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# Statistical Analysis of the Drop -Out Ratio Using Python Programming Language

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**ABSTRACT:** Education system plays very important role in our life. Therefore everyone should focus on all the areas of education system because if we focus on all the parts of it we can grow more in this domain. The more we will grow the more our country can be benefit with this because education is the key. The purpose of this paper is to analysis and research about drop out rate of Indian Education System. In this paper we havetaken dataset of drop -out rate of all the states of India 2012 to 2015 and analysis is prepared using Python Programming in Jupyter Notebook. This research paper will guide to Indian Government, Colleges, Schools and may other.

**KEYWORDS:** India Education System, Primary School , Upper Primary ,Secondary , Reasons Drop-out.

## I. INTRODUCTION

“Education is the new currency of 21<sup>st</sup> century”. From this we can say that education is one of the most important factor of our life and with the help of better education we can help in developing this country also.

Drop out meaning leaving of school before it gets completed and without completion of certificate. This drop out can happen because of so many reasons like not having fees for education, not having parents support, caste issues or they may not have knowledge about how much education is important for each and everyone.

Research says that there are more number of female drop out than male because early marriage ,lack of interest and even parents are not supporting for it ,this is due to old mentally.

This research paper is written with the motto that we can find the drop out ratio of Indian education system ,what are the reasons behind them and analysis is carried out with the help of dataset. We have compared the drop out ratio of all the states from 2012 to 2015.

### Data Sources

Data for this analysis has been obtained from the Open Government Data (OGD) Platform India and it is released under National Data Sharing and Accessibility Policy (NDSAP) and it is contributed by Ministry of Education Department of School Education and Literacy, conducted in 2012- 2015. The OGD provides information on drop -out rate of Primary boys and girls ,Upper Primary Boys and Girls, Secondary Boys and girls and Higher Secondary Boys and girls. In this article, a school dropout is described as a child that drops out of school between the first to twelfth grades at any point and ends their schooling.

## II. LITERATURE SURVEY (10 PAPERS)

- 1) This research paper is written by Pankaj Das, Research scholar from National University of Educational Planning and Administration, New Delhi, India. The purpose of this research paper is to find the reason for Girls dropping out schools and colleges because statistics shows that 60% of all the children from rural area in the age group of 6-14 years do not enroll themselves in the school and so due to this reason the drop out ratio is high. The analysis says some of the reason for this drop -out ratio and its found that family background and schooling experiences this are the jointly reason.

2) This research paper is written in collaboration of Lanuguge Technology institute of Pittsurgh, PA and Vellore Institute of Technology Chennai ,India. The purpose of this research paper is to analysis the drop out ratio because people are preferring online courses and internet university more.

3) Dropping Out from School: A Cross Country Review of Literature

Poverty combines with other aspects of socioeconomic deprivation, placing extra pressure on children who are still at risk of dropping out. Orphans, refugees, lower caste/scheduled tribe youth, and children from minority language communities, for example, have impaired entry and are more likely to drop out in certain, but not all, ways. Different patterns of access for girls and boys are influenced by gendered social practices within families, cultures, and schools; in some cases, girls are more likely to drop out, while in others (often rural and urban), the burden seems to be on boys to withdraw. Evidence shows that there are ways to reach these disadvantaged demographic populations in order to retain connectivity, such as through child care programs, program initiatives, and adaptive learning methods, as seen in case study examples.

4) Predictive Modeling of Student Dropout Indicators in Educational Data Mining using Improved Decision Tree by Subitha Sivakumar<sup>1\*</sup>, Sivakumar Venkataraman<sup>1</sup> and Rajalakshmi Selvaraj<sup>2</sup>

Family causes (10.25 percent), campus climate (7.58 percent), poor placement rate (4.62%), and personal issues (4.92 percent), transition issue in hostel (2.79 percent), and home sickness were the most common reasons for dropping out (4.86 percent). Few students, on the other hand, are likely to drop out due to injury, home sickness, peer difficulties, heavy course fees, transition issues, and a poor placement rate, among other factors.

5) Recommendations for confronting vocational education dropout: a literature review by Antoni Cerda-Navarro, Jaume Sureda-Negre and Ruben Comas-Forgas

Published in : Empirical Research in Vocational Education and Training volume 9, Article Number : 17(2017)

Given the prominence of the issue of early school dropout, there are few studies on performance and dropout pathways in Vocational Education and Preparation, relative to many studies on other educational levels. The following questions are addressed in this article: What part does realistic advice play in technical school dropout research? What aspects of the instructional intervention are these guidelines directed toward? What are the most relevant realistic ideas for minimizing vocational school dropouts? A study of the scientific literature has been carried out. There were a total of 60 records found and examined. The results show that the bulk of guidelines are based on student guidance and treatment, with recommendations directed at improving the institutional climate and organisation, as well as teaching workers competences and characteristics, attracting less attention.

6) Systematic Review of High School Dropout Prevention Programs by Dayne M. Bartlett, B.S.S.W.

The aim of this comprehensive literature review is to apply a groundbreaking qualitative data analysis approach to the limited observational studies on high school dropout reduction initiatives. This research examines the socioeconomic variables correlated with at-risk schools and students using a method focused on social capital theory.

High school dropout and graduation have been a nationwide priority for decades. However, observational trials assessing the efficacy of concerted actions are hard to come by. This comprehensive literature review has two purposes: it covers holes in the literature and it introduces a groundbreaking dropout prevention assessment process.

Seven databases representing different disciplines were investigated using a systematic literature review approach. The aim of the literature review and data collection was to uncover observational research as well as some novel approaches to resolving low school success. Just 18 research out of 2,744 were found to meet the criterion for inclusion.

This research focuses on the social influences that lead to and discourage dropout. Data from the research and services is compared to the principles of social capital bonding and bridging

The findings indicate that dropout prevention research lacks methodological methods, social variables are underappreciated, mixed outcomes are made, and no groundbreaking theoretical constructs are shared. There did not seem to be any surveys or services that assessed, examined, or targeted in-depth social influences that influence the classroom, student body, or families..

7) Why Students Drop Out of School: A Review of 25 Years of Research By  
Russell W. Rumberger and Sun Ah Lim

By Russell W. Rumberger and Sun Ah Lim

This study taught us a lot of things. The first is that no one reason will fully explain whether a pupil chooses to stay in school before graduation. The study literature describes a range of main variables that tend to affect the decision, much as students themselves report a variety of reasons for leaving school.

Second, the decision to drop out is not solely based on what occurs in the classroom. Students' actions and academic achievement directly affect their decision to stay or leave school. However, students' actions and attitudes outside of school, especially deviant and criminal conduct, have an effect on their desire to stay in school.

Third, falling out is a process rather than a one-time occurrence. The phase starts in early grade school with several children. A series of long-term experiments that followed clusters of children from nursery or early primary school to the end of high school discovered early markers that could determine when students would drop out or finish high school.

Early academic success and students' academic and social activities were the two most consistent metrics.

Fourth, meaning is essential. A variety of variables within families, colleges, and neighborhoods have been described in the research literature as influencing whether students are likely to drop out or graduate from high school. Access to not only financial and material services, but also social resources in the form of positive partnerships in families, colleges, and neighborhoods, are among them.

8) Factors Leading to School Dropouts in India: An Analysis of National Family Health Survey-3 Data by Sateesh Gouda M. and T.V Sekher.

The report also looked at household and parental characteristics that could have an effect on school dropouts. In general, dropout rates were found to be higher among children from Muslim, Scheduled Caste, and Scheduled Tribe communities. The number of school dropouts has decreased as household land holdings have increased. Children from low-SLI households were even more likely to drop out, according to the quality of living index. Parental factors play an important part in deciding a child's school education. Dropout rates were four times higher among children of illiterate parents than among children of literate parents. It was also discovered that if both parents were unemployed, their children were more likely to drop out of school. The most important predictors of school dropouts in India, according to the multivariate analysis, were household size, number of living children, and parental education.

9) A Study of Potential Drop-Out and its Causal Factors in Elementary Schools of Central U.P. By Yogendra Nath Tiwari and Dr. Ali Imam

This study looked at the impact of gender, school resources, and time on dropout rates among Central U.P. students in grades I through VIII. A total of 520 male and 497 female students from fifty Central U.P. schools participated in the study. For intelligence research, the Cattell culture fair test, R.L. Bharadwaj's Socio Economic Status, a school knowledge questionnaire, and a self-made school absenteeism schedule test were used for data collection. For statistical analysis, the t-test and correlation coefficient were used. Male and female students alike dropped out in similar proportions, according to the results. Furthermore, the results indicated that school services had no effect on dropout rates.



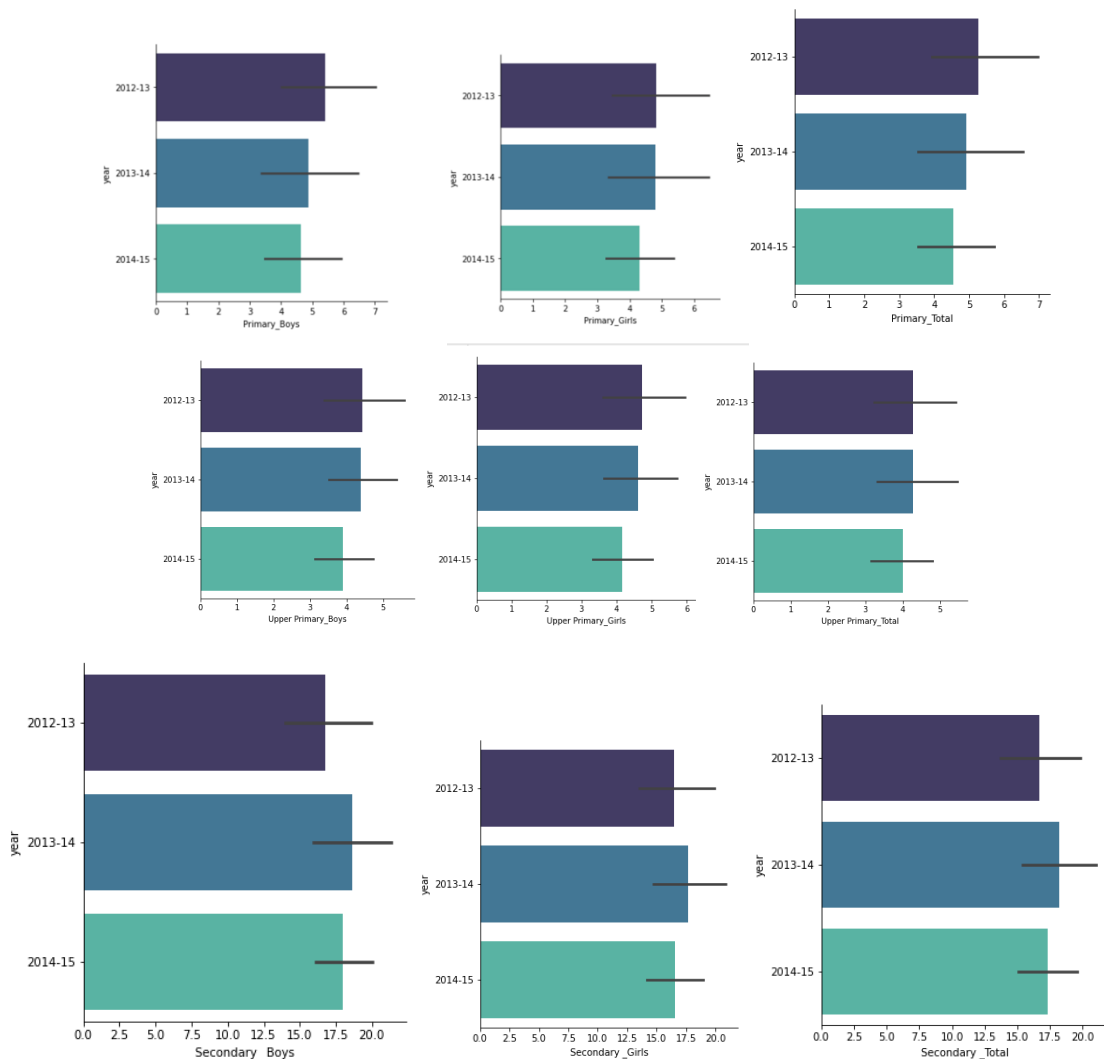


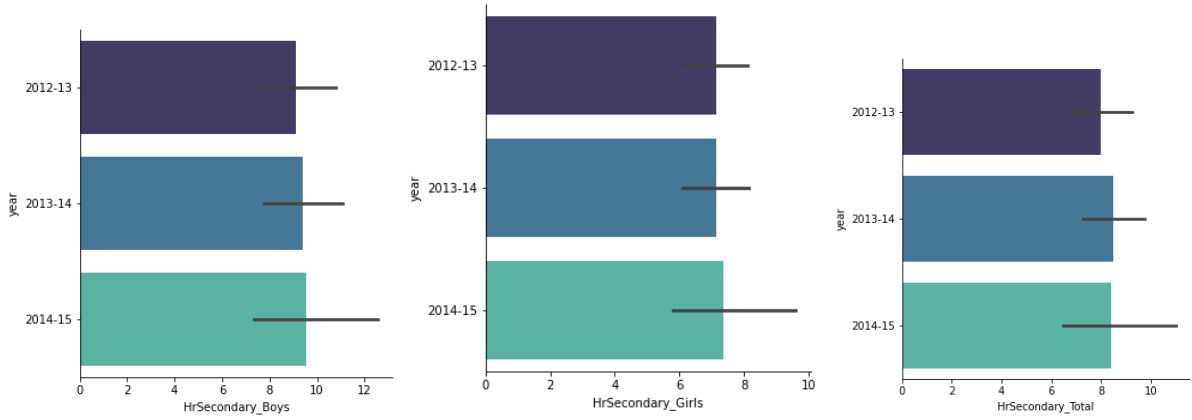
10) School Dropouts: Examining the Space of Reasons by Arun N.R. Kishore and K.S Shaji. Physical disabilities were the most prevalent "reason" (80, 21.8 percent), followed by Mental Retardation (77, 20.9 percent). As a "cause," child labor (employment) came in last (30, 8.1 percent), while financial problems accounted for 50 percent (13.6 percent). Family issues accounted for 63 (17.1%) and school-related issues accounted for 68 percent (18.5 percent). This research highlights the importance of looking at a number of explanations for this problem, as well as the constructive engagement and collaboration of various organizations to evaluate and help bringing kids back to school and avoiding dropouts.

### III. ANALYSIS OF THE DROP – OUT RATE

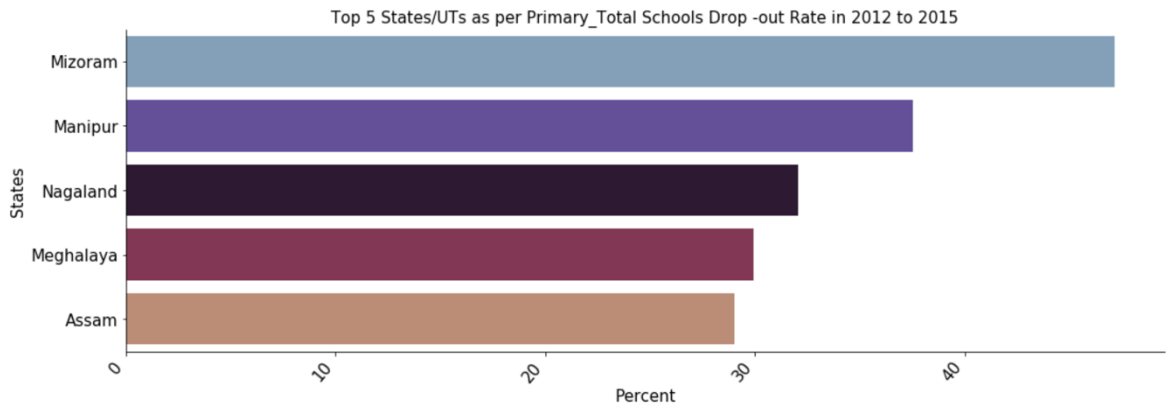
In this part we have done the analysis of the dataset using data visualization tool in python programming. Here are the results for the same.

1) Yearly comparison in boys , girls and average of it .

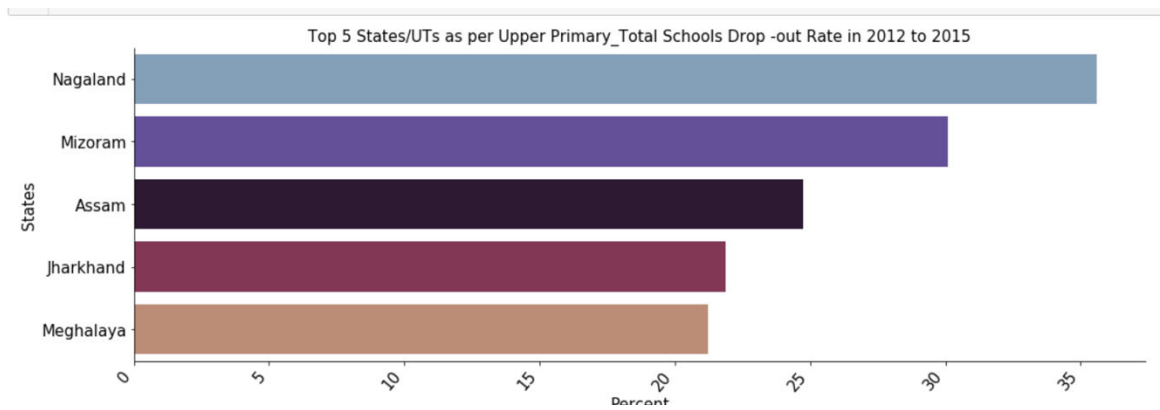




2) Top 5 States/UTs as a Primary Total Schools Drop -out Rate in 2012 to 2015

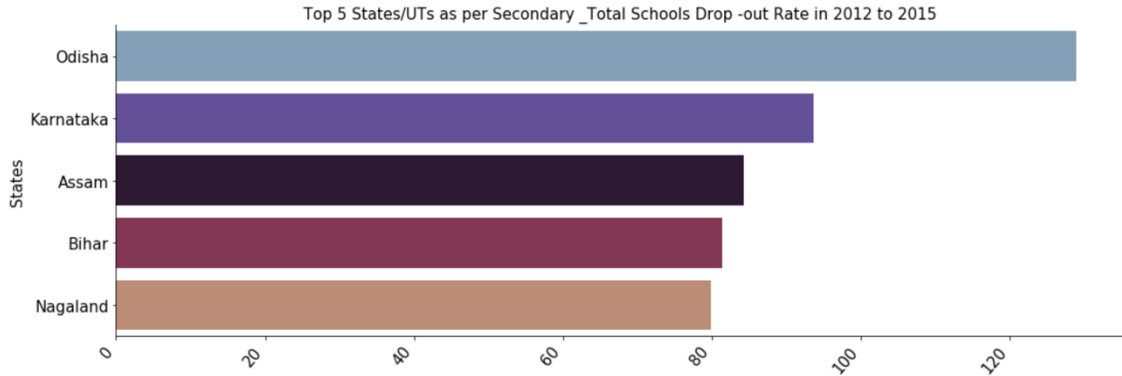


3) Top 5 States/UTs as a Upper Primary Total Schools Drop -out Rate in 2012 to 2015

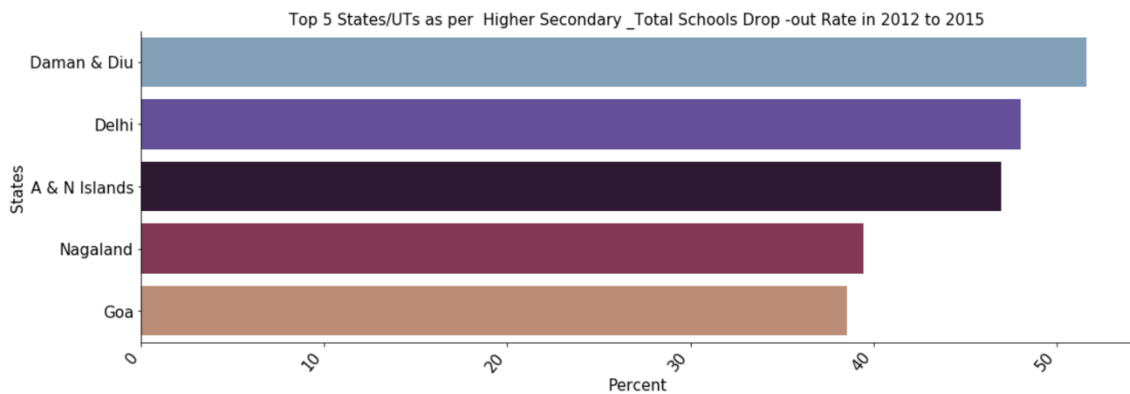




4) Top 5 States/UTs as a Secondary Total Schools Drop -out Rate in 2012 to 2015



5) Top 5 States/UTs as a Higher Secondary Total Schools Drop -out Rate in 2012 to 2015



IV. PROPOSED ANALYSIS APPROACH

Problem: Drop - out rate Analysis from 2012 to 2015 using stratified random sampling method. Stratified Random Sampling means it is a sampling process in which a population is separated into smaller sub-groups called strata. Strata are created in stratified random sampling, or stratification, based on common attributes or characteristics among participants, such as income or educational attainment. Proportional random sampling or quota random sampling are other names for stratified random sampling.

8 steps of the proposed analysis approach are being carried out.

First of all we will take sample size

$$n = \frac{N}{1 + N(e)^2}$$

Where n = sample size

N = Population size

e = Precision level



$$n = \frac{108}{1+108(.05)^2}$$

$$n = 86$$

Name-	Mean of strata
Primary_Boys	4.05
Primary_Girls	2.35
Primary_Total	2.37
Upper Primary Boys	3.09
Upper Primary Girls	2.5
Upper Primary Total	2.25
Secondary_Boys	9.93
Secondary_Girls	8.84
Secondary_Total	9.1
Higher Secondary Boys	11.75
Higher Secondary Girls	8.54
Higher Secondary Total	9.62

1) Estimate a population parameter.

A statistic is a characteristic of a sample. If you collect a sample and calculate the mean and standard deviation, these are known as population parameters. But when we are using stratified random sampling we have to take group-wise strata and then you can take the average of that every strata.

$$\bar{x} = \frac{\sum_{i=1}^n x_i}{n}$$

$$= \frac{4.05 + 2.35 + 2.37 + 3.09 + 2.5 + 2.25 + 9.93 + 8.84 + 9.1 + 11.75 + 8.54 + 9.62}{12}$$

$$\bar{x} = 6.19$$

2) Estimate population variance.

$$\bar{x} = \frac{\sum (x_i - x_h)^2}{(n_h - 1)}$$

$$= 6.19$$

3) Compute standard error.

The estimated standard deviation of a statistical sample population is the standard error (SE) of a statistic. The standard error is a mathematical concept that describes how often a sampling distribution fits a population when standard deviation is used. In mathematics, a sample mean varies from the population's real mean; this difference is known as the standard error of the mean.

$$SE = (1/N) * \sqrt{\sum [N_h^2 * (1 - n_h/N_h) * s_h^2 / n_h]}$$

$$S.E = 1.06$$

4) Confidence Level

There are two types of tests: the t-test and the z-test. When we have a small sample size (less than 50) and uncertain population variance, we use the T-test, while when we have a significant sample size (>50) and known population variance, we use the z-test.

We'll use the z-test since the sample size is so high. The crucial z-score is calculated using the Regular Normal Distribution Table.

Typically, researchers select a confidence level in this portion of the study, and the most often chosen confidence level is 95 percent. As a consequence, we'll just have it.



5) Find the critical value (often a z-score or a t-score). And Critical Probability :

$$\alpha = 1 - (\text{confidence level}/100)$$

$$\alpha = 1 - (95/100)$$

$$\alpha = 0.05$$

Critical Probability :

$$p^* = 1 - \frac{\alpha}{2}$$

$$p^* = 1 - \frac{0.05}{2}$$

$$p^* = 0.975$$

6) Compute margin of error.

Complete the margin of error (ME)

ME = critical value \* standard error

$$\text{ME} = 1.96 * 1.06$$

$$= 2.07$$

7) Confidence interval.

$$CL_{min} = x - S.E * CV$$

$$= 6.19 - 1.06 * 2.077$$

$$= 3.98$$

$$CL_{max} = x + S.E * CV$$

$$= 6.19 + 1.06 * 2.077$$

$$= 8.39$$

In summary, here are the result of the analysis based on the sample data, we estimate that the population mean is 6.19. Given 95% confidence level, the margin of error around that estimate is 2.07 and the 95% confidence interval is 3.98 to 8.39.



Reasons for Drop-out:

Expensive tuition fees

This is the most important explanation for students dropping out of school and colleges these days. We are all aware that education has been exceedingly expensive in recent years, but they only have one option: government schools and Trust schools and colleges. The government has now begun to offer education loans, which many people are unaware of.

Cast related issues

Things are evolving these days, but some people do have an obsolete mentality. Parents are not wanting their children to attend school because of the generation gap, and even though the child wishes to learn, they will not help them, and this form of situation is most common in rural areas. Even some people believe that women are only useful in the kitchen.

Bullying

They are afraid of being judged and laughed at if they come out into the open. They begin to make excuses for not attending classes. It is at this stage where parents must intervene and take full responsibility.

Supporting family

It is disappointing that students would forego their studies due to financial constraints. One of these reasons may be an inability to afford the school bill. Several difficult circumstances may arise in which the family's underage children are asked or seen as a helping hand. These children are often mentally manipulated into abandoning their academic pursuits in order to concentrate on the family crisis. The majority of girls drop out of school to help with household duties, while the boys drop out to supplement household income.

Education Not Considered Necessary

Many people ask what they can do when they complete their studies. They would continue to fulfil the same roles as their guardians. As a result, these children drop out of school during their elementary education. Education is not seen as a priority by either parents or children.

Other reasons:

Early marriage in girls cases:

Health issues:

Lack of interest

Did not get admission

No proper school facilities for girls

As a result, different factors contribute to the reality of school dropouts. And the fact that government actions increased enrolment, none of them were able to reduce school dropouts.

## V. CONCLUSION

The dropout problem has been found to be highly nuanced, with several intertwined variables contributing to this complex scenario. This paper is the modest attempt to explore about reasons for the drop-outs and also to carried out the analysis comparison between different states of India with the ratio of drop -out and apart from that we have done the sampling to figure out some statistics which can also help us .We have done Stratified Random Sampling, it is also know as Random Quota Sampling .Stratified Random Sampling is used when the researcher intends to focus only on specific strata from the available population data. We have taken 12 strata for it. For further analysis mean of all that 12 strata has been taken.

Briefly, the Primary Schools are having drop out of 2.38%, the Upper Primary Schools are having 2.25% drop out, Secondary Schools are having 9.1% drop out and the Higher Secondary Schools are having 9.62% of drop out. We came on a conclusion that on average 7% is the drop out ratio from 2012 to 2015.

Let's discuss about data visualization part, So we have done the data visualization using jupyter notebook. Data Visualization can be carried out using various tools like Google data studio ,MS excel etc. Post Analysis we now see that Mizoram has the highest drop -out rate in Primary Schools, Nagaland has the highest drop -out rate in Upper Primary Schools, Odisha has the highest drop -out rate in Secondary Schools and Daman & Diu has the highest drop-out in Higher Secondary Schools.

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