

Draft

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Subject: Minutes of National Workshops on Retention and Quarterly Review Meeting of MIS Coordinators, Conducted by MIS Unit, TSG

The MHRD and MIS unit, TSG conducted the National Workshop on Retention and Quarterly Review Meeting of MIS Coordinator during 11-12, December, 2009 at Gangtok, Sikkim. The agenda of the Workshops included the following:

- Retention rate – various methodologies
- Retention rate – different data sources
- Retention rate – how to improve
- Capacity Building on Analyzing DISE data
- Data Sharing and Dissemination
- Presentation on Jan-Vaachan (Social Audit) of DISE data
- Review of Quarterly Progress – MIS (including web-portal)

The workshop was conducted primarily, to expose the MIS, Planning and Research & Evaluation Coordinators to the various methodologies of calculating the retention rate. During the workshop the usage of DISE data was discussed at length with focus on the following:

- What data is available
- How the Retention/dropout is being calculated
- What are different sources of data
- Sharing of methodology of Dropout Study
- Demonstration and Group-work on calculation of Flow Rates using Reconstructed Cohort Method
- Presentations by States on Best Practices (Jan-Vaachan, Social audit, Data Sharing, Dissemination, EDI etc.)
- Review of Quarterly Progress – MIS (including web-portal)

The workshop was attended by 77 participants from 21 States/UTs including the following resource persons from National level who attended the workshop in order to provide inputs (Attendance Sheet enclosed at Annex – IV).

Dr. Arun C. Mehta, Professor & Head, NEUPA
Sh. Ravi Chand, Under Secretary, MHRD
Dr. A.B.L. Srivastava, Chief Consultant, TSG

Ms. Ruchika Gupta, Deputy Director, Statistics Dept., MHRD
Sh. Naveen Bhatia, Computer Programmer, NUEPA
Sh. U. S. Srivastava, Statistics Dept., MHRD
Sh. Ravi Kant Baghel, Consultant, TSG
Sh. Amit Saxena, Consultant, TSG
Sh. Dinesh Pradhan, NE Cell, Consultant, TSG
Sh. Shalender Sharma, Chief Consultant, TSG

The Workshop was inaugurated by the Secretary Education (HRD), Sikkim. The Education Secretary, Sikkim in his opening remarks has mentioned the importance of this kind of workshop at National level and has also suggested having uniformity while calculating the educational indicators of utmost importance. The workshop started with presenting an overview and providing details about the two day's agenda.

Retention being one of the SSA goals has always been the focus area for all concerned. The discussion on retention would help States to come up with concrete, specific and viable strategies to improve retention. During the workshop, the first day was completely devoted to the discussion on retention which included i) various methodologies to calculate retention rate ii) different data sources available iii) reasons for low retention and remedies to improve. For the above the experts from MHRD, NUEPA, NCERT and TSG made presentations and the same was followed by a group work and presentation by each the group of States. The planning indicators to be used for elementary education were also discussed during the workshop. During this part of the workshop, not only the indicators generated using DISE data but the other data sources were discussed, as well.

Dr. ABL Srivastava, TSG, made a presentation to discuss various methodologies used to calculate the Dropout, Promotion and Repetition rates. The participants were exposed to the following methodologies:

- True Cohort Method
- Alternatives to the True Cohort Method
 - Apparent Cohort Method
 - Reconstructed Cohort Method

During the presentation the definition of each of the above methods was shared with the participants. The participants were also given to formulas to calculate the Flow Rates using each of the method. Then the actual calculation was done in front of the participants. At the end, the limitations and assumptions in each methodology were discussed in detail. All the State Coordinators were asked to bring the Grade-wise Enrolment and Repeaters data for last five years. Subsequently, the

participants were divided into ten groups and an exercise was given to the train them extensively on the calculation of dropout rates using the Reconstructed Cohort Method. (Presentation Attached at Annex – I)

During the later half of the day, the groups (States) made a presentation on the Dropout calculated by them using their own set of data. The states were made familiar of the methodologies by doing the group work.

The second day started with the presentation by Mr. Shalender Sharma, Chief Consultant, MIS unit, TSG explaining various flow rates calculation methodologies in generic manner so that it become easier for the MIS Coordinators to calculate the indicators easily using the DISE data. During the presentation, Dr. Arun C. Mehta, Professor and Head, NUEPA, also explained the Reconstructed Cohort Chart to the participants and explained the importance and usage of other indicators being generated from the Reconstructed Cohort Method (Presentations attached at Annex – II & III).

The States, Later on, made the presentation on Best Practices on Jan-Vaachan, Social audit, Data Sharing, Dissemination, EDI etc (Copy of presentations sent to all States/UTs through email).

A brief review of quarterly progress towards MIS activities was also convened on the second day where most of the States reported that they are in process of data entry and envisage sending the complete data by January 2010. The States were asked to give proper attention on the Jan-Vaachan for the year 2009-10. It was also emphasized that the DISE 2009-10 data should be used while preparing the Annual Work Plan for the year 2010-11.

Keeping in view the available data set and requirements, it was unanimously recommended that the Grade-wise Flow-rates (Promotion, Repetition, and Dropout) will be calculated and reported using the Common Schools (Schools exist in both the years) to minimize negative dropout rates.

Data required for calculating the above mentioned flow rates will be the enrolment (common schools) of two consecutive years and repeaters data for the latter year. It is assumed that there will be no new entrance except in grade I if there is any new entrance it should be deducted. Furthermore, the information on transfer-in and transfer-out is not taken into account because of limitations in the data available. However, the same may be considered in the subsequent years while calculating the promotion, repetition and dropout rates. The formula and example to be used for calculating the above is as follows:

Table: 1

	Grade I			Grade II		Grade VIII		
	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls
Enr 2008-09	1000	550	450	950	525	425	800	425	375
Enr 2009-10	980	430	550	900	500	400	750	380	370
Rep 2009-10	100	60	40	100	50	50	50	25	25

(Hypothetical dataset)

$$\text{Promotion Rate Grade I} = \frac{\text{Enrolment in Grade II CY (-) Repeaters in Grade II CY}}{\text{Enrolment in Grade I PY}} \times 100$$

$$\text{Example: Promotion Rate Grade I} = \frac{900 (-) 100}{1000} \times 100 = \frac{800}{1000} \times 100 = 80$$

$$\text{Repetition Rate Grade I} = \frac{\text{Repeaters in Grade I CY}^1}{\text{Enrolment in Grade I PY}^2} \times 100$$

$$\text{Example: Repetition Rate Grade I} = \frac{100}{1000} \times 100 = 10$$

$$\text{Dropout Rate Grade I} = 100 - (\text{Promotion} + \text{Repetition})$$

$$\text{Example: Dropout Rate Grade I} = 100 - (80 + 10) = 10$$

Similarly, the same could be calculated gender-wise for all grades. The DISE data is collected upto the Grade VII/VIII whereas, the above formula would require the data for Grade VIII/IX (First grade of secondary level) in order to get promotion rate of terminal grade of elementary level. The assumption for this could be made that the percentage of students passing grade VIII in the previous year the same percentage of students will pass the grade VIII this year also. The pass percentage could be applied to the enrolment of Grade VII/VIII to ascertain the number of students graduating the elementary cycle.

¹ CY = Current year

² PY – Previous year

It remains a limitation that the calculation of flow rates with this formula for school level would be difficult sometime and need to be interpreted with limitations. The proposed formula demands for at least next grade's enrolment and repetition. If school is running grade 1-3 or 1-4 it would be difficult to calculate the promotion rate for grade 3 or 4 (last grade of a school) where school management is not aware whether the student joined the next grade or not. In this case by using this formula Promotion, Repetition, Dropout (PRD) can be calculated at the school level for one grade less than the running grade at a school.

Another limitation is that the direct entry into the higher grades (grade 4-5) is not separated out while taking out the promotes.

In order to calculate the flow rates in case of terminal grade of upper primary level the following formula and example (based on table 2) could be used:

Table: 2

	Grade I			Grade VII			...Grade VIII		
	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls
Enr 2008-09	1000	550	450	950	525	425	800	425	375
Enr 2009-10	980	430	550	900	500	400	750	380	370
Rep 2009-10	100	60	40	100	50	50	50	25	25

(Hypothetical dataset)

Assumption: 90 % (to be used as per actual pass percentage – DISE data) of students pass grade VIII examination. In this case we are assuming that all graduates (e. g. 90%) will join in the next grade.

$$\text{Promotion Rate Grade VIII} = \frac{(\text{Enrolment Grade VIII CY (x) \% students passed Grade VIII})/100}{\text{Enrolment in Grade VII PY}} \times 100$$

$$\text{Example: Promotion Rate Grade VIII} = \frac{(750 \times 90)/100}{950} \times 100 = \frac{675}{1000} \times 100 = 71$$

$$\text{Repetition Rate Grade VIII} = \frac{\text{Repeaters in Grade VIII CY}}{\text{Enrolment in Grade VIII PY}} \times 100$$

$$\text{Example: Repetition Rate Grade VIII} = \frac{50}{800} \times 100 = 6.25$$

Dropout Rate Grade VIII = 100 – (Promotion + Repetition)

Example: Dropout Rate Grade VIII = 100 – (71 + 6.25) = 22.75

Using the above formulas the promotion, repetition and dropout rates could be calculated by gender and grade upto the terminal grade of elementary level. While interpreting the promotion rate of terminal grade it is noteworthy that all students passing terminal grade of elementary level may not take admission in next grade i.e. grade IX and need to use some assumptions to find out how many (or per cent) students will take an admission in grade IX on the basis of local context.

The promotion, repetition and dropout rates for the primary level of education would be calculated as per the methodology described below:

Flow rates for Primary level

The flow rates for primary level should be calculated as annual average flow rates. That means, these flow rates depict the average of promotion, repetition and dropout in all the grades of primary level (I- IV/V). Keeping in view the rapid changes in the education scenario, particularly elementary level, it becomes more pertinent to track the flow rates on annual average basis.

The DISE data now collects the data on repeaters by social category which enable us to calculate the flow rates for SC/ST/OBC and Muslim category separately, which was not possible earlier. Therefore, it is recommended that the state should also analyze and report the flow rates by Social categories.

The formula to calculate the average annual flow rates at the primary level is as follows:

$$\text{Promotion rate} = \frac{\text{Enrolment in Grades II – VI (C.Y.) (-minus)} - \text{Repeaters in Grades II – VI (C.Y.)}}{\text{Enrolment in Grades I – V (P.Y.)}} \times 100$$

Primary level

$$\text{Repetition rate} = \frac{\text{Repeaters in Grades I – V (C.Y.)}}{\text{Enrolment in Grades I – V (P.Y.)}} \times 100$$

Primary level

Dropout Rate = 100 - (Promotion rate + Repetition rate)

Hence, the table to be generated would appear as follows:

Dropout rate

District	Grade I			Grade II			Grade.....			Primary level(I-V)			...Grade VIII		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Dist...1															
Dist...2															
State															

Promotion rate

District	Grade I			Grade II			Grade.....			Primary level(I-V)			...Grade VIII		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Dist...1															
Dist...2															
State															

Repetition rate

District	Grade I			Grade II			Grade.....			Primary level(I-V)			...Grade VIII		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Dist...1															
Dist...2															
State															

Further details of various indicators and methodologies

Reconstructed cohort method:

Though the states have been asked to provide data on the grade-wise annual flow rates and average annual flow rates for primary level, a more pertinent and commonly used method is reconstructed cohort method. This method is internationally used and accepted to check the health of the system by producing various indicators.

It is recommended that the States should also generate, report and build capacities of the District level officers to calculate the flow rates using reconstructed cohort method. Using this method, a cohort is reconstructed and the survival rates are generated using two consecutive years data which gives near to correct flow rates. A software (EXCEL Templates) developed by UIS/UNESCO to workout efficiency indicators (made available at www.educationforallinindia.com and will also be made available at www.dise.in). The details about the methodologies are provided below:

The reconstructed cohort method places less demand on the availability of detailed data over time. To apply this method, data on enrolment by grade for two consecutive years and on repeaters by grade from the first to second year will be sufficient to enable the estimation of three main flow-rates: promotion, repetition and drop-out. Once obtained, these rates may be analysed first of all by grade to study the patterns of repetition and drop-out. Then, they are used in a reconstructed pupil-cohort flow to derive other indicators of internal efficiency.

The following indicators could be derived using the reconstructed cohort method:

- **Survival rate (upto terminal grade of primary level)**
- **Year input per graduate**
- **Coefficient of efficiency**
- **Input-output ratio**

Detailed methodology and description is given below:

The methodology of the reconstructed cohort flow model is based on the fundamental concept that for pupils enrolled in a given grade at a certain year, there could be only three eventualities: (a) some of them will

be promoted to the next higher grade in the next school year; (b) others will repeat the same grade the next school year; (c) the remaining will drop-out of school in the course of the year.

Survival rates

Definition: Percentage of a cohort of pupils (or students) enrolled in the first grade of a given level or cycle of education in a given school-year who are expected to reach each successive grades.

Purpose: Survival rate measures the holding power and internal efficiency of an education system. It illustrates the situation regarding retention of pupils (or students) from grade to grade in schools, and conversely the magnitude of drop-out by grade.

Calculation method: Divide the total number of pupils belonging to a school-cohort who reached each successive grade of the specified level of education by the number of pupils in the school-cohort i.e. those originally enrolled in the first grade of the same level of education, and multiply the result by 100.

Formula:

$$SR_{g,i}^k = \frac{\sum_{t=1}^m P_{g,i}^t}{E_g^k} * 100$$

Where: $P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$

i = grade (1, 2, 3,...,n) t = year (1, 2, 3, ...,m) g = pupil-cohort.

$SR_{g,i}^k$ = Survival Rate of pupil-cohort g at grade i for a reference year k

E_g^k = Total number of pupils belonging to a cohort g at a reference year k

$P_{g,i}^t$ = Promotees from E_g^k who would join successive grades i throughout successive years t.

R_i^t = Number of pupils repeating grade i in school-year t

Data required: Enrolment by grade for two consecutive years (years t and t+1); number of repeaters by grade for year t+1.

Data source: School register, school survey or census.

Type of disaggregation: Survival Rates can be disaggregated by gender, by geographical location (region, urban/rural) and type of institution (private/public). It can also be disaggregated between survival with and without repetition.

Interpretation: Survival Rate approaching 100% indicates a high level of retention and low incidence of drop-out. Survival Rate may vary from grade to grade, giving indications of grades with relatively more or less drop-outs. The distinction between survival rate with and without repetition is necessary to compare the extent of wastage due to drop-out and repetition. Survival rate to grade 5 of primary education is of particular interest since this is commonly considered as pre-requisite for sustainable literacy.

Quality standards: Since the calculation is based on pupil-flow rates, the reliability of the Survival Rate depends on the consistency of data on enrolment and repeaters in term of coverage over time and across grades.

Limitations: Given that this indicator is usually estimated using cohort analysis models that are based on a number of assumptions, care should be taken in using of the results in comparisons.

Year input per graduate

Definition: The estimated average number of pupil-years spent by pupils (or students) from a given cohort who graduate from a given cycle or level of education, taking into account the pupil-years wasted due to drop-out and repetition. N.B. One school-year spent in a grade by a pupil is equal to one pupil-year.

Purpose: To assess the extent of educational internal efficiency in terms of the estimated average number of years to be invested in producing a graduate.

Calculation method: Divide the total number of pupil-years spent by a pupil-cohort (graduates plus drop-outs) in the specified level of education by the sum of successive batch of graduates belonging to the same cohort.

Formula :

$$YIG_{\xi} = \frac{\left\{ \sum_{j=n}^{n+k} G_{\xi,j} * j \right\} + \left\{ \sum_{j=1}^{n+k} D_{\xi,j} * j \right\}}{\sum_{j=n}^{n+k} G_{\xi,j}}$$

For more details, see the flow diagram on cohort analysis

Where:

YIGg = Years input per graduate (for graduates belonging to cohort g)

$G_{g,j}$ = Graduates from cohort g after j years of study
k = number of grade (or duration) in the cycle.

k denotes the number of repetitions allowed; n the prescribed normal duration of study for a cycle or level of education; g the pupil-cohort; and j the number of years of study.

Data required: Total number of pupil-years spent by the pupil-cohort and the total number of graduates from the same cohort. These data can be derived using cohort reconstructed model, which requires enrolment by grade for two consecutive years (years t and t+1); number of repeaters by grade for year t+1 and number of graduates for year t.

Data source: School register, school survey or census or records.

Type of disaggregation: The years input per graduate can be disaggregated by gender, by geographical location (region, urban/rural) and by type of institution (private/public).

Interpretation: The closer the value of this indicator is to the theoretical number of grades (or duration) of the specified education cycle, the higher the internal efficiency and the lesser the negative effects of repetition and drop-out. A high number of pupil-years per graduate as compared to the normal duration, denotes waste of resources and hence inefficiency.

Quality standards: Since the calculation of this indicator is based on pupil-flow rates, its reliability depends on the consistency of data on enrolment and repeaters in term of coverage over time and across grades. Differences in national regulations concerning the number of repetitions allowed constitute an aspect to be taken into account when using this indicator for inter-country comparisons.

Limitations: From a conceptual viewpoint, having most pupils (or students) graduating within the prescribed duration of the cycle is optimal with regard to economic efficiency and resource utilization, but this does not necessarily imply achievement of the expected learning outcomes. Also, according to this calculation method, early drop-outs (i.e. from lower grades) can result in higher internal efficiency than late drop-out (i.e. from higher grades); this means that efficiency from the economic point of view can be in contradiction with educational objectives aiming at retaining pupils in schools until higher grades when they would have acquired the desired knowledge and skills.

Coefficient of efficiency

Definition: The ideal (optimal) number of pupil-years required (i.e. in the absence of repetition and drop-out) to produce a number of graduates from a given school-cohort for a cycle or level of education expressed as a percentage of the actual number of pupil-years spent to produce the same number of graduates. Input-Output ratio, which is the reciprocal of the coefficient of efficiency, is often used as an alternative. Note: One school-year spent in a grade by a pupil is counted as one pupil-year.

Purpose: This is a synthetic indicator of the internal efficiency of an educational system. It summarises the consequences of repetition and drop-out on the efficiency of the educational process in producing graduates.

Calculation method: Divide the ideal number of pupil-years required to produce a number of graduates from a given school-cohort for the specified level of education, by the actual number of pupil-years spent to produce the same number of graduates, and multiply the result by 100.

Formula:

$$CE_g = \frac{\sum_{j=n}^{n+k} G_{g,j} * n}{\left\{ \sum_{j=n}^{n+k} G_{g,j} * j \right\} + \left\{ \sum_{j=1}^{n+k} D_{g,j} * j \right\}} * 100;$$

For more details, see the flow diagram on cohort analysis.

Where:

CE_g = Coefficient of Efficiency for a pupil-cohort g

$G_{g,n}$ = the number of pupils graduating from cohort g in final grade n after n years of study (without repetition)

$G_{g,j}$ = the number of pupils graduating from cohort g in final grade n after j years of study

$D_{g,j}$ = the number of pupils (of the cohort g) dropping out after j years of study

k denotes the number of repetitions allowed; n the prescribed normal duration of study for a cycle or level of education; g the pupil-cohort; and j the number of years of study.

Data required: Number of graduates and drop-outs by length of study. These data can also be derived using the reconstructed cohort model, which requires enrolment by grade for two consecutive years (years t and

t+1); number of repeaters by grade for year t+1 and number of graduates for year t.

Data source: School register, school survey or census for data on repeaters and enrolment.

Type of disaggregation: The Coefficient of Efficiency can be disaggregated by gender, by geographical location (region, urban/rural), and by school type (private/public).

Interpretation: A Coefficient of Efficiency approaching 100% indicates a high overall level of internal efficiency and no wastage due to repetition and drop-out. Coefficient of Efficiency of less than 100% signals inefficiency due to grade repetition and drop-out. As the reciprocal, the optimum input-output ratio is unity i.e. 1, and inefficiency arises from any point which is greater than one.

Quality standards: Since the calculation of this indicator is based on pupil-flow rates, its reliability depends on the consistency of data on enrolment and repeaters in term of coverage over time and across grades. Differences in national regulations concerning the number of repetitions allowed constitute an aspect to be taken into account when using this indicator for inter-country comparisons.

Limitations: Given that this indicator is usually derived using cohort analysis models that are based on a number of assumptions, and owing to the highly synthetic nature of this indicator, care should be taken in the use of the results in comparing education systems. From a conceptual viewpoint, having most pupils (or students) graduating within the prescribed duration of the cycle is optimal with regard to economic efficiency and resource utilization, but this does not necessarily imply achievement of the expected learning outcomes. Also, according to this calculation method, early drop-outs (i.e. from lower grades) can result in higher internal efficiency than late drop-out (i.e. from higher grades); this means that efficiency from the economic point of view can be in contradiction with educational objectives aiming at retaining pupils in schools until higher grades when they would have acquired the desired knowledge and skills.

Input-output ratio

Definition: The ideal (optimal) number of pupil-years required (i.e. in the absence of repetition and drop-out) to produce a number of graduates from a given school-cohort for a cycle or level of education expressed as a percentage of the actual number of pupil-years spent to

produce the same number of graduates. Input-Output ratio, which is the reciprocal of the coefficient of efficiency, is often used as an alternative. N.B. One school-year spent in a grade by a pupil is counted as one pupil-year.

Purpose: This is a synthetic indicator of the internal efficiency of an educational system. It summarises the consequences of repetition and drop-out on the efficiency of the educational process in producing graduates.

Calculation method: Divide the ideal number of pupil-years required to produce a number of graduates from a given school-cohort for the specified level of education, by the actual number of pupil-years spent to produce the same number of graduates, and multiply the result by 100.

Formula:

$$CE_g = \frac{\sum_{j=n}^{n+k} G_{g,j} * n}{\left\{ \sum_{j=n}^{n+k} G_{g,j} * j \right\} + \left\{ \sum_{j=1}^{n+k} D_{g,j} * j \right\}} * 100;$$

For more details, see the flow diagram on cohort analysis.

Where:

CE_g = Coefficient of Efficiency for a pupil-cohort g

$G_{g,n}$ = the number of pupils graduating from cohort g in final grade n after n years of study (without repetition)

$G_{g,j}$ = the number of pupils graduating from cohort g in final grade n after j years of study

$D_{g,j}$ = the number of pupils (of the cohort g) dropping out after j years of study

k denotes the number of repetitions allowed; n the prescribed normal duration of study for a cycle or level of education; g the pupil-cohort; and j the number of years of study.

Data required: Number of graduates and drop-outs by length of study. These data can also be derived using the reconstructed cohort model, which requires enrolment by grade for two consecutive years (years t and t+1); number of repeaters by grade for year t+1 and number of graduates for year t.

Data source: School register, school survey or census for data on repeaters and enrolment.

Type of disaggregation: The Coefficient of Efficiency can be disaggregated by gender, by geographical location (region, urban/rural), and by school type (private/public).

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