School Dropout Rate: Concept, Formula & Procedure

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Importance

A crucial indicator that plays a vital role in achieving the goal of universal school education is a grade-to-grade dropout, or the average annual dropout rate, computed for a level or stage of school education.

To compute the dropout rate, grade-wise enrolment for two consecutive years and the grade-wise number of repeaters in the latest year are required.

It is observed that the concept of dropout is different from the retention and transition rates. However, these rates also play a vital role in attaining the universalization of school education.

It may be observed that despite the Right to Education Act 2009, there may still be repeaters in the system. In India, the only data source on grade-wise enrolment and the number of repeaters is the UDISE+ which attain the status of official statistics from 2012-13. The formula to compute drop out rate is presented below, which looks complicated but is simple to apply:

In general, if $\mathcal{E}_{it}$ denotes enrolment and $\mathcal{R}_{it}$ is the number of repeaters in Grade i in the Year t, then for Grade i in year t.

$$\text{Promotion Rate, } PR(i,t) = \frac{(E_{i+1,t+1} - \mathcal{R}_{i+1,t+1})}{E_{i,t}} \text{X}100$$

$$\text{Repetition Rate, } RR(i,t) = \frac{\mathcal{R}_{i,t+1}}{E_{i,t}} \text{X}100$$

$$\text{Dropout rate, } DR_{(i,y)} = \frac{E_{i,t} - \mathcal{R}_{i,t+1} - (E_{i+1,t+1} - \mathcal{R}_{i+1,t+1})}{E_{i,t}} \text{X}100$$

or $DR_{(i,t)} = 100 - PR_{(i,t)} - RR_{(i,t)}$

Here $E_{i+1,t+1} - \mathcal{R}_{i+1,t+1}$ gives the number of promotees from grade i in the year t to the next grade $i+1$ in year t +1. This otherwise means that the total dropout, promotion, and repetition rates will come to 100; if not, re-check the calculation.

It may be observed that the latest enrolment ($\mathcal{E}_{it}$) and repeaters ($\mathcal{R}_{it}$) data is available for the year 2021-22 (t + 1); thus, for computing the dropout rate, we need two years of consecutive data, i.e., the years 2020-21 (t) and 2021-22 (t + 1), and the number of repeaters in the latest year, i.e., 2021-22 (t + 1). The dropout rate computed based on this data set will give us the dropout rate for the Cohort 2020-21 and not for the year 2021-22.

The Caution

While computing the dropout rate, one must ensure that both years' grade-wise enrolment is based on the same number of schools, i.e., common schools and not all schools. If considered, all schools will present an underestimation of the dropout rate and may present a misleading picture. Common schools are the schools that are covered in both years. UDISE presents dropout rates based on common schools from 2005-06 to 2017-18 and on all schools from 2018-19 onwards. This applies both to grade-specific as well as to the average annual dropout rate at an educational level.

The Computation Demonstration

Grade-wise enrolment (Grades I to XII) for the latest years 2021-22 and 2020-21 and repeaters for the year 2021-22 are presented in Table 1, which we shall use in demonstrating the computation of dropout rate for the Cohort 2020-21 for primary grades and primary level/stage as such. It may be known that to obtain a dropout rate at the primary level of education, we also need enrolment and repeaters of Grade VI, which shall help us compute flow rates, like promotion and dropout rates in Grade V.

Table 1: Grade-wise Enrolment & Repeaters, 202021 & 2021-22

Classes	Enrolment		Repeaters
	2020-21	2021-22	2021-22
I	23194649	24180153	104843
II	25178129	23839906	96613
III	25021850	25001304	99373
IV	24502573	24720364	96374
V	24124090	24100523	158538
VI	21930788	22636898	158580
VII	21903970	22138001	157541
VIII	22019441	22015793	158779
IX	19732303	19785727	230499
X	19274072	18742904	189916
XI	13534080	15249326	137476
XII	13388516	13329724	142131
Total	253804461	255740623	1730663

Source: UDISE+ 2020-21 & 2021-22

Flow rate presents the internal dynamics of an educational system. Once the student enters the system, he/she can either be promoted to the next grade, repeat a grade in the next year, or even drop out of the system before completing a grade.

For demonstration purposes, we compute flow rates at the primary level of education, both grade-specific and level-specific.

(a) Promotion Rate

First, we discuss the promotion rate, which needs to be computed separately for all the primary level grades, i.e., Grades I to V.

The number of promotees, also known as the freshers who are promoted to the next higher grade, must be obtained first. Of the total 23,195 thousand children in Grade I in 2020-21, it looks like about 23,840 thousand children were promoted to the next higher grade, i.e., Grade II in 2021-22. But in reality, the number of promotees was 23,743 and not 23,840 thousand because of 97 thousand repeaters who are also included in the Grade II enrolment. Thus, the actual number who were promoted to Grade II in 2021-22 was 23,840 - 97 = 23,743 thousand. In a similar fashion, promotees in the remaining grades are to be worked out. Once the number of promotees is worked out, the next step is to compute the promotion rate in different grades. The promotion rate in a particular grade can be computed as follows:

$$= \frac{\text{Number of Students Promoted to } \text{Grade}_{i+1}^{\,t+1}}{\text{Total Number of Students in } \text{Grade}_{i}^{\,t}} \times 100$$

In notations, it is expressed by the following equation:

$$\text{Promotion Rate } (p_i^t) = (p_{i+1}^{\,t+1} / E_i^{\,t}) \times 100$$

In the present example, 't' is the year 2020-21, and 't+1 is the year 2021-22. Promotion rate for Grade I is obtained like

$$PR^{2020\text{-}21}_{\ I} = \frac{P^{2021\text{-}22}_{\ II}}{E^{2020\text{-}21}_{\ I}} \times 100$$

$$= \frac{23{,}743}{23{,}195} \times 100$$

Enrolment and Repeaters at the All India Level
2020-21 and 2021-22

(In Thousand)

Year			**GRADES**			**Total**	
	I	II	III	IV	V	I-V	VI
Enrolment							
2020-21	23,195	25,178	25,022	24,503	24,124	122021	21,931
2021-22	24,180	23,840	25,001	24,720	24,101	121842	22,637
Repeaters							
2021-22	105	97	99	96	159	556	159

Flow Diagram

Year	**I**	**II**	**III**	**IV**	**V**	**VI**
	129	124	121	124	124	120
		-653	179	299	465	1487
2020-21	23,195	25,178	25,022	24,503	24,124	21,931
	105	97	99	96	159	159
	23743	24902	24624	23942	22478	
2021-22	24,180	23,840	25,001	24,720	24,101	22,637

Flow Rates (%)

Flow Rate	**I to II**	**II to III**	**III to IV**	**IV to V**	**V to VI**
Promotion Rate (PR)	102.37	98.90	98.41	97.71	93.18
Repetition Rate (RR)	0.45	0.39	0.40	0.39	0.66
Drop-out Rate (DR)	-2.82	0.71	1.19	1.90	6.16
Total	100.0	100.0	100.0	100.0	100.0
Average Annual Promotion Rate, Total Promotes: 1,19,689	**98.089%**	**Average Annual Dropout Rate**			Total of PR, RR & DR
Average Annual Repetition Rate, Total Repeaters: 556	**0.456%**	Total Dropouts: 1,777		**1.456%**	100.00

Note: 2020-21 number of repeaters are added in 2020-21 enrolment, and such are not required in computation.
Source: UDISE+ 2020-21 & 2021-22.

$$= \quad 102.37\ \%.$$

Thus, the 102.37 percent promotion rate in Grade I indicates that more students have been promoted than actually enrolled in Grade I in the previous year, which is because of consideration of enrolment of all schools and not that of the common schools. By adopting the same procedure, the promotion rate in the remaining primary grades (I to V) can also be computed, which is presented in Table 2.

(b) Repetition Rate

Once the promotion rate is computed, the next indicator which is computed is the grade-to-grade repetition, which is the division of the number of repeaters in a grade to the enrolment in the previous year but in the same grade. For computing the repetition rate in a grade, says Grade I in 2020-21, repeaters of 2021-22 are considered because a repeater can repeat a particular grade only in the next year. In notations, it is presented as follows:

$$= \frac{\text{Number of Repeaters in } \text{Grade}^{t+1}{}_i}{E^t{}_i} \times 100$$

$$\text{or} \quad (r^t{}_i) = \frac{R^{t+1}{}_i}{E^t{}_i} \times 100$$

Now let us compute the repetition rate for one of the grades, namely, Grade III

$$RR^{2020\text{-}21}{}_{III} = \frac{R^{2021\text{-}22}{}_{III}}{E^{2020\text{-}21}{}_{III}} \times 100$$

$$= \frac{99}{25{,}022} \times 100$$

$$= \quad 0.40\ \%.$$

The repetition rate in Grade III indicates that of the 25,022 thousand students in 2020-21, only 0.40 percent repeated the grade the next year. The remaining children may either be promoted or dropped out before the completion of Grade III. Similarly, the repetition rate in the remaining grades is worked out.

(c) Drop-out Rate

One of the important indicators of educational development is the dropout rate, which like other rates, should also be computed grade-wise. Before the dropout rate is computed, the basic requirement is to first obtain the number of dropouts. In fact, the balance of the enrolment in a particular grade is termed as the dropouts. Or in other words, those who are not promoted or have repeated are known as dropouts. For example, Grade I enrolment in 2020-21 is 23,195 thousand, of which 23,743 children are promoted to the next higher Grade II, and 105 thousand students repeated Grade I, which means that the resultant 23,195 - 23,743 - 105 = - 653 thousand is termed as the dropouts of Grade I. The number of dropouts is linked to enrolment in a particular grade.

$$\text{Drop-out rate } (d^t_i) = \frac{D^t_i}{E^t_i} \times 100$$

$$= \frac{\text{Number of students dropping-out from grade `i' in year t}}{E^t_i} \times 100$$

Thus for Grade III, the dropout rate is

$$DR^{2020\text{-}21}_{III} = \frac{E^{2020\text{-}21}_{II} - (P^{2021\text{-}22}_{IV} + R^{2021\text{-}22}_{III})}{E^{2020\text{-}21}_{III}} \times 100$$

$$= \frac{25{,}022 - (24{,}624 + 99)}{25{,}022} \times 100$$

$$= 1.19\ \%.$$

Drop-out rate in Grade III indicates that about 1.19 percent of children in 2020-21 dropped out from the system before the completion of Grade III, thus contributing to wastage in the system.

It may, however, be noted that the addition of promotion, repetition, and drop-out rates in a particular grade is 100, meaning that the addition of three can not exceed the total enrolment in that grade in that year. Knowing two of them means knowing the third one as well.

$$p^t_i \quad + \quad r^t_i \quad + \quad d^t_i \quad = 100$$

Flow Rates at Level/Stage of Education

In addition to the grade-specific flow rates, many a time, they are also required to be worked out for a level/stage of education. For demonstration purposes, we continue with the example of the primary level and work out the average annual promotion, repetition, and dropout rate.

For example, in simple terms, total promotees (Grades 2 to 6), number of repeaters (Grades 1 to 5), and dropout (between Grades 1 to 5) children in Grades I to V are added together, which in turn is then divided by the total enrolment at the primary level, i.e., Grades I to V and is multiplied by 100 to obtain the requisite rate.

In denotations, they are expressed as follows (for details, please see Srivastava 2015):

Average Repetition rate, $RR(primary, t) = \frac{\mathcal{R}_{primary\ ,t+1}}{E_{primary\ ,t}} \text{X}100$

Average Promotion rate, $\text{P}R(primary, t) = \frac{P_{primaaary\ ,t+1}}{E_{primary\ ,t}} \text{X}100$

where $E_{primary\ ,t} = E_{1,t} + E_{2,t} + E_{3,t} + E_{4,t} + E_{5,t}$

$$R_{primary\ ,t+1} = R_{1,t+1} + R_{2,t+1} + R_{3,t+1} + R_{4,t+1} + R_{5,t+1}$$

$P_{primary\ ,t+1}$ = Total of promotees in Grades 2, 3, 4, 5, and 6 in year t+1 from grades 1, 2, 3, 4, and 5, respectively, of the previous year

$$= (E_{2,t+1} - R_{2,t+1}) + (E_{3,t+1} - R_{3,t+1}) + - - - - - + (E_{6,t+1} - R_{6,t+1})$$

Hence the number of dropouts out of

$$E_{primary\ ,t} = D_{primary\ ,t} = E_{primary\ ,t} - R_{primary\ ,t+1} - P_{primary\ ,t+1}$$

and the

Average Dropout rate, $DR_{(primary\ ,t)} = \frac{E_{primary\ ,t} - \mathscr{R}_{primary\ ,t+1} - P_{primary\ ,t+1}}{E_{primary\ ,t}} \text{X}100$

$= [E_{primary,t} - E_{primary,t+1} + (E_{1,t+1} - R_{1,t+1}) - (E_{6,t+1} - R_{6,t+1})] / E_{primary\ ,t}\ X\ 100$

By following the above methodology, we have obtained the number of promotees, repeaters, and dropout students' details which are presented in Table 2.

- The number of Promotees at the Primary level is the sum of 23,743 + 24,902 + 24,624 + 23,942 + 22,478 = 11,96,89 thousand, which is then divided by the total Primary enrolment = 122021 thousand to obtain an average annual promotion rate at this level of education to be 98.09 percent.
- By following the same procedure, the number of Repeaters at the Primary level is the sum of 105+ 97 + 99 + 96 + 159 = 556 thousand, which is then divided by the total Primary enrolment = 122021 thousand to obtain an average annual repetition rate at this level of education to be 0.46 percent and
- the number of dropouts children at the Primary level is the sum of -653+ 179 + 299 + 465 + 1487 = 1777 thousand, which is then divided by the total Primary enrolment = 122021 thousand to obtain an average annual dropout rate at this level of education to be 1.46 percent per annum.

By following the same methodology, dropout rates at other levels of education based on 2020-21 and 2021-22 enrolment and repeaters data are computed, which is presented in Table 3, which suggests that without improving the efficiency of the education system, India may not attain the status of 100 percent GER at the school education as envisaged in NEP 2020.

Table 3: Dropout Rates: Cohort 2020-21, All India

Indicator 2021-22	**Boys**	**Girls**	**Total**	**2019-20**	**2020-21**
Dropout Rate					
Primary	1.6	1.4	**1.5**	1.5	0.8
Upper Primary	2.7	3.3	**3.0**	2.6	1.9
Secondary	13.0	12.3	**12.6**	16.1	14.6

Source: UDISE+, different years.

By following the methodology as described above, compute the flow rate at all levels of school education and compare your results.