Within the rural areas, the proportion of children enrolled in private schools is 18.6 per cent. The gross enrolment rate (GER) and net enrolment rate (NER) at the primary level are respectively 85.7 and 78.6. These enrolment figures become very poor at the upper primary levels: they are 28.9 and 23.6 respectively. Also there is as gender disparity in enrolment where for every 10 boys enrolled there are 9 girls: GPI (gender parity index) is 0.9). The different flow rates at the elementary level of schooling in the state are as follows. The *apparent survival rate*[9] (upto grade V) is found to be 54.1 and *retention rate* is 51.12. The *transition rate* from primary cycle to upper primary one is 62.12. *Repetition rates* observed for each class, shows that it is higher in lower classes and declines as the grade increases[10]. The educational progression ratio shows that the average expected number of years of schooling who enrolled in elementary is about 2.3.

B. Regional Disparities

The above description is a summary account of the macro scenario of the state but within the state across districts there is wide variation in the levels and performances of factors related to educational development. The degree of variation across districts differs between indicators. Among the indicators selected for the exercise, a few indicators (for instance, percentage of schooling having pre-primary sections, percentage of schools without black board) are showing greater variation across district and a few others (like percentage of schools having

drinking water facility, number of grades per classroom) are showing relatively lesser variation (see Table 3A in appendix).

Figure I: Relationship Between Variation among the Normalised indices of Indicators and the Educational Development Index : Districts of Uttar Pradesh, 2002-04



The analysis of quartile distribution of districts on the scale of measurement of each indicators shown that the distribution of district is not conforming normal distribution rather they are either skewed towards first quartile or concentrated in middle quartiles (see Table 5A in Appendix). There is no clear pattern emerging out of it to show that backwardness/development is homogeneous/heterogeneous. In other words the concentration of more number of districts in lower quartile of a indicator in which the level of development increases with the higher quartile, one can say that backwardness is homogenous: likewise the case of development.

The analysis of variation (shown by coefficient of variation) across normalised values of indicators in each district shows that there exists a wide variation among the indicators across districts (see Table 6A in Appendix). Interestingly this variation across indicators shows a strong negative relationship with the educational development index (see Figure). This indicates that the district with less variation across the indicators having better outcome of educational development than those districts having higher variations across the indicators. This observation may help in arguing in favour of consistency across indicators giving rise to better outcomes in general.

Variation across districts in different dimensional (School, Infrastructure, Teachers, Incentives, Grants and Enrolment) index (it is based on the values of normalised indices of indicators) found to be the highest for the incentives dimension and the lowest is observed for the teachers' dimension (see Table 8A in Appendix).

C. Associative Relations

The associative relation between input and output indicators and within the input and output category of indicators is examined. First we examine the correlation and then undertake a test for degree of association followed by a sensitivity analysis among the indicators.

a. The relationship between different Methods/Approaches

As already mentioned above, we have used different statistical procedure to construct a composite index that describes the educational development across districts of Uttar Pradesh. In this exercise, the index values obtained through different methods are not exactly matching but are exhibiting a similarity in pattern given a high correlation between indices based on different methods. For instance the correlation coefficient of PCA1 and Inverse of CV methods is 0.81. Similarly, the Borda method has 0.50 of correlation coefficient with PCA1 and Inverse of CV each. The matching of the index value is difficult because different methods use different scales of measurement of the original variables/indicators. For instance, in PCA we have used the original values of the variable and for Inverse of CV method we have used normalised values of the variables.

b. Relation between independent variables

The correlation analysis of independent variables shows that a few indicators have correlation among total of 39 variables considered in the study, while many are having no correlation among them. Among the school access related indicators none are correlated.

Indicators relating to the teachers dimension, many are found with a significant levels of correlation: Teachers per lakh of population has a negative relationship with teacher-pupil ratio (-0.64) and positively correlated with percentage of teacher in private schools (0.50); Teacher per school is negatively correlated with percentage of single teacher schools (-0.75) and number of grades per teacher (-0.95); percentage of female teacher and percentage of schools with no female teachers are negatively correlated; teacher-pupil ratio has positive relation with percentage of school with single teachers (0.55) and number grades per teacher

(0.70); percentage of schools with single teacher has positive relationship with number of grades per teacher.

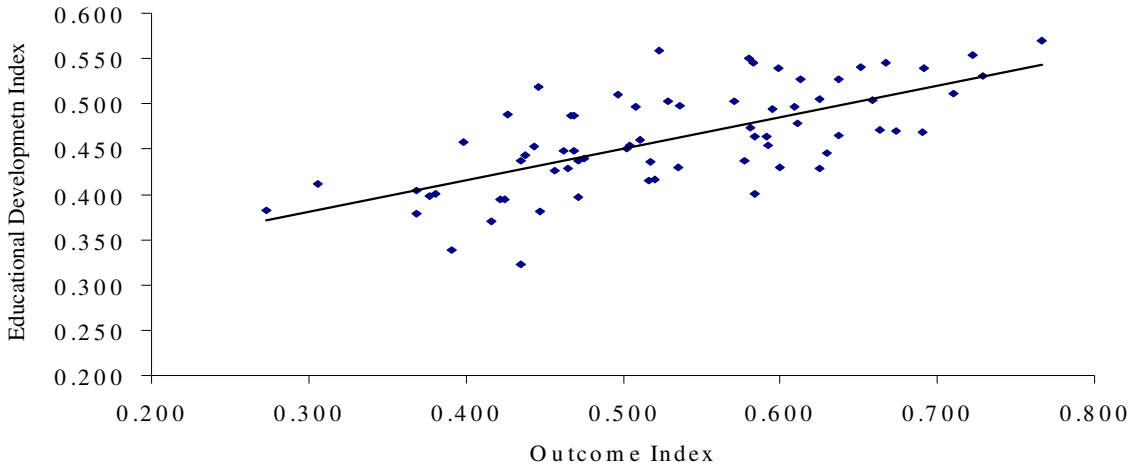
Among the indicators relating to physical infrastructure of the school few indicators showing relationships: number of grades to be accommodated in a single classroom is negatively associated with teachers per schools (-0.68) and positively associated with number of grades per teachers (0.63); percentage of school with common toilets and girls toilets positively related to each other. Two indicators of the grant dimension (percentage of schools receiving school development grants and TLM grants) are positively correlated (0.83). Among the indicators related to outcomes: gross and net enrolment ratios in each stage (primary as well as upper primary stage) are positively correlated the transition rate is negatively associated with dropout rate (-0.58).

Indicators across dimensions also show relationships: schools and teachers per lakh population are positively correlated (0.78); percentage of rural school has positive relationship with percentage of female teachers (0.65) and negative relationship enrolment (PGER: – 0.64 and PNER: -0.58); percentage of schools under private management and percentage of teachers in private schools are positively correlated (0.80); the ratio of upper primary schools/section to primary schools/section and percentage of classrooms under good condition are negatively correlated (-0.53).

c. On comparison of Index of varied Dimensions

Then we grouped the related indicators (like indicators related to access/availability of school, human resources). While examining the relationship between these clustered indicators, it is observed that some of the dimensions are independent of others. In other words they do not any significant correlation between them.

Figure II: The Relationship Between Outcome (i.e. Enroment) Index and Educational Development Index across Districts of Uttar Pradesh: DISE (2003-04)



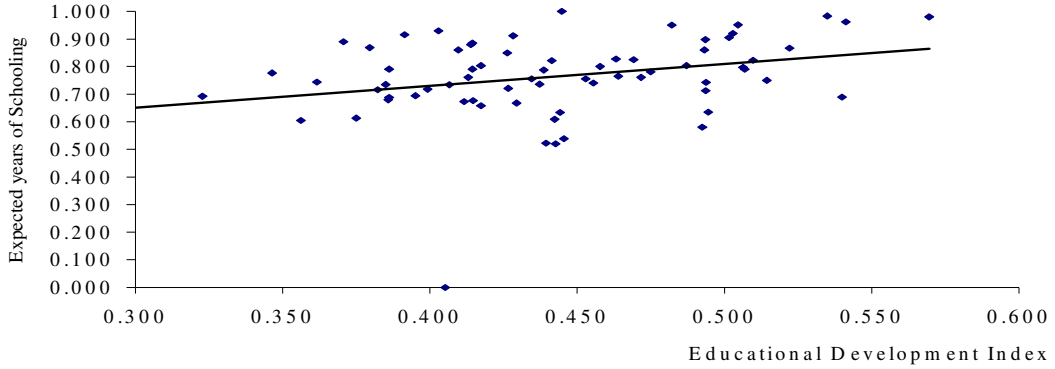
The school dimension index and the human resource are positively correlated (0.65). The relationship between dimensional index and composite index (i.e. educational development index) shows that the overall educational development has significant bearing on school, teachers and outcome (enrolment) dimensions (the correlation coefficient are 0.46, 0.53 and 0.62 respectively) and the rest of the dimensions are having insignificant level of relationship.

In addition, there is high level correlation between educational infrastructure and educational development indices. Interestingly, the outcome index does not show any significant level of correlation with educational infrastructure index. One way it is indicating that educational outcomes are not a mere consequence of the features of schooling system but also implied by the larger differences in the socio-economic conditions at the regional and household level.

d. Rank Analysis

There is hardly any exact match between the rank orders of different methods and the rank order of different dimensions. However, the composite variable ranking analysis following the 'Borda approach' has shown similarity with the ranks based on the PCA index and inverse of CV index. In the sense there is high correlation found among these three methods rank orders across districts. The comparison of dimension ranks shows that there is insignificant rank correlation between many of the dimensions except school and human resource ones.

Figure III: Average Expected Number of Years of Schooling and Educational Infrastructure Development Index across Districts : Uttar Pradesh, 2003-04



e. Relation between Educational Development Index and other Socio-Economics Variables

In addition to analysis of the status of educational development across district of Uttar Pradesh, we have examined its relationship with few other socio-economic variables. Interestingly, the educational infrastructure and educational development index and their individual component bear significant correlation with indicators of socio-economic conditions at the district level. The Educational Development index (of the Borda approach) has a positive correlation with urbanisation (0.59) and the overall literacy rate (0.56) and has a negative relationship with percentage of agricultural workers (-0.64) and the percentage of workers in cultivation (-0.58). While considering different dimensions school related index is significantly correlated with overall literacy rates and urbanisation (proportion of population living in urban areas) across districts.

The outcome index is associated with proportion of SC/STs in total population and percentage of female workers in agriculture and the proportion female agriculture labourers to the total female workers. The enrolment ratio (both GER and NER) is associated with urbanisation and the proportion of workers as cultivators and the proportion of female workers as agricultural labourers to the total female workers.

IV. Discussion and Remarks

The present exercise is an attempt to assess the status of educational development and examine relationship between input (access, infrastructure, human resources, incentives and school grants) and outcome (like enrolment, transition rate and learning achievement)

indicators across districts in the context of a north Indian state – Uttar Pradesh. Using the latest survey (2003-04) of District Information System for Education (DISE), different statistical procedures are applied to get the composite index of educational infrastructure (input indicators only) and educational development (including input and outcome indicators) index. All the four methods result in different index values, primarily because they use different scales of measurement for indicators and the weights assigned to them were derived based on varying premise of valuation. However, there is larger agreement in the pattern of the index values derived based on different methods.

The state of Uttar Pradesh is seen as one of the backward states especially in terms of education in India. But the educational infrastructure of the state has an advantage when compared with the all –India average of educational infrastructure. A majority of schools in the state (about 95 percent) have pucca buildings. About 50 per cent of these schools are having ancillary facilities like toilets and drinking water. As regards the incentive schemes, the most common scheme benefiting the children is distribution of textbooks. However the outcome variables (enrolment) are not congruent with this advantage in schooling infrastructure in the state, as many children are found out-of-schools. There remains a stark regional disparity in many of these indicators across districts in the state, which gets manifested in the development index. The pattern of educational development across district shows that the districts having a greater consistency across the range of indicators are having relatively better position than those of inconsistent ones.

The association analysis between various indicators reveals that a selected few have suggestive association between them as evidenced by the values of correlation coefficients. Across dimensions too, only a few have significant level of association and a few dimensions is showing a strong association with the composite index of educational development. Educational Infrastructure and Educational Development indices are strongly correlated. Outcome index is found to be significantly associated with educational development index but its association is less significant with educational infrastructure index. This pattern informs that educational outcomes are not only associated with educational infrastructure (endogenous factors) but also factors beyond the educational system (i.e. exogenous factors).

* * *

Appendix

Table 1A: The Information available in DISE data

1	Number schools by the category of the school (eg, PS, UPS)	8	Schools not inspected
2	Pupil teacher ratio(by school category)	9	Enrolment profile
3	Condition of classrooms and other rooms	10	Class-wise enrolment
4	Selected indicators	11	Enrolment by management
5	Type of school buildings	12	Repeaters by type and class
6	Distribution of schools by enrolment	13	Teachers profile by age, gender and caste.
7	Schools by number of working days	14	Teachers profile by professional qualification

Note:

Source: \\http\www.dpepmis.org

Table 2A: Variable Description

Sn	Indicators		Remarks
1	*2*	*3*	*4*
A	**Access/Availability**		Input Indicator
1	S / P	Schools per lakh Population	
2	S / V	Schools per Village	
3	%RS	Percentage of Rural Schools	
4	%PMS	Percentage of Schools under Private Management	
5	RPUP	The ratio of middle schools to primary	
B	**Human Resources**		Input Indicator
1	T / P	Teachers per lakh Population	
2	T / S	Teachers per School	
3	TPR	Teacher-Pupil Ratio	
4	NG / T	Number of Grades per Teacher	
5	%ST	Percentage of Single-Teacher Schools	
6	%FT	Percentage of Female Teachers in Total	
7	%NFT	Percentage of Schools with No-Female Teachers	
8	%TAQ	Percentage of Teacher with appropriate Qualification	
9	TSCST	Gap in share of SC/ST between Teachers and Population	
C	**Physical Infrastructure**		Input Indicator
1	%SCR	Percentage of Schools having Single Classrooms	
2	NG/CR	Number of Grades to be accommodated per Classroom	
3	%SCT	Percentage of Schools with Common Toilets	
4	%SGT	Percentage of Schools with Girls Toilets	
5	%SDW	Percentage of Schools with Drinking Water facility	
6	%SNBB	Percentage of Schools without Blackboard	
7	%SPB	Percentage of Schools with Pucca Building	
8	%CGC	Percentage of Classrooms with Good Condition	
D	**Incentive Scheme** (Percentage of Beneficiaries out of enrolled children)		Input Indicator
1	%BFTB	Text Books	
2	%BFU	Uniform	
3	%BFS	Stationery	
4	%BA	Attendance	
E	**Finance: Grants**		Input Indicator
1	%SG	Percentage of Schools receiving School Development Grants	
2	%TL	Percentage of Schools receiving TLM Grants	
F	**Enrolment**		Outcome indicators
1	GER	Gross Enrolment Rate (GER)	
2	NER	Net Enrolment Rate (NER)	
3	DPR	Dropout Rate	
4	RTR	Retention Rate*	No complete data
5	RPR	Repetition Rate	
6	PMR	Promotions Rate	
7	TSR	Transition Rate	
8	CTR	Completion Rate*	No complete data
9	LA	Learning Achievement Index	
10	ES	Average Expected Number of Years of Schooling	
11	GPI	Gender Parity Index*	No complete data

Note: These indicators are selected based on the information reported in District Report Cards (DRS).
Source: Authors' Conceptualisation based on the available information in DRC

Table 3A: Descriptive Statistics (Mean, Standard Deviation, Coefficient of variation across districts of UP and Weight) of Selected Indicators

Sn	Indicators	Min	Max	Range	Mean	SD	CV	W	Best
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
A	**Access/Availability**								
1	S/P	44.2	135.8	91.6	84.3	20.96	24.8	4.02	H
2	S/V	0.60	3.0	2.39	1.39	0.41	29.4	3.40	H
3	SPP%	0.00	30.0	30.0	5.9	8.2	139.6	0.72	H
4	% R	-0.30	40.1	40.4	10.4	8.3	79.4	1.26	H
5	%P	4.9	35.6	30.7	18.3	7.1	39.1	2.56	
6	RUP	0.09	0.43	0.34	0.26	0.07	28.2	3.54	L
B	**Human Resources**								
1	T/P	136.5	447.5	311.0	248.6	65.5	26.4	3.8	H
2	T/S	1.8	4.8	3.1	3.0	0.6	18.8	5.3	H
3	FT%	11.2	54.12	42.9	27.5	7.9	28.7	3.5	H
4	NFT%	11.9	70.9	59.0	42.7	9.8	23.0	4.3	L
5	SCT%	0.289	27.6	27.3	9.2	5.3	57.9	1.7	L
6	PvT%	7.2	52.4	45.2	26.5	10.9	41.0	2.4	H
7	TPR	24.3	118.1	93.8	65.6	16.4	25.0	4.0	L
8	ST%	3.3	51.1	47.8	14.9	8.9	59.4	1.7	L
9	NG/T	1.0	2.7	1.7	1.6	0.307	18.8	5.3	H
C	**Physical Infrastructure**								
1	SCR%	0.167	10.8	10.6	2.0	1.6	83.5	1.2	L
2	NG/CR	0.930	1.7	0.8	1.4	0.2	12.8	7.8	L
3	CT%	30.0	98.0	68.0	67.7	16.1	23.8	4.2	H
4	GT%	21.3	85.0	63.7	54.0	17.0	31.4	3.2	H
5	DW%	81.8	100.0	18.2	94.2	3.4	3.6	27.6	H
6	NB%	0.125	22.2	22.1	3.4	3.7	106.8	0.9	L
7	%CGC	8.5	42.4	33.9	21.4	5.3	24.9	4.0	H
8	%SPB								H
D	**Incentive Scheme**								
1	%BFU	0.000	0.409	0.409	0.023	0.054	239.5	0.418	H
2	%BFS	0.000	0.191	0.191	0.044	0.052	117.8	0.849	H
3	%BFTB	9.3	77.5	68.2	57.7	11.3	19.6	5.1	H
4	%BA	0.000	38.6	38.6	13.2	11.9	89.9	1.1	H
E	**Finance: Grants**								
1	%SG	0.092	81.7	81.6	37.6	23.6	62.7	1.6	H
2	%TL	0.000	82.6	82.6	30.6	25.5	83.3	1.2	H
E	**Outcome: Enrolment,**								
1	GER	44.0	117.3	73.3	82.6	15.2	18.4	5.4	H
2	NER	33.6	115.9	82.3	75.6	16.3	21.5	4.7	H
3	RPR	0.1	8.3	8.2	3.071	1.9	62.8	1.6	L
4	DPR	1.1	42.1	41.0	13.04	6.3	48.6	2.1	H
5	PR	16.6	86.2	69.5	68.43	20.2	29.5	3.4	L
6	RTR	-	-	-	-	-	-	-	-
7	TSR	0.000	101.9	101.9	58.5	20.3	34.8	2.9	H
8	CTR	-	-	-	-	-	-	-	H
9	LA	0.014	0.895	0.881	0.213	0.114	53.5	1.9	H
10	ES	0.8	2.9	2.1	2.4	0.311	13.1	7.6	
11	GPI	-	-	-	-	-	-	-	L

Note: 1. The 'Best' in the col. 10 indicates the value of the indicators considered as the best (whether it is lowest or the highest value) in terms of status/performance while constructing index.
Source: Computed using DRC raw data.

Table 4A: Correlation Matrix

Indicators	General					School						Infrastructure		
	PV	U	OL	FL	SCT	S/P	S/V	SPP%	% R	%P	RUP	SCR%	NG/CR	CT%
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
PV	1.00													
U	0.57	1.00												
OL	0.35	**0.52**	1.00											
FL	0.36	**0.60**	**0.98**	1.00										
SCT	-0.26	-0.23	0.07	0.02	1.00									
S/P	**-0.52**	-0.15	0.07	0.07	0.31	1.00								
S/V	**0.67**	0.46	0.41	0.41	-0.04	0.22	1.00							
SPP%	-0.03	-0.06	-0.04	-0.03	0.11	0.07	0.00	1.00						
% R	**0.52**	**0.91**	**0.51**	**0.57**	-0.19	-0.20	0.37	-0.13	1.00					
%P	0.20	0.49	0.36	0.39	-0.09	0.12	0.26	0.21	0.31	1.00				
RUP	-0.15	-0.29	-0.34	-0.36	-0.02	-0.21	-0.29	-0.07	-0.24	-0.39	1.00			
SCR%	-0.03	0.18	-0.04	-0.03	0.03	0.16	0.14	0.19	0.08	0.03	-0.04	1.00		
NG/CR	-0.31	-0.25	-0.35	-0.31	0.02	0.30	-0.09	0.00	-0.30	-0.42	0.43	0.24	1.00	
CT%	0.18	0.29	0.11	0.13	0.17	-0.06	0.13	-0.04	0.38	0.06	-0.25	0.01	-0.44	1.00
GT%	0.21	0.36	0.12	0.12	0.05	-0.09	0.12	-0.18	0.39	0.04	-0.28	0.00	-0.46	**0.90**
DW%	0.13	0.00	-0.22	-0.18	-0.09	-0.38	-0.22	0.14	0.00	0.11	0.19	-0.11	-0.10	0.05
NB%	0.12	0.24	0.07	0.13	0.02	-0.01	0.13	-0.05	0.11	0.05	-0.01	-0.01	0.24	-0.04
%CGC	0.02	0.02	0.36	0.34	0.21	0.38	0.35	0.01	0.02	-0.02	**-0.53**	0.01	-0.07	0.19
SPB	0.01	0.20	0.04	0.06	-0.05	0.13	0.12	-0.15	0.15	0.07	-0.08	0.20	0.14	0.11
T/P	-0.28	0.09	0.41	0.40	0.20	**0.78**	0.27	0.15	0.04	0.42	-0.41	0.09	-0.13	0.06
T/S	0.41	0.41	**0.56**	**0.54**	-0.17	-0.32	0.14	0.10	0.40	0.43	-0.35	-0.12	**-0.68**	0.23
FT%	0.39	**0.71**	0.35	0.44	-0.07	-0.22	0.18	0.16	**0.65**	0.40	-0.27	0.13	-0.30	0.34
NFT%	-0.19	-0.34	-0.05	-0.13	0.10	0.25	0.02	-0.08	-0.39	-0.13	0.22	0.01	0.23	-0.19
SCT%	-0.20	-0.18	-0.08	-0.11	**0.87**	0.25	-0.02	0.15	-0.19	-0.08	-0.04	0.16	0.06	0.18
PvT%	0.10	0.38	0.18	0.22	-0.15	0.19	0.21	0.32	0.25	**0.80**	-0.34	0.08	-0.30	0.05
TPR	-0.22	-0.48	**-0.69**	**-0.67**	0.06	-0.26	-0.39	-0.10	-0.42	-0.40	0.34	-0.08	0.27	-0.13
ST%	-0.28	-0.30	-0.52	-0.48	-0.08	0.17	-0.13	-0.03	-0.22	-0.34	0.23	0.04	0.50	-0.29
NG/T	-0.33	-0.35	**-0.62**	**-0.58**	0.08	0.20	-0.15	-0.11	-0.33	-0.42	0.39	0.09	**0.63**	-0.22
%BFU	-0.12	-0.14	-0.13	-0.13	0.14	-0.03	-0.13	0.19	-0.08	-0.13	0.12	0.12	0.03	0.02
%BFS	0.01	-0.05	-0.19	-0.22	-0.01	-0.11	-0.06	0.11	-0.04	-0.18	0.10	0.24	0.09	0.06
%BFTB	-0.17	-0.18	-0.07	-0.09	0.04	0.07	-0.11	0.01	-0.10	-0.40	0.09	0.16	0.25	-0.04
%BA	-0.12	-0.16	-0.10	-0.12	0.23	0.04	-0.05	0.12	-0.11	-0.10	-0.11	-0.01	-0.11	0.10
%SG	-0.10	-0.01	0.08	0.09	0.05	0.15	0.08	-0.20	0.04	-0.06	-0.41	-0.05	-0.13	0.25
%TL	-0.15	-0.01	0.06	0.03	0.09	0.17	0.01	-0.15	0.02	-0.05	-0.44	-0.03	-0.27	0.33
PGER	**-0.57**	**-0.63**	-0.48	-0.51	0.32	0.49	-0.18	0.09	**-0.64**	-0.15	0.13	0.00	0.34	-0.16
PNER	**-0.58**	**-0.60**	-0.44	-0.47	0.43	0.46	-0.21	0.02	**-0.58**	-0.20	0.09	-0.02	0.34	-0.14
UPGER	-0.42	-0.30	0.01	-0.05	0.39	0.48	-0.08	0.21	-0.37	0.17	-0.27	0.04	-0.01	-0.15
UPNER	-0.40	-0.29	0.05	0.00	0.35	0.41	-0.08	0.24	-0.35	0.17	-0.22	0.06	-0.05	-0.16
TR	0.23	0.29	0.17	0.17	-0.07	-0.16	0.14	0.23	0.26	0.14	-0.42	0.09	-0.37	0.15
LA	-0.25	0.04	-0.18	-0.13	-0.09	0.13	-0.18	-0.17	0.10	-0.07	0.11	-0.03	0.28	0.09
RR	0.17	0.15	0.27	0.26	-0.12	0.01	0.11	0.21	0.11	0.22	-0.22	-0.04	-0.23	0.23
DR	-0.35	-0.24	-0.28	-0.30	-0.13	0.02	-0.45	-0.13	-0.25	-0.14	0.36	0.19	0.26	-0.14
PR	-0.40	-0.21	-0.34	-0.33	-0.03	0.20	-0.30	-0.05	-0.24	-0.19	0.00	0.15	0.19	0.09
ES	-0.18	0.01	0.38	0.40	0.27	0.28	-0.04	0.11	-0.02	0.22	-0.48	0.00	-0.24	0.04

Note: 1. This correlation matrix includes the other socio-economic indicators (referred as "general'); 2. PV – Population per Village; U – Share of Urban Population to Total; OL – Overall Literacy Rate; FL – Female Literacy Rate; SC/ST – Share of SC/ST Population.

	GT%	DW%	NB%	%cgc	SPB	T/P	T/S	FT%	NFT%	SCT%	PvT%	TPR	ST%	NG/T
	16	***17***	***18***	***19***	***21***	***22***	***23***	***24***	***25***	***26***	***27***	***28***	***29***	***30***
GT%	1.00													
DW%	-0.07	1.00												
NB%	-0.01	-0.07	1.00											
%CGC	0.20	-0.39	0.04	1.00										
SPB	0.15	-0.04	0.08	0.24	1.00									
T/P	0.01	-0.30	-0.07	0.40	0.07	1.00								
T/S	0.22	0.08	-0.09	0.09	-0.08	0.31	1.00							
FT%	0.31	0.12	0.18	-0.13	0.01	0.04	0.43	1.00						
NFT%	-0.15	-0.05	-0.12	0.14	0.06	0.10	-0.28	**-0.73**	1.00					
SCT%	0.11	-0.04	0.13	0.11	-0.08	0.11	-0.19	0.00	0.00	1.00				
PvT%	0.02	0.03	0.02	-0.01	-0.01	**0.50**	0.44	0.34	-0.20	-0.08	1.00			
TPR	-0.16	0.17	0.06	-0.37	-0.05	**-0.64**	**-0.58**	-0.30	-0.03	0.10	**-0.51**	1.00		
ST%	-0.25	-0.06	0.05	-0.10	0.08	-0.30	**-0.70**	-0.25	-0.18	-0.03	-0.21	**0.55**	1.00	
NG/T	-0.21	-0.01	0.09	-0.18	0.09	-0.42	**-0.95**	-0.36	0.15	0.12	-0.46	**0.70**	**0.76**	1.00
%BFU	-0.13	0.15	-0.16	0.13	-0.02	-0.03	0.01	-0.05	-0.07	0.04	-0.11	0.18	0.05	0.07
%BFS	0.03	0.04	-0.13	0.01	0.01	-0.20	-0.13	0.05	-0.16	0.00	-0.11	0.14	0.12	0.15
%BFTB	0.05	-0.10	-0.31	0.24	0.07	-0.08	-0.20	-0.13	0.10	0.08	-0.32	-0.09	0.05	0.15
%BA	0.00	0.10	-0.26	0.17	0.07	-0.02	-0.02	-0.14	0.01	0.19	-0.13	0.05	-0.01	0.03
%SG	0.24	-0.16	-0.05	0.37	0.04	0.20	0.11	-0.01	-0.06	0.02	-0.05	-0.19	-0.14	-0.18
%TL	0.40	-0.19	-0.01	0.37	0.00	0.28	0.19	0.06	-0.14	0.09	0.02	-0.22	-0.15	-0.27
PGER	-0.27	-0.14	-0.09	-0.03	-0.02	0.23	-0.38	-0.42	0.16	0.26	-0.10	**0.50**	0.32	0.39
PNER	-0.26	-0.17	-0.12	0.03	-0.06	0.18	-0.40	-0.41	0.12	0.35	-0.16	0.49	0.33	0.39
UPGER	-0.14	-0.11	-0.04	0.19	-0.16	0.45	-0.03	-0.17	0.14	0.33	0.20	-0.16	-0.07	-0.05
UPNER	-0.16	-0.11	-0.03	0.12	-0.27	0.40	0.00	-0.13	0.02	0.33	0.18	-0.10	-0.01	-0.07
TR	0.20	0.05	-0.21	0.28	-0.03	0.00	0.33	0.27	-0.19	0.04	0.11	-0.29	-0.24	-0.32
LA	0.06	-0.04	-0.14	0.01	0.14	-0.06	-0.29	0.00	0.00	-0.12	-0.02	0.12	0.23	0.30
RR	0.28	0.16	-0.12	0.16	0.08	0.16	0.24	0.23	-0.07	-0.10	0.19	-0.37	-0.17	-0.28
DR	-0.12	-0.04	0.12	-0.21	-0.13	-0.21	-0.36	-0.28	0.11	-0.14	-0.04	0.24	0.29	0.34
PR	0.07	-0.05	0.07	0.06	-0.04	-0.01	-0.35	-0.15	0.06	0.01	0.02	0.11	0.19	0.28
ES	-0.02	0.10	0.06	0.29	0.08	0.45	0.27	0.12	-0.10	0.20	0.15	-0.24	-0.20	-0.33

	%BFU	%BFS	%BFTB	%BA	%SG	%TL	PGER	PNER	UPGER	UPNER	TR	LA	RR	DR	PR	ES
	31	***32***	***34***	***35***	***36***	***37***	***38***	***39***	***40***	***41***	***42***	***43***	***44***	***45***	***46***	***47***
%BFU	1.00															
%BFS	0.42	1.00														
%BFTB	0.06	0.09	1.00													
%BA	0.27	0.20	0.17	1.00												
%SG	-0.04	0.08	0.25	0.24	1.00											
%TL	-0.09	0.09	0.23	0.14	**0.83**	1.00										
PGER	0.24	0.04	-0.07	0.08	0.00	0.02	1.00									
PNER	0.28	0.12	-0.02	0.14	0.09	0.07	**0.94**	1.00								
UPGER	-0.14	0.02	0.13	0.10	0.05	0.24	0.33	0.32	1.00							
UPNER	-0.08	0.05	0.05	0.07	0.01	0.20	0.31	0.30	**0.94**	1.00						
TR	0.06	0.11	0.18	0.36	0.15	0.18	-0.37	-0.28	0.03	0.05	1.00					
LA	0.13	0.02	0.27	0.06	0.07	-0.03	0.18	0.21	-0.29	-0.32	-0.06	1.00				
RR	-0.07	-0.10	0.25	-0.24	-0.06	0.13	-0.25	-0.32	-0.09	-0.12	0.12	0.09	1.00			
DR	0.14	0.26	0.14	-0.13	-0.04	-0.04	0.09	0.09	0.30	0.29	**-0.58**	-0.04	-0.22	1.00		
PR	0.11	0.11	0.31	-0.10	0.11	0.20	0.11	0.19	0.17	0.15	-0.18	0.15	0.05	0.40	1.0	
ES	-0.09	-0.33	-0.11	0.03	0.17	0.20	0.02	0.05	0.42	0.45	0.15	-0.29	-0.01	-0.13	0.03	1

Table 5A: Quartile Distribution of the Districts for each Indicator : Uttar Pradesh, 2003-04

		No. of District in each Quartile					Percentage of Districts				
Sn	**Variable**	**Q1**	**Q2**	**Q3**	**Q4**	**Missg**	**Q1**	**Q2**	**Q3**	**Q4**	**Missg.**
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
A	**School**										
1	S/P	12	39	11	8	0	17.1	55.7	15.7	11.4	0
2	S/V	18	44	7	1	0	25.7	62.9	10.0	1.4	0
3	SPP%	49	10	7	4	0	70.0	14.3	10.0	5.7	0
4	% R	39	22	8	1	0	55.7	31.4	11.4	1.4	0
5	%P	20	21	24	5	0	28.6	30.0	34.3	7.1	0
6	RUP	42	26	1	0	1	60.0	37.1	1.4	0.0	1.4
B	**H R**										
1	T/P	27	30	8	4	1	38.6	42.9	11.4	5.7	1.4
2	T/S	17	36	14	3	0	24.3	51.4	20.0	4.3	0
3	FT%	16	41	10	3	0	22.9	58.6	14.3	4.3	0
4	NFT%	5	25	35	5	0	7.1	35.7	50.0	7.1	0
5	SCT%	27	29	11	2	1	39.1	42.0	15.9	2.9	1.4
6	PvT%	18	25	21	6	0	25.7	35.7	30.0	8.6	0
7	TPR	6	42	18	4	0	8.6	60.0	25.7	5.7	0
8	ST%	46	17	6	1	0	65.7	24.3	8.6	1.4	0
9	NG/T	16	35	17	1	1	22.9	50.0	24.3	1.4	1.4
C	**P I**										
1	SCR%	55	14	0	0	1	78.6	20.0	0.0	0.0	1.4
2	NG/CR	4	18	31	17	0	5.7	25.7	44.3	24.3	0
3	CT%	10	19	24	17	0	14.3	27.1	34.3	24.3	0
4	GT%	15	14	27	14	0	21.4	20.0	38.6	20.0	0
5	DW%	1	12	30	27	0	1.4	17.1	42.9	38.6	0
6	NB%	61	6	1	2	0	87.1	8.6	1.4	2.9	0
7	%CGC	11	45	13	0	1	15.7	64.3	18.6	0.0	1.4
8	SPB	4	8	22	36	0	5.7	11.4	31.4	51.4	0
D	**Incentive**										
1	%BFU	67	2	0	1	0	95.7	2.9	0.0	1.4	0
2	%BFS	45	12	9	4	0	64.3	17.1	12.9	5.7	0
3	%BFTB	1	6	35	28	0	1.4	8.6	50.0	40.0	0
4	%BA	33	12	17	8	0	47.1	17.1	24.3	11.4	0
E	**Grants**										
1	%SG	18	21	18	13	0	25.7	30.0	25.7	18.6	0
2	%TL	36	12	11	11	0	51.4	17.1	15.7	15.7	0
F	**Enrolment**										
1	GER	9	16	36	8	1	13.0	23.2	52.2	11.6	1.4
2	NER	8	21	34	6	1	11.6	30.4	49.3	8.7	1.4
3	TR	5	13	40	12	0	7.1	18.6	57.1	17.1	0
4	LA	47	21	1	1	0	67.1	30.0	1.4	1.4	0
5	RR	25	23	11	4	7	39.7	36.5	17.5	6.3	10.0
6	DR	23	28	2	1	16	42.6	51.9	3.7	1.9	22.9
7	PR	7	4	7	36	16	13.0	7.4	13.0	66.7	22.9
8	ES	1	0	30	39		1.4	0.0	42.9	55.7	0

Note: 1. Missg. - Missing which indicates that the value of the respective indicators is not available.
Source: Computed.

Table 6A: Variation Across Indicators of Educational Development in each District : Uttar Pradesh, 2003-04

Sn	District	Min	Max	Range	mean	SD	CV	sn	District	Min	Max	Range	mean	SD	CV
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Agra	0.004	0.909	0.905	0.391	0.248	63.3	**36**	Jalaun	0.032	1.000	0.968	0.521	0.283	54.2
2	Aligarh	0.014	0.901	0.887	0.481	0.246	51.2	**37**	Jaunpur	0.000	1.000	1.000	0.400	0.284	70.8
3	Allahabad	0.003	1.000	0.997	0.458	0.303	66.1	**38**	Jhansi	0.000	0.911	0.911	0.472	0.252	53.3
4	Amb. Nagar	0.000	1.000	1.000	0.540	0.298	55.2	**39**	J P Nagar	0.014	0.979	0.965	0.478	0.245	51.3
5	Auraiya	0.000	1.000	1.000	0.553	0.320	57.9	**40**	Kannauj	0.000	0.975	0.975	0.420	0.271	64.5
6	Azamgarh	0.117	1.000	0.883	0.511	0.273	53.4	**41**	Kanpur Dehat	0.001	0.994	0.993	0.456	0.269	58.9
7	Baghpat	0.000	1.000	1.000	0.478	0.321	67.2	**42**	Kanpur Nagar	0.002	1.000	0.998	0.546	0.328	60.1
8	Bahraich	0.000	1.000	1.000	0.372	0.332	89.2	**43**	Kaushambi	0.010	0.972	0.963	0.506	0.306	60.5
9	Ballia	0.000	0.966	0.966	0.445	0.294	66.1	**44**	Kheri	0.010	0.841	0.831	0.417	0.256	61.4
10	Balrampur	0.027	0.942	0.915	0.452	0.252	55.7	**45**	Kushinagar	0.002	1.000	0.998	0.412	0.311	75.4
11	Banda	0.011	0.990	0.979	0.557	0.279	50.1	**46**	Lalitpur	0.000	0.995	0.995	0.540	0.285	52.9
12	Barabanki	0.000	1.000	1.000	0.412	0.346	84.0	**47**	Lucknow	0.000	1.000	1.000	0.413	0.292	70.6
13	Bareilly	0.000	0.971	0.971	0.445	0.249	56.0	**48**	Maharajganj	0.056	0.993	0.938	0.504	0.252	50.0
14	Basti	0.000	1.000	1.000	0.457	0.257	56.3	**49**	Mahoba	0.000	0.957	0.957	0.519	0.267	51.5
15	Bhadohi	0.011	1.000	0.989	0.504	0.356	70.7	**50**	Mainpuri	0.000	0.949	0.949	0.416	0.260	62.5
16	Bijnor	0.045	1.000	0.955	0.500	0.244	48.7	**51**	Mathura	0.000	0.962	0.962	0.458	0.221	48.3
17	Budaun	0.017	1.000	0.983	0.509	0.265	52.1	**52**	Mau	0.000	0.960	0.960	0.443	0.286	64.5
18	Bulandshahr	0.000	1.000	1.000	0.425	0.328	77.2	**53**	Meerut	0.000	0.906	0.906	0.383	0.290	75.8
19	Chandauli	0.010	1.000	0.990	0.561	0.307	54.8	**54**	Mirzapur	0.000	1.000	1.000	0.492	0.252	51.2
20	Chitrakoot	0.000	1.000	1.000	0.575	0.343	59.7	**55**	Moradabad	0.045	0.989	0.944	0.446	0.264	59.1
21	Deoria	0.058	1.000	0.942	0.439	0.253	57.7	**56**	Muzaffarnagar	0.000	0.948	0.948	0.368	0.329	89.2
22	Etah	0.000	0.962	0.962	0.434	0.264	60.8	**57**	Pilibhit	0.016	0.888	0.872	0.477	0.238	49.9
23	Etawah	0.000	1.000	1.000	0.550	0.308	56.1	**58**	Pratapgarh	0.000	0.959	0.959	0.433	0.282	65.3
24	Faizabad	0.001	1.000	0.999	0.468	0.277	59.2	**59**	Rae Bareli	0.005	0.961	0.956	0.456	0.287	62.9
25	Farrukhabad	0.003	0.863	0.860	0.418	0.247	59.1	**60**	Rampur	0.000	1.000	1.000	0.468	0.335	71.6
26	Fatehpur	0.000	1.000	1.000	0.462	0.271	58.7	**61**	Saharanpur	0.000	0.969	0.969	0.490	0.283	57.8
27	Firozabad	0.000	1.000	1.000	0.468	0.283	60.4	**62**	S K Nagar	0.000	0.928	0.928	0.438	0.283	64.6
28	G B Nagar	0.000	1.000	1.000	0.468	0.338	72.3	**63**	Shahjahanpur	0.000	0.876	0.876	0.438	0.243	55.6
29	Ghaziabad	0.000	1.000	1.000	0.469	0.327	69.7	**64**	Shrawasti	0.000	0.937	0.937	0.432	0.276	63.8
30	Ghazipur	0.000	1.000	1.000	0.363	0.292	80.4	**65**	Siddharthnagar	0.000	0.994	0.994	0.420	0.267	63.5
31	Gonda	0.011	0.840	0.829	0.430	0.212	49.3	**66**	Sitapur	0.000	1.000	1.000	0.497	0.250	50.3
32	Gorakhpur	0.000	1.000	1.000	0.446	0.255	57.1	**67**	Sonbhadra	0.008	1.000	0.992	0.514	0.285	55.5
33	Hamirpur	0.010	0.991	0.980	0.542	0.277	51.0	**68**	Sultanpur	0.000	0.968	0.968	0.456	0.279	61.2
34	Hardoi	0.023	1.000	0.977	0.522	0.258	49.3	**69**	Unnao	0.084	1.000	0.916	0.529	0.264	50.0
35	Hathras	0.000	1.000	1.000	0.481	0.262	54.4	**70**	Varanasi	0.000	1.000	1.000	0.488	0.365	74.7

Note: 1.
Source: Computed

Table 7A: Comparison of Different Methods in Educational Development Indices and Ranking across Districts: Uttar Pradesh, 2003-04

		Indices				Ranking			
Sn	District	PCA1	PCA2	1/CV	Borda	PCA1	PCA2	1/CV	Borda
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
1	Agra	32.2	-0.50	0.338	1163	65	46	69	57
2	Aligarh	38.1	0.36	0.510	1546	37	21	15	17
3	Allahabad	37.5	1.27	0.426	1630	43	8	54	10
4	Ambedkar Nagar	43.5	0.73	0.570	1426	10	15	1	29
5	Auraiya	48.6	1.45	0.550	1786	3	7	4	5
6	Azamgarh	39.4	0.26	0.505	1491	23	25	16	22
7	Baghpat	36.7	1.95	0.497	1604	51	5	21	13
8	Bahraich	32.2	-2.71	0.370	1043	66	70	68	67
9	Ballia	38.5	-0.07	0.430	1239	34	37	51	49
10	Balrampur	35.4	-1.43	0.444	1108	59	69	44	62
11	Banda	45.8	0.17	0.540	1569	6	31	7	15
12	Barabanki	35.4	-0.53	0.446	1093	58	48	43	63
13	Bareilly	38.3	0.27	0.453	1409	35	24	39	33
14	Basti	37.8	-0.64	0.454	1143	41	51	37	60
15	Bhadohi	36.3	1.23	0.460	1813	54	9	35	4
16	Bijnor	41.3	0.60	0.498	1617	16	17	20	12
17	Budaun	40.8	-0.17	0.519	1491	18	39	13	24
18	Bulandshahr	31.2	-0.84	0.411	1243	69	56	57	48
19	Chandauli	43.4	0.74	0.554	1634	11	14	3	9
20	Chitrakoot	48.6	-0.71	0.531	1335	2	54	10	39
21	Deoria	34.3	-0.67	0.428	1325	60	53	53	42
22	Etah	41.5	0.15	0.437	1276	14	33	46	44
23	Etawah	47.9	1.46	0.546	1758	5	6	5	7
24	Faizabad	38.1	0.09	0.465	1483	36	34	32	25
25	Farrukhabad	37.8	-0.31	0.415	1332	39	41	56	40
26	Fatehpur	37.7	-0.52	0.473	1223	42	47	28	50
27	Firozabad	38.7	0.44	0.450	1420	32	19	40	30
28	G B Nagar	38.9	2.25	0.458	1772	29	1	36	6
29	Ghaziabad	34.2	2.23	0.437	1835	61	2	48	2
30	Ghazipur	31.4	-1.14	0.323	953	68	66	70	69
31	Gonda	39.0	-0.43	0.448	1210	27	43	42	52
32	Gorakhpur	37.2	0.41	0.454	1447	45	20	38	28
33	Hamirpur	43.7	0.23	0.539	1521	9	28	9	19
34	Hardoi	41.5	-1.03	0.512	1188	15	63	14	55
35	Hathras	39.3	0.17	0.487	1491	25	32	25	23
36	Jalaun	44.2	0.03	0.527	1367	8	35	11	35
37	Jaunpur	32.6	-1.08	0.417	951	64	64	55	70
38	Jhansi	40.8	0.72	0.464	1412	17	16	34	32
39	J P Nagar	36.9	-1.00	0.502	1256	49	61	19	47
40	Kannauj	35.8	-0.37	0.381	1217	57	42	66	51

Table 7A Continued……

Sn	District	Indices				Ranking			
		PCA1	PCA2	1/CV	Borda	PCA1	PCA2	1/CV	Borda
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
41	Kanpur Dehat	37.8	-0.93	0.429	1161	40	57	52	58
42	Kanpur Nagar	49.4	2.00	0.559	1843	1	4	2	1
43	Kaushambi	39.9	0.22	0.440	1413	21	29	45	31
44	Kheri	37.0	-0.95	0.394	1070	47	59	64	65
45	Kushinagar	33.2	-1.29	0.430	1155	62	67	50	59
46	Lalitpur	48.4	0.53	0.540	1482	4	18	8	26
47	Lucknow	36.6	1.04	0.379	1638	53	12	67	8
48	Maharajganj	39.7	0.33	0.487	1588	22	23	26	14
49	Mahoba	45.6	0.25	0.497	1270	7	26	22	46
50	Mainpuri	37.0	-1.09	0.401	1272	48	65	59	45
51	Mathura	38.6	0.34	0.399	1562	33	22	61	16
52	Mau	37.1	0.94	0.437	1542	46	13	47	18
53	Meerut	31.7	1.23	0.404	1518	67	10	58	20
54	Mirzapur	40.4	0.23	0.469	1456	19	27	31	27
55	Moradabad	37.4	-0.46	0.448	1336	44	44	41	38
56	Muzaffarnagar	30.0	0.21	0.382	1373	70	30	65	34
57	Pilibhit	39.3	-0.47	0.494	1327	26	45	23	41
58	Pratapgarh	36.7	-0.99	0.464	1069	50	60	33	66
59	Rae Bareli	35.8	-0.65	0.470	1195	56	52	30	54
60	Rampur	39.3	-1.01	0.479	1340	24	62	27	37
61	Saharanpur	40.3	1.21	0.488	1628	20	11	24	11
62	Sant Kabir Nagar	33.0	-0.59	0.401	1134	63	49	60	61
63	Shahjahanpur	38.9	-0.77	0.395	1184	30	55	63	56
64	Shrawasti	36.7	-1.42	0.397	985	52	68	62	68
65	Siddharthnagar	36.1	-0.95	0.436	1093	55	58	49	64
66	Sitapur	41.7	-0.02	0.504	1355	13	36	17	36
67	Sonbhadra	38.9	-0.59	0.527	1305	31	50	12	43
68	Sultanpur	37.9	-0.13	0.471	1209	38	38	29	53
69	Unnao	43.0	-0.24	0.546	1503	12	40	6	21
70	Varanasi	39.0	2.21	0.502	1817	28	3	18	3

Note: **1**. Bhadhohi district name has been changed as Sant Ravidas Nagar; **2**. Different indices shown in the table are constructed using different statistical procedures and different scales of measurement are used for different methods. For instance, for the method inverse of CV we used normalised value of the indicator and for PCA and Borda methods we have used the raw values of the indicators.

Source: Computed using DRC data.

Table 8A: Educational Development Index and its Dimensions across Districts of Uttar Pradesh, 2003-04: Following the Alternative (Weight is 1/CV of the Variable) Method

Sn	District	SA	PI	HR	I	Grants	Enrolment	EIDI	EDI
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
1	Agra	0.312	0.478	0.287	0.252	0.004	0.391	0.323	0.338
2	Aligarh	0.301	0.747	0.381	0.440	0.732	0.497	0.514	0.510
3	Allahabad	0.204	0.579	0.293	0.221	1.000	0.456	0.417	0.426
4	Ambedkar Nagar	0.538	0.655	0.468	0.138	0.538	0.766	0.503	0.570
5	Auraiya	0.452	0.635	0.616	0.102	0.726	0.580	0.541	0.550
6	Azamgarh	0.262	0.705	0.426	0.543	0.202	0.625	0.469	0.505
7	Baghpat	0.397	0.810	0.419	0.055	0.381	0.508	0.493	0.497
8	Bahraich	0.251	0.488	0.272	0.636	0.085	0.416	0.356	0.370
9	Ballia	0.380	0.379	0.463	0.112	0.440	0.600	0.380	0.430
10	Balrampur	0.290	0.569	0.440	0.647	0.174	0.438	0.445	0.444
11	Banda	0.373	0.585	0.421	0.378	0.984	0.651	0.507	0.540
12	Barabanki	0.306	0.674	0.315	0.225	0.051	0.629	0.391	0.446
13	Bareilly	0.348	0.599	0.436	0.243	0.531	0.444	0.456	0.453
14	Basti	0.284	0.474	0.422	0.494	0.392	0.592	0.413	0.454
15	Bhadohi	0.177	0.699	0.370	0.073	0.894	0.511	0.445	0.460
16	Bijnor	0.420	0.647	0.470	0.343	0.319	0.536	0.487	0.498
17	Budaun	0.359	0.756	0.392	0.356	0.911	0.447	0.540	0.519
18	Bulandshahr	0.465	0.713	0.384	0.133	0.000	0.305	0.443	0.411
19	Chandauli	0.194	0.738	0.437	0.253	0.962	0.722	0.505	0.554
20	Chitrakoot	0.544	0.297	0.501	0.343	0.969	0.729	0.472	0.531
21	Deoria	0.238	0.555	0.307	0.594	0.511	0.465	0.417	0.428
22	Etah	0.414	0.439	0.541	0.212	0.310	0.471	0.427	0.437
23	Etawah	0.540	0.553	0.583	0.141	0.778	0.582	0.535	0.546
24	Faizabad	0.278	0.729	0.371	0.216	0.017	0.637	0.414	0.465
25	Farrukhabad	0.326	0.470	0.397	0.131	0.497	0.516	0.385	0.415
26	Fatehpur	0.387	0.708	0.352	0.139	0.289	0.581	0.441	0.473
27	Firozabad	0.398	0.619	0.485	0.147	0.065	0.502	0.435	0.450
28	G B Nagar	0.421	0.769	0.461	0.096	0.077	0.398	0.475	0.458
29	Ghaziabad	0.351	0.758	0.325	0.287	0.063	0.435	0.437	0.437
30	Ghazipur	0.241	0.448	0.296	0.133	0.027	0.435	0.290	0.323
31	Gonda	0.302	0.596	0.449	0.258	0.471	0.462	0.444	0.448
32	Gorakhpur	0.278	0.628	0.328	0.348	0.630	0.504	0.439	0.454
33	Hamirpur	0.476	0.494	0.560	0.218	0.659	0.691	0.493	0.539
34	Hardoi	0.481	0.410	0.500	0.498	0.335	0.710	0.453	0.512
35	Hathras	0.339	0.643	0.350	0.522	0.766	0.466	0.494	0.487
36	Jalaun	0.506	0.556	0.649	0.108	0.311	0.613	0.502	0.527
37	Jaunpur	0.249	0.644	0.322	0.183	0.266	0.520	0.386	0.417
38	Jhansi	0.439	0.561	0.454	0.114	0.235	0.584	0.428	0.464
39	J P Nagar	0.369	0.650	0.342	0.568	0.651	0.529	0.495	0.502
40	Kannauj	0.283	0.481	0.377	0.204	0.277	0.447	0.362	0.381

Table 8A **Continued**…..

Sn	District	SA	PI	HR	I	Grants	Enrolment	EIDI	EDI
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***	***10***
41	Kanpur Dehat	0.342	0.412	0.393	0.251	0.368	0.625	0.371	0.429
42	Kanpur Nagar	0.683	0.606	0.591	0.194	0.546	0.523	0.570	0.559
43	Kaushambi	0.207	0.618	0.341	0.137	0.942	0.475	0.429	0.440
44	Kheri	0.267	0.550	0.316	0.252	0.484	0.422	0.386	0.394
45	Kushinagar	0.326	0.516	0.417	0.245	0.300	0.535	0.399	0.430
46	Lalitpur	0.418	0.661	0.567	0.277	0.446	0.599	0.522	0.540
47	Lucknow	0.404	0.459	0.302	0.134	0.610	0.368	0.382	0.379
48	Maharajganj	0.302	0.712	0.438	0.364	0.517	0.468	0.492	0.487
49	Mahoba	0.499	0.540	0.526	0.130	0.308	0.609	0.463	0.497
50	Mainpuri	0.326	0.471	0.404	0.443	0.344	0.381	0.407	0.401
51	Mathura	0.441	0.401	0.425	0.372	0.312	0.377	0.405	0.399
52	Mau	0.362	0.596	0.368	0.052	0.270	0.577	0.395	0.437
53	Meerut	0.339	0.754	0.329	0.130	0.023	0.368	0.414	0.404
54	Mirzapur	0.338	0.522	0.403	0.401	0.148	0.691	0.403	0.469
55	Moradabad	0.358	0.644	0.269	0.436	0.500	0.469	0.442	0.448
56	Muzaffarnagar	0.295	0.748	0.258	0.152	0.348	0.273	0.415	0.382
57	Pilibhit	0.312	0.664	0.335	0.484	0.521	0.595	0.464	0.494
58	Pratapgarh	0.342	0.615	0.373	0.367	0.213	0.592	0.426	0.464
59	Rae Bareli	0.338	0.634	0.332	0.226	0.264	0.673	0.410	0.470
60	Rampur	0.351	0.747	0.278	0.258	0.306	0.611	0.439	0.479
61	Saharanpur	0.385	0.745	0.399	0.135	0.752	0.427	0.506	0.488
62	Sant Kabir Nagar	0.206	0.556	0.368	0.234	0.025	0.584	0.346	0.401
63	Shahjahanpur	0.407	0.474	0.347	0.291	0.262	0.425	0.386	0.395
64	Shrawasti	0.324	0.544	0.381	0.280	0.009	0.472	0.375	0.397
65	Siddharthnagar	0.208	0.520	0.407	0.259	0.729	0.518	0.412	0.436
66	Sitapur	0.328	0.607	0.440	0.182	0.642	0.659	0.458	0.504
67	Sonbhadra	0.362	0.796	0.364	0.441	0.229	0.637	0.494	0.527
68	Sultanpur	0.319	0.644	0.438	0.094	0.158	0.663	0.415	0.471
69	Unnao	0.419	0.725	0.454	0.242	0.478	0.667	0.510	0.546
70	Varanasi	0.179	0.823	0.350	0.093	0.917	0.571	0.482	0.502
Descriptive Statistics									
Minimum		0.177	0.297	0.258	0.052	0.000	0.273	0.290	0.323
Maximum		0.683	0.823	0.649	0.647	1.000	0.766	0.570	0.570
Range		0.506	0.526	0.391	0.595	1.000	0.493	0.280	0.247
Average		0.351	0.603	0.404	0.267	0.421	0.532	0.441	0.462
SD		0.10	0.12	0.09	0.15	0.28	0.11	0.06	0.06
CV		27.6	19.3	21.6	56.4	67.5	20.2	12.6	12.0

Note: **1**. Bhadhohi district name has been changed as Sant Ravidas Nagar; 2. **SA** – Access to and Availability of Schools: **PI**- Physical Infrastructure: **HR** - Human Resources (Teacher): **I** – Beneficiaries under Incentive Schemes: **EIDI** – Educational Infrastructure Development Index: **EDI** – Educational Development Index; **3**. EIDI includes input indicators but excludes the outcome indicators whereas the EDI includes both input and output indicators.
Source: Computed using DRC data.

References

Dreze, J and Gazdar, H (1997) "The Burden of Inertia in Uttar Pradesh", in Dreze and Sen (eds.) **India Development: Regional Perspectives**, O U P, New Delhi.

Field, Andy (2000) **Discovering Statistics Using SPSS for Windows**, Sage London.

Filmer, Deon and Pritchett, Lant (1998) "Estimating Wealth Effects Without Income of Expenditure Data or Tears: Educational Enrolment in India", *Policy Research Working Paper No. 1994*, The World Bank, Washington DC.

Glewwe, Paul (2000) "Education" in Margaret Gosh, and Paul Glewwe (eds.) **Designing Household Survey Questionnaires for Developing Countries: Lessons form 15 Years of the Living Standard Measurement Surveys**, The World Bank Washing ton DC. Vol. I-III.

Hamilton, Lawrence C (1992) **Regression with Graphics**, Duxbury Press, Belmont.

Henry, Lovis (1976) **Population Analysis and Models**, Edward Arnold Press.

IAMR (2001) "***Educational Development Parameters and Preparation of Educational Development Index***", Institute of Applied Manpower Research, New Delhi.

Mehta, Arun C (2004) **Elementary Education in India: Where do we Stand?, Analytica Report 2003**, National Institute of Educational Planning and Administration, New Delhi.

Mishra U S and Dilip (2002) "Does Better Reproductive Health Status Mean Low Fertility Levels? Evidence from Asian Countries", *Health and Population Perspective and Issues*, 25 (2), 65-73.

Mishra U S; S. Irudaya Rajan and Mala Ramanathan (1999) "1981-91: A Decade of Urban Explosion", *Nagarlok*, Vol. XXXI, July-Sept, pp. 10-21.

Mishra U S and Venkatanarayana, M (2004) Review of a Book entitled "**District Level Deprivation in the New Millennium**" by Bibek Debroy and Laveesh Bhandari (2003), Konark, New Delhi, *Indian Journal of Labour Economics*, Vol. 59, Oct-Dec.

NIEPA (2004a) **Elementary Education in India: Where do we Stand?, District Report Cards**, National Institute of Educational Planning and Administration, New Delhi. http\\www.dpepmis.org\\download\\src2004.

NIEPA (2004b) **Elementary Education in India: Where do we Stand?, State Report Cards**, National Institute of Educational Planning and Administration, New Delhi.

PROBE Team (1999) **Public Report on Basic Education in India**, O U P, New Delhi.

Qizilbash, Mozaffar (2004) "On the Arbitrariness and Robustness of Multi-Dimensional Poverty Rankings", *Journal of Human Development*, Vol. 5 (3).

Raza, Moonis (1990) *Educational Development and Society*, Vikas, New Delhi.

UNDP (2004) **Human Development Report 2004**, O U P, Oxford.

World Bank (1997a) **Primary Education in India**, The World Bank, Washington DC.

Notes

[1] As a matter of fact, PCA may be used for two different purposes: i). When there are large number of variables/indicators, to simplify the analysis and bringing out the underlying dimension out of those indicators it useful to reduce the large number of indicators in a few without losing their importance (for instance see IAMR, 2001); and ii). In situation of constructing a composite index and when it is necessary to give weight to each indicator, the PCA helps us in weighing each indicator according to their statistical significance (e.g see Filmer and Pritchett, 1998). . When there are too many indicators related to particular phenomenon, one has to reduce them to few for simplifying the analysis.

[2] In situation of large set of information related to a phenomenon like educational development and the existence of clusters of large correlation between subsets of variables informs that these correlated variables may be measuring aspects of the same underlying dimension. These underlying dimension are known as factors (or latent variables). Here the analysis could be simplified when one can reduce the data set from a group of correlated variables into a smaller set of uncorrelated factors. In the PCA, factors are conceived based on the statistical property (i.e. variability) where the individual indicators are combined with that of similar variability.

[3] PCA decomposes the original data into a set of linear variates (Field, 2000).

[4] This method is used in a study on educational development across Indian States by Institute of Applied Manpower Resources, New Delhi (see IAMR, 2000).

[5] Ranking can be derived in different ways: a rank may be assigned to a district based on its relatively position in the series of values (may be raw values or normalised ones) in each component/variable of each dimension. To arrive at the composite rank, all these ranks are combined (an average of the ranks of all components in all dimensions may serve the purpose) together.

[6] This concept is similar to that of the 'hypothetical cohort' used in fertility analysis, where in the age specific fertility rates at a point of time are cumulated over ages to indicate the expected fertility per women at the end of the reproductive span assuming that the current fertility regime will continue in the near future.

[7] For instance: a) school density (i.e. school per population) against single teacher schools; b) percentage of schools under private management against teacher-pupil ratio or teachers with appropriate qualification; c) percentage of rural schools against all infrastructure variables (this is to argue for rural schools being insufficient/inadequate in terms of infrastructure; d) ratio of middle schools to primary one and transition rate; e). teacher-pupil ratio against net enrolment rate; e) single teacher school against net enrolment rate.

[8] The Expert Group on Education recommended it as 1 : 3 ratio.

[9] That is enrolment in Grade II and subsequent primary grades in a year 't' is divided by enrolment in Grade I in the same year 't' is multiplied by 100 to obtain survival rate in primary grades (see NIEPA, 2004b).

[10] See NIEPA (2004b) for the formulae to calculate all these flow rates.