

# A Computational Analysis of School Factors for Reducing Drop-outs in Mumbai's Municipal Schools

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Municipal school children holding a piece of writing chalk in their hands

## **Abstract:**

Dropping out of the educational system can cause serious individual, familial, educational, and social difficulties. This is influenced by a variety of factors, but it is mainly at the school level where students drop out.

Mumbai's municipal schools are facing a problem of high dropout rates. Nearly 49% of these dropouts are due to child-centric school factors.

Currently, government funds for aided schools are allocated without any detailed analysis of school factors. The government should compare schools across various parameters and correlate them with the schools' student strength, to identify specific areas of improvement.

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To investigate and identify key school factors related to drop-outs for a predictive analysis, I have collected standardized school report cards of over 1600 Mumbai municipal schools comprising information about various schools' facilities, students and teachers.

Following an analysis using machine learning algorithms, several school factors directly impacting drop-outs were highlighted: *digital learning, English medium of instruction, high female-to-male teacher ratio, and free textbooks*. Rather than sanitation in toilets and mid-day meals, government resources should be redirected towards these factors for a quality education.

### **Keywords:**

*Drop-outs, school factors, machine learning, municipal schools, education*

### **Introduction:**

Education serves as a vital component for the socioeconomic development of the individual, community, and the country. The emphasis on education as a central piece of growth (both at an individual and societal scale) - "education for development" does not have an unfamiliar ring to it. In order to truly tap and reap the benefits of human potential, it is essential that everyone has the correct access to education. It is not just education, but the relevance of education to development that brings the larger picture into perspective.

Primary education holds utmost importance due the impressionable minds of students at that age. The foundational skills acquired early in childhood make a lifetime of learning possible, due to the early exposure and encouragement both inside and outside of the formal schooling system, according to the science of brain development. This education stimulates and integrates core values and skills: social, cognitive, cultural, emotional, and physical, which are much needed in the future.

These students represent the youth of India, where their growth runs parallel to that of the nation and is reflected through the learning and experience imbibed and stimulated over the years. The thread of the growth of society depends upon the quality of education that is being imparted, and the extent of its reach.

India has one of the lowest literacy rates, of merely 74.37%, despite having a largely young population. Leaving school, or "dropping out", at an early stage makes it hard for a large part of India's population to improve their living conditions and break the cycle of poverty that currently chains down the weaker socio-economic classes.

Even though school drop-out rates have improved in recent years, it remains a major cause for concern when it comes to the overall development of the country. For every 100 children enrolled in school, only 70 manage to complete their studies. So that implies a 30% drop-out rate!

Based on rich empirical data, most researchers agree that school drop-outs are influenced not by a single factor, but rather by a combination of factors (*Janosz et al., 2000; Lamot et al., 2013; Lyche, 2010; Rumberger, 2011*). Although school is not solely responsible for drop-outs, it is at the school level *de facto* where dropping out takes place. Members of the school staff are the ones with a direct contact with children and, as such, they are

the first to notice the risk of a child dropping out of school. Factors such as a parent's wish to educate their child and a child's willingness to learn are also affected by the facilities provided at school, such as playgrounds, digital facilities. Social and household factors such as income, family problems are only controllable by the government up to a certain extent, and not much can be done on an individual level on a large scale.

Therefore, we deemed it relevant to explore all the factors at school level related to early school leaving. These school factors can be categorized under:

- learning resources (such as free textbooks and uniforms)
- school infrastructure (availability of laptops, projectors, ICT labs, playgrounds, laboratories etc.)
- health and hygiene (includes meals, drinking water availability and toilets)
- safety (such as distance of schools from home, female-to-male teacher ratio)

The Municipal Corporation of Greater Mumbai (MCGM), the central administrative body in Mumbai, does not have any predictive model that analyses each school's individual needs before allocating aid to the respective schools. When funds are allocated without research on an individual level, this may lead to a sub-optimal use of funds.

### **Scope:**

This research paper conducts an in-depth analysis of school-based parameters to highlight determinants of potential risk or protective factors. This project focuses only on the **primary** sections of Mumbai's Municipal schools.

### **Methodology:**

Data collection:

Before starting the research, it was necessary to understand different perspectives about the current scenario of the education system.

**Experts** such as Mrs. Swapna Agarwal (Founder of *Yogdaan*, a street school), Mrs. Nikita Ketkar (CEO of *Masoom*, a night school), and the school principal of *Global Talent International School*, Mrs. Kajal Chattija, agreed that drop-outs are a major problem, and pointed us towards specific factors in each of their organizations and schools.

We also did a **survey** via Google Form to students' parents and teachers to understand which factors they believed were causing drop-outs. This was a simple multiple choice question survey, which addressed the different barriers to education.

Since much primary data collection was not possible, we collected **data for each school from the government website**. Information for each school (regarding students, teachers, facilities available, school background, etc.) is collected and uploaded regularly by the government in the form of a school report card. This is authentic data in a standardized format and can be used for analysis every two years when data is collected.

Each school has a unique UDISE code. When the code is entered into the website, a school report card is generated for the respective school. Since the school report cards were available in a PDF format, we used a Robotic Process Automation (RPA) Path to convert it into an excel sheet. The excel sheet contained data of over 1600 schools (935 primary and upper primary schools, 722 secondary schools) with the following parameters: *school district, school type, classes taught, medium of instruction, building status, availability of ramps and handrails, mid-day meals, availability of roads, number of toilets for girls and boys, library, drinking water availability, playground, furniture, electricity, medical checkup facility, internet, ICT lab, desktops, printers, projectors, laptops, free textbooks, number of male and female teachers, number of girls and boys, and total strength.*

Since certain factors such as the age of the building, and solar panels seemed relatively irrelevant, we chose to **clean and segregate the data** - keeping only the factors mentioned above. We also organized the data class-wise, to assess factors causing drop-outs for primary and secondary sections separately.

SCHOOL REPORT CARD										(as on 30th September 2018)		
UDISE Code	27 22 02 00 289		School Name	BAJAJ MR SCHOOL								
State	Maharashtra		District	MUMBAI (SUBURBAN)		Block	URC-2 (KANDIVALI)					
Rural / Urban	2-Urban		Cluster	BAJAJ ROAD MUN MAR								
Ward	R/S-WARD		Mohalla			Pincode	400067					
Panchayat	NA		City	Mumbai		Municipality	MUMBAI					
Assembly Const.			Parl. Constituency									
School Category	1- Primary		Medium of Instruction	Medium 1		10-Merams						
School Management	3-Municipal Corporations (MNC)		Acad. Inspections	3		CIRC Coordinator						
School Type	3-Co-educational		Block Level Officers	0		State/District Officers						
Lowest & Highest Class	1 - 5		Block Level Officers	0		State/District Officers						
Pre Primary	2-No		State/District Officers	0								
Year of Establishment	1973		Is this a Shift School?	2-No		Anganwadi At Premises	2-No					
Year of Recognition-Pri.			Building Status	3-Government		Anganwadi Boys	0					
Year of Recognition-Upr Pri.			Boundary wall	1-Pucca		Anganwadi Girls	0					
Year of Recognition-Sec.			No of Building Blocks	1		Anganwadi Worker	NA					
Year of Recognition-Higher Sec.			Pucca Building Blocks	1		Residential School	2-No					
Affiliation Board-Sec			Is Special School for CWSN?	1-Yes		Residential Type						
Affiliation Board-UPSec			Availability of Ramps	1-Yes		Minority School	2-No					
			Availability of Handrails	1-Yes		Approachable By All Weather Road	1-Yes					
Toilets	Boys	Girls	Total Class Rooms	6		Drinking Water Available	1-Yes					
Total	4	4	In Good Condition	6		Drinking Water Functional	Yes					
Functional	3	3	Needs Minor Repair	0		Rain Water Harvesting	2-No					
Func. CWSN Friendly	1	1	Needs Major Repair	0		Playground Available	1-Yes					
Urinal	5	1				Furniture Availability	58					
Handwash Near Toilet	1-Yes		Other Rooms			Electricity Availability	1-Yes					
Handwash Facility for Meal	1-Yes		Library Availability	1-Yes		Solar Panels	2-No					
			Separate Room for HM	1-Yes		Medical checkups	1-Yes					
Digital Facilities (Functional)			No. of Students Received (DCF 5.1, 5.2)	Primary		Up.Primary						
ICT Lab	2-No		Free Textbooks	47		0						
Laptop	0		Transport	0		0						
Projector	0		Free uniform	0		0						
RTE Information & Management						RTE Information						
SMC Exists	1-Yes   SMC & SMDC Same		NA SMDC Constituted	1-Yes		Instructional days	215		0		0	
Text Books Received	1-Yes   Special Training		Material for Training	1-Yes		Avg. School hrs.Std.	5.3		0.0		0.0	
Grants Details under Samagra Shiksha (DCF Sl. No. 8.3)						Avg. School hrs.Tch.						
Grants Receipt	10000.0		Grants Expenditure	10000.0		CCE	1-Yes					
Total no. of Students Enrolled Under Section 12 of the RTE Act In Private Unaided and Specified Category Schools (DCF Sl. No. 1.42(a))												
Pre-Pri.	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	Class XI	Class XII
B	G	B	G	B	G	B	G	B	G	B	G	B
Total no. of Economically Weaker Section (EWS) students Enrolled in Schools (DCF Sl. No. 1.42(b))												
Pre-Pri.	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII	Class IX	Class X	Class XI	Class XII
B	G	B	G	B	G	B	G	B	G	B	G	B
Teachers												
Classes Taught				Total		6		Gender				
1-Primary	6		2-Up.Pr.	0		Nature of Appointment		6 Male				
3-Pr. & Up.Pr.	0		5-Sec. only	0		Regular		0 Female				
6-H Sec only.	0		7-Up pri and Sec.	0		Part-time		0 Transgender				
8-Sec and H Sec	0		10- Pre-Primary Only.	0		Contract		0				
11-Pre- Pri & Pri	0				Academic Qualification		5					
Teachers Aged above 55	0				Below Graduate		0 Graduate					
No. of Total Teacher Received Service Training	0				Post Graduates and Above		1					
Total Teacher Involve in Non Training Assignment	0				Total Teacher Trained in Computer		6					
Teacher With Professional Qualification												
Diploma or Certificate in basic teachers' training				2		Bachelor of Elementary Education (B.El.Ed.)		0				
B.Ed. or Equivalent				0		1 M.Ed. or Equivalent		0				
Other				0		None		0				
Diploma/degree in special Education				3		Pursuing any Relevant Professional Course		0				

A sample school report card

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
UDISE Code	School Name	State	District	School Cate	School Mana	School Type	Lowest & H	Pre primary	Medium Of	Is This a shif	Building Stat	Boundary W	No of Buildir	Availability c	Availability c	Meals	Road Availa
2.7221E+10	LORD HARRI	Maharashtra	Mumbai	2- Primary w	Municipal Coi	Co-educator Jr.Kg. to VIII	no	no	Marathi	No	government	pucca	3	yes	Yes	no	Yes
2.7221E+10	COLABA MAJ	Maharashtra	Mumbai(SUE 1	-primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Marathi	No	government	pucca	3	yes	Yes	no	Yes
2.7221E+10	COLABA MU	Maharashtra	Mumbai(SUE 1	-primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Marathi	Yes	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	COLABA MU	Maharashtra	Mumbai(SUE 1	-primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Marathi	Yes	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	COLABA MU	Maharashtra	Mumbai(SUE 1	-Primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Hindi	Yes	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	COLABA LP L	Maharashtra	Mumbai(SUE 1	- Primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Urdu	Yes	government	pucca	1	yes	Yes	yes	Yes
2.7221E+10	COLABA MU	Maharashtra	Mumbai(SUE 1	- Primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	kannada	Yes	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	COLABA MU	Maharashtra	Mumbai(SUE 2	- Primary v	Municipal Coi	Co-educator Jr.Kg. to VIII	no	no	English	Yes	government	pucca	1	yes	Yes	yes	Yes
2.7221E+10	MANOHARD	Maharashtra	Mumbai(SUE 2	- Primary v	Municipal Coi	Co-educator Jr.Kg. to VIII	no	no	Marathi	No	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	BORABAZAR	Maharashtra	Mumbai(SUE 2	- Primary v	Municipal Coi	Co-educator Jr.Kg. to VIII	no	no	Hindi	No	government	pucca	1	yes	Yes	no	Yes
2.7221E+10	NEW MODY	Maharashtra	Mumbai(SUE 2	- Primary v	Municipal Coi	Co-educator Jr.Kg. to VIII	yes	yes	English	No	government	pucca	1	yes	Yes	yes	Yes
2.7221E+10	DONGRI MU	Maharashtra	Mumbai(SUE 1	- Primary	Municipal Coi	Co-educator Jr.Kg. to V	yes	yes	Marathi	Yes	government	pucca	1	yes	Yes	yes	Yes
2.7221E+10	BANGALIPUF	Maharashtra	Mumbai(SUE 1	- Primary	Municipal Coi	Co-educator Jr.Kg. to V	no	no	Urdu	Yes	government	pucca	1	yes	Yes	yes	Yes
Toilets Boys	Toilets Girls	Total Class r	Library	Drinking Wat	Rain Water	Play ground	Furniture	Electricity	Medical Che	Internet	ICT lab	Desktops	Printer	Projector	Laptop		
8	8	8	Yes	Yes	Yes	Yes	95	Yes	Yes	yes		2	10	1	1	0	
3	3	4	Yes	Yes	no	Yes	73	Yes	Yes	yes	no		1	1	1	0	
5	5	8	Yes	Yes	Yes	Yes	218	Yes	Yes	yes	no		4	1	2	0	
5	5	9	Yes	Yes	Yes	Yes	244	Yes	Yes	yes	no		1	0	1	0	
5	5	14	Yes	Yes	Yes	Yes	447	Yes	Yes	yes	no		1	1	1	0	
4	6	8	Yes	Yes	Yes	Yes	227	Yes	Yes	yes		2	1	1	1	0	
3	6	2	Yes	Yes	no	Yes	59	Yes	Yes	yes		2	0	1	1	0	
5	5	2	Yes	Yes	no	Yes	18	Yes	Yes	yes	no		1	1	1	0	
4	5	32	Yes	Yes	Yes	Yes	1346	Yes	Yes	yes	no		15	1	1	0	
2	2	4	Yes	Yes	no	Yes	40	Yes	Yes	yes		0	1	1	1	0	
2	2	4	Yes	Yes	no	Yes	43	Yes	Yes	yes		0	1	1	1	0	
6	6	6	Yes	Yes	no	Yes	169	Yes	Yes	yes		0	1	1	1	0	
4	3	9	Yes	Yes	no	Yes	186	Yes	Yes	yes		0	1	1	1	0	
2	3	2	Yes	Yes	no	Yes	35	yes	Yes	no		0	0	0	1	0	
5	7	8	Yes	Yes	Yes	Yes	214	Yes	Yes	yes	no		20	1	1	0	
4	3	8	Yes	Yes	no	Yes	198	Yes	Yes	yes		0	4	0	1	0	
5	5	4	Yes	Yes	no	Yes	99	Yes	Yes	yes		0	1	1	1	0	

### AI Model Training:

In the first step, a prediction model is developed using the training data. The aim of the model is to identify the potential dropouts as early as possible by classifying student observations as dropouts or not and then checking the accuracy of the prediction by displaying the confusion matrix of each algorithm.

The methods used for the classification are **Logistic Regression, SVM (Support Vector Machine), Decision Tree, and Random Forest**. All these classification algorithms use supervised techniques.

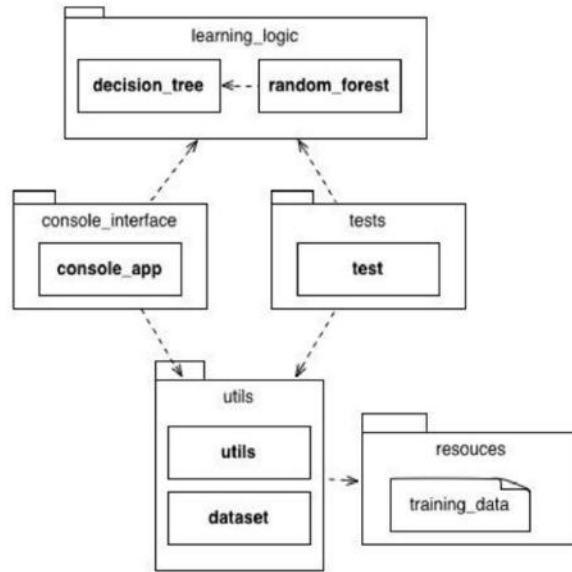
Step 1: Dividing the data into primary and secondary data

Step 2: The data was divided into training sets (to train the model) and testing sets (to evaluate the results). The training part comprised of 70% of the subjects, chosen at random and the testing part of 30%.

Step 3: The training algorithm we used is random forest. It should be noted that the base methodology to build decision trees we use is called CART (Classification and regression trees). CART uses a recursive partitioning method for building decision trees for classification and regression. To make the implementation generic to any dataset, a normalization function which deletes the dataset's incomplete entries was implemented.

As our dataset was based on theory, we classified the different schools with respect to their parameters by a 'YES' or 'NO'. This helped understand which factors children look for in schools and reduce drop-out rates.

```
#output
{'min_samples_split': 12, 'splitter': 'random', 'max_depth': 1}
Made predictions in 0.0005 seconds.
Tuned model has a training F1 score of 0.8000.
Made predictions in 0.0002 seconds.
Tuned model has a testing F1 score of 0.7273.
Made predictions in 0.0002 seconds.
Tuned decision tree model has a training F1 score of 0.8098.
Made predictions in 0.0001 seconds.
Tuned decision tree model has a testing F1 score of 0.8129.
```

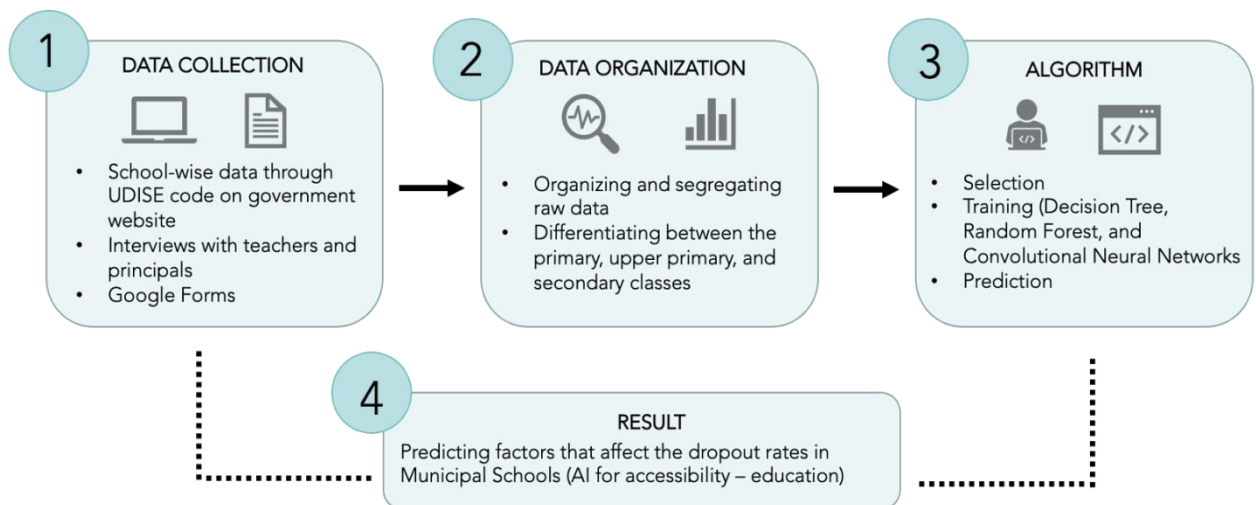


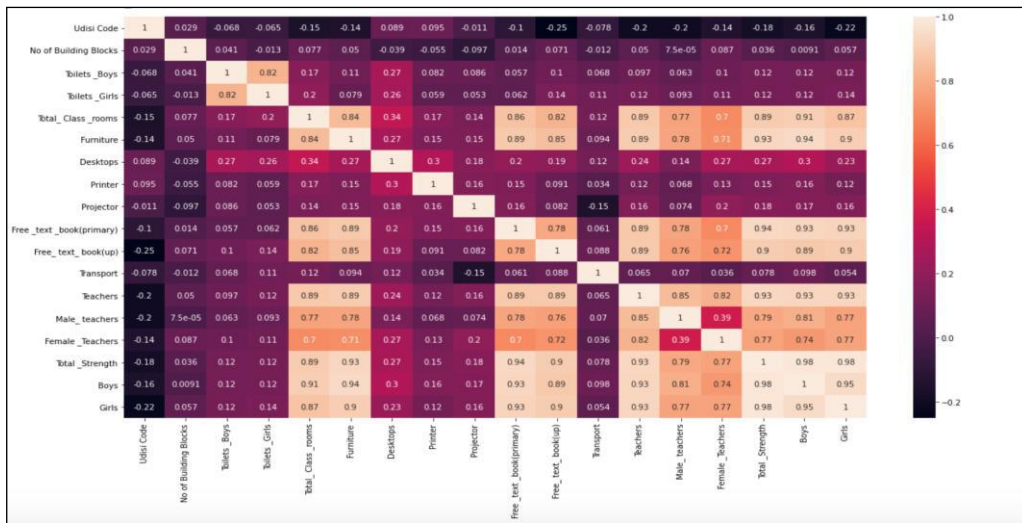
The results of the different models are summarized below:

	Decision Tree	Random Forest	Convolutional Neural Networks
Precision	98.69	90.51	96.65
Recall	99.34	86.65	96.87
F1-score	99.34	96.27	97.77

Ultimately, the Decision Tree model gave us optimum results, with a precision of 98.69%.

The overall methodology can be summarized as seen in the flowchart below:





Heat map: correlation between different school-based parameters

**Results:**

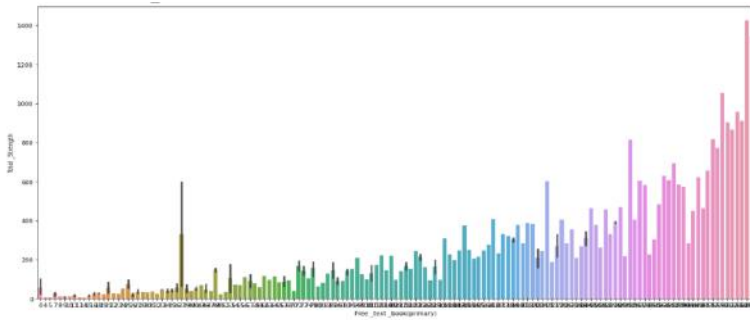
First, we analyze the heat map that correlates the different school parameters, where the lighter shades represent a high correlation, and the darker shades represent no correlation.

Here are a few important things to note:

1. The correlation between free textbooks and number of students is very high (0.94), which shows that as number of free textbooks provided increases, the number of students is likely to increase too.
2. The correlation between number of female teachers and number of students is also very high (0.79), which suggests that the number of students is likely to increase when there are more female teachers, maybe because of an ease of safety concerns
3. The correlation between number of desktops and students is also relatively high compared to other values, which explains the current importance of digital learning, as well as the curiosity of students to engage more in a technological education.
4. Surprisingly, the correlation between total number of students and no. of toilets is not very high, which puts up a further question whether the fund allocation towards sanitation is really needed.

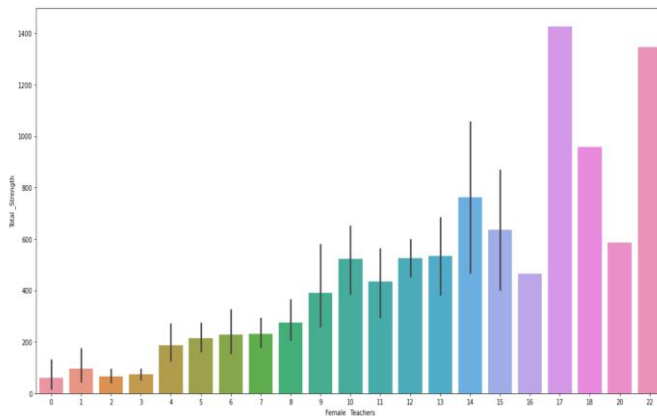
We now study a few of our parameters in detail.

### 1. Free Textbooks



As can be seen in the graph above, as number of free textbooks provided in school increases, the number of students (total strength) increases too. The provision of free textbooks reduces the burden of the cost of education on the parents by a large amount. Students can have access to necessary course materials required for classes, providing them with better chances of success. Without these free textbooks, students may have to pay for them, making them take up part-time jobs at a young age, or they may not buy textbooks at all. This leads to a lack of understanding, and hence, interest in studies which further causes them to drop out of school.

### 2. Female Teachers

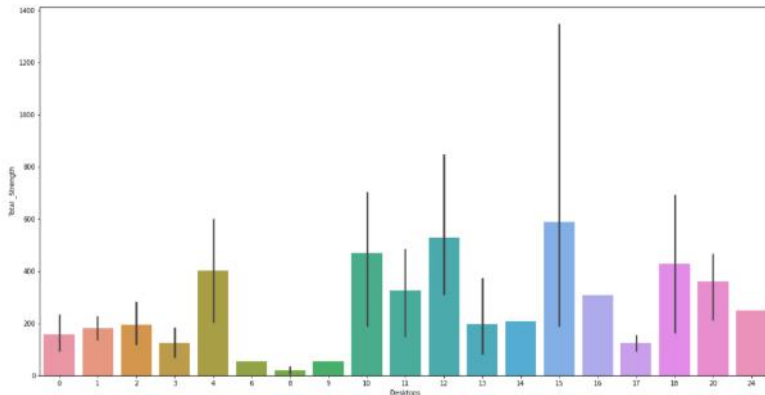


The general trend of the graph shows that as number of female teachers increases, the total strength also increases. Evidence suggests that female teachers are likely to increase the likelihood that girls remain in school and ease any safety concerns that students or parents may have.

Additionally, it is very important to expose students (especially girls) to look up to accomplished female role models as much as possible. Women, as teachers, can raise gender awareness and the sensitivity of male teachers, while also helping to promote important behavioral patterns in students. Female empowerment in the education sector can create a school environment that can makes girls feel comfortable to learn and grow.

### 3. Desktops

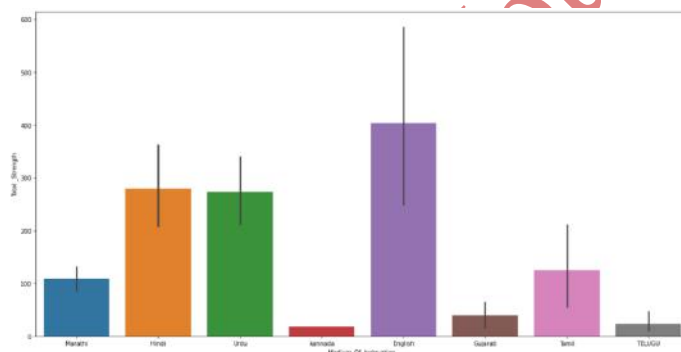
Trends show that for more desktops provided in a school, there tend to be more students (with a few exceptions). Digital learning has



become a very usual occurrence in the modern world and is even replacing most traditional educational procedures. It has not only made learning mobile, but also interactive and engaging, which motivates students to maintain interest.

Furthermore, digital learning tools, and technology sharpen critical thinking skills which are the basis for the growth of systematic reasoning. Nearly every employment opportunity nowadays involves some degree of technological proficiency. Providing and teaching students how to use desktops, tablets, and phones has made education available to all by addressing the constraints of traditional models of learning.

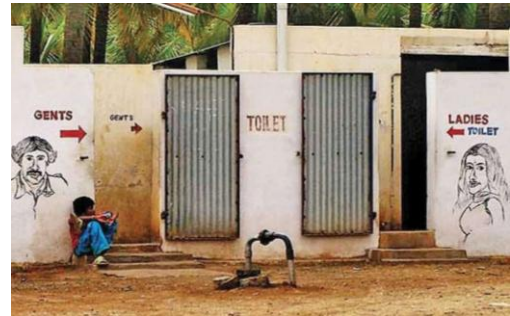
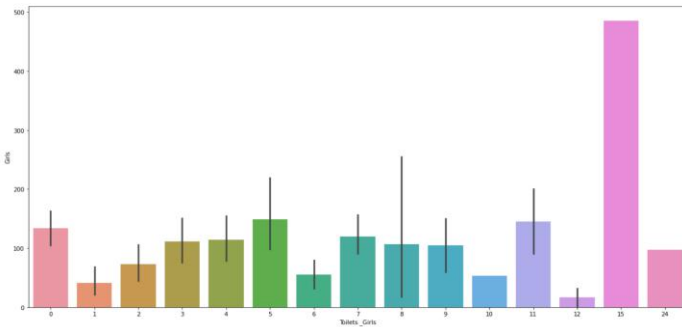
### 4. Medium of Instruction



This parameter can be overlooked easily, but we see an interesting observation. Schools with an English and Hindi medium of instruction see a higher number of students, despite being in the state of Maharashtra, where the language spoken is Marathi.

This shows that students are now showing a preference for primary and mainstream languages such as Hindi and English, which can help them with a wider variety of employment opportunities in the future and does not restrict them to a relatively uncommon language such as Telugu or Kannada.

### 5. Toilets

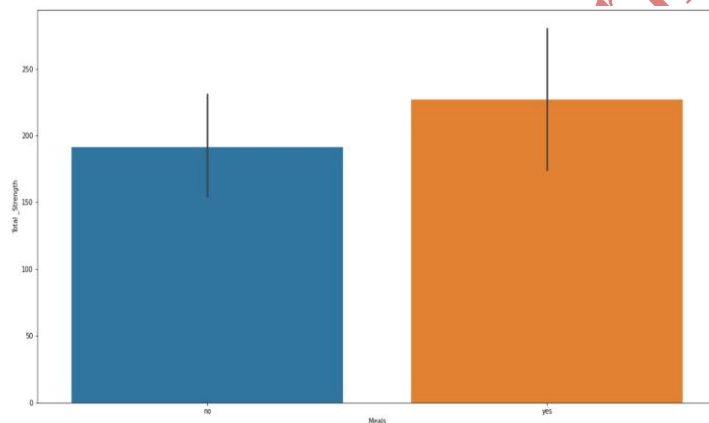


Toilets are considered an important factor when it comes to school facilities. Previous research shows that a large number, nearly 23% of girls, drop out of schools in India because of the lack of sanitation facilities when they reach puberty, due to menstruation.

However, the uniform distribution of our data shows us that toilets are not a very important factor when it comes to girls' education in Mumbai's Municipal Schools. This is possibly because in the short schooling hours, students do not feel the need to utilize the toilet facilities.

Additionally, a lot of funds have been directed towards sanitation programs in such schools, which is why most schools have an adequate number of health and hygiene facilities with respect to the number of students. This does not bring out a need for focus on sanitation facilities in toilets in these schools.

### 6. Mid-day Meals



Previously, during field surveys it was learned that in some schools, children come to school only to have the lunch provided by the school since most of them belong to socially and economically weaker sections of the society.

However, our data suggests otherwise. Schools providing and not providing meals have approximately the same number of students. This is possibly because the government has a lot of schemes in place to provide the families with food grains, and the students no longer feel the need to drop out of school on the basis of whether meals are provided or not.

**Conclusion:**

The table below summarizes a few of the government schemes that provide aid to municipal schools.

**Table 2: Summary of Major Government Schemes**

Sarva Shiksha Abhiyan	Mid-day Meal Scheme	Swachh Vidyalaya Abhiyan	Samagra Shiksha Abhiyan
Aim: to open new schools in those habitations which do not have schooling facilities and strengthen existing school infrastructure through provision of additional class rooms, toilets, drinking water, maintenance grant and school improvement grants	Aim: provide cooked mid-day meals with 300 calories and 8-12 grams of protein to all children studying in Government and aided schools and EGS/ AIE centres, with a view to enhance enrolment, retention and attendance and while simultaneously improving nutritional levels among children	Aim: to ensure that every school in India has a set of functioning and well maintained water, sanitation, and hygiene facilities (a combination of technical and human development components that are necessary to produce a healthy school environment and to develop or support appropriate health and hygiene behaviours)	Aim: to improve school effectiveness measured in terms of equal opportunities for schooling and equitable learning outcomes. It subsumes the three Schemes of Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA) and Teacher Education (TE). Provides children with free textbooks and digital learning and teachers with training
Budget: ₹ 26,129crore	Budget: ₹ 11,500crore	Budget: ₹ 620billion	Budget: ₹ 27,957crore

A large part of government aid towards schools is directed towards sanitation and mid-day meals, with special schemes for the same. The important factors, such as the provision of digital education and female teachers, have relatively smaller schemes with a smaller budget.

Conventionally, one would expect the drop-outs to be caused due to lack of sanitation facilities, or mid-day meals. This was the need till a few years ago, and to some extent, is still needed in some schools. **However, our circumstances have changed, and so the focus of our resources needs to change too.**

Previously, a majority parents looked at municipal schools as mere caregiving centres with such facilities, where they would send their children to eat and play when they would go out for work. However, our research suggests that now there is a major shift in parents' perspectives of school.

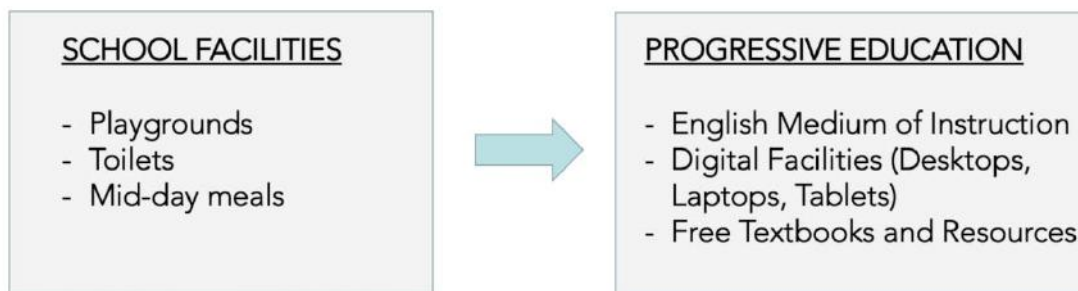
While previously, schools were looked at as merely a centre where parents could send their children while they worked, now they are looked at as education hubs. Students, as well as parents are gradually understanding the

importance and seriousness of education that, in today's age, is a necessity to break out of the cycle of poverty for weaker socio-economic sections.

Now, field conversations with a few parents have told us that in some cases, the students are pulled out of school as they do not learn much and only go to play, which serves as a waste of money. In order to reduce these drop-outs, the government must adapt to this shift in perspective, from emphasis on school facilities, to a progressive education. Students are no longer looking at school facilities, but those school factors that enable and provide opportunities for employability. This education includes digital learning through laptops, tablets, and desktops and encourages students to study in schools with English as the medium of instruction.

Furthermore, the need for free textbooks has risen. Students are becoming serious about their studies, and these textbooks provide them with the means to achieve their academic goals without having to worry about the burden of the cost of education. Female teachers serve as an additional factor that help prevent dropouts, especially for girls, due to the school environment they create that makes students feel comfortable to learn and grow.

Now, the proposed government schemes should be directed towards a primarily progressive education. In order



to reduce drop-outs effectively, it is essential to direct resources towards the quality education of these students.

Here are a few takeaways:

- 1. Provide progressive learning through the digital medium (desktops, projectors etc.)**
- 2. Focus more on English medium schools**
- 3. Provide free textbooks and uniforms**
- 4. Train more female teachers to reduce safety concerns**

By reducing drop-out rates effectively, the impact is an improved employment rate due to a quality education where municipal schools are looked at as education hubs rather than mere caregiving facilities. This breaks the cycle of poverty for first generation learners and leads to equality in education. These students represent the youth of our nation. Effective steps taken to reduce such drop-outs will reap the benefits of India's human potential - leading to greater growth and development.

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## REFERENCES

<https://portal.mcgm.gov.in/irj/portal/anonymous/qlBMCScl123>

<https://src.udiseplus.gov.in/hom>

<https://timesofindia.indiatimes.com/city/pune/marathi-to-be-must-till-class-10-in-all-maharashtra-schools/articleshow/74328309.cms>

<https://mumbaimirror.indiatimes.com/mumbai/other/will-students-in-bmc-run-schools-soon-get-to-learn-a-foreign-language/articleshow/70464088.cms>

<https://www.mdpi.com/2079-9292/9/10/1613/htm>

<http://14.139.60.153/bitstream/123456789/8835/1/A%20Study%20of%20the%20extent%20and%20causes%20of%20droopouts%20in%20primary%20schools%20in%20rural%20maharashtra%20with%20special%20ref%20to%20fir1%20dropouts.pdf>

<http://schooldropoutprevention.com/country-data-activities/india/>

<http://iosrjournals.org/iosr-jrme/papers/Vol-4%20Issue-6/Version-3/K04637583.pdf>

<https://files.eric.ed.gov/fulltext/ED587683.pdf>

[https://www.researchgate.net/publication/314077615\\_DECREASING\\_SCHOOL\\_DROPOUT\\_RATE\\_AS\\_A\\_FACTOR\\_OF\\_ECONOMIC\\_GROWTH\\_AND\\_SOCIAL\\_EMPOWERMENT\\_THEORETICAL\\_INSIGHTS](https://www.researchgate.net/publication/314077615_DECREASING_SCHOOL_DROPOUT_RATE_AS_A_FACTOR_OF_ECONOMIC_GROWTH_AND_SOCIAL_EMPOWERMENT_THEORETICAL_INSIGHTS)

[https://www.researchgate.net/publication/342833162\\_PREDICTION\\_OF\\_SCHOOL\\_DROP\\_OUTS\\_WITH\\_THE\\_HELP\\_OF\\_MACHINE\\_LEARNING\\_ALGORITHMS](https://www.researchgate.net/publication/342833162_PREDICTION_OF_SCHOOL_DROP_OUTS_WITH_THE_HELP_OF_MACHINE_LEARNING_ALGORITHMS)

[https://www.researchgate.net/publication/333016151\\_Machine\\_Learning\\_Approach\\_for\\_Reducing\\_Students\\_Dropout\\_Rates](https://www.researchgate.net/publication/333016151_Machine_Learning_Approach_for_Reducing_Students_Dropout_Rates)

<https://er.educause.edu/articles/2019/12/predictive-analytics-for-student-dropout-reduction-at-pontificia-universidad-javeriana-cali>

<https://www.indiaspend.com/budget/budget-explainer-how-india-funds-public-school-education-718488>

<https://www.oecd-ilibrary.org/docserver/9789264276147-4->

<en.pdf?expires=1620655339&id=id&accname=guest&checksum=D23318A4B9477D02CE5608095D04CB63>

<https://www.oecd.org/education/school-resources->

[review/TheFundingofSchoolEducation\\_summaryENG\\_combine-min.pdf](review/TheFundingofSchoolEducation_summaryENG_combine-min.pdf)

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