

# AN EVALUATION OF THE STATUS OF INFRASTRUCTURE AND EDUCATIONAL FACILITIES IN THE MUNICIPAL SCHOOLS OF THE MUMBAI REGION USING THE UNDP'S MULTI-DIMENSIONAL POVERTY INDEX (MPI) APPROACH

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## Abstract

This electronic document is a “live” template and already defines the components of your paper [title, text, heads, etc.] in its style sheet. One book, one pen, one child, and one teacher can change the world quoted Malala Yousafzai. And to facilitate this, all one needs is a school. Today, the role of the school from being just a four walled structure has enlarged to accommodate a larger perspective which includes a myriad of activities encompassing the overall development of the child. Apart from basic education, a host of pre-requisites have become the norm – be it the plethora of activities related to sports, or activities related to the development of the creative genius, or activities intending to develop the overall personality including Emotional Quotient and the Intellectual Quotient of the child. Education today, albeit, does concentrate on teaching and learning nevertheless, the focus and the selling point has now shifted to the availability of facilities. Thus, with the array of schools today, showcasing their infrastructure and facilities in our visible universe, the choices for a parent to enroll their young minds are superfluous. There are schools which are of international stature and those who are not international, aspire to be one. Then come the residuals - the municipal run schools, often alleged to be overlooked by both the enrollers and the facilitators. And yet they have an audience - the marginals for whom education is a virtue and getting it completed in the limited available options is an obligation. Often symbolized as a place for education for those with limited financial viabilities, do these institutions necessarily mirror poverty and insignificance? Are these schools sustainable and guarantee the development of the child to compete in the ever challenging environ of today’s world? Do they have the infrastructure facilities which can bring out holistic development of the child? We put this to test by examining these schools run by the Brihan Mumbai Municipal Corporation (BMC) in the eastern suburbs of Mumbai, where several schools were visited and examined under various indicators such as Classroom Infrastructure, Teaching Infrastructure and other collaterals for a school. To do this differently we used Oxford and UNDPs (United Nations Development Programme) Multi-Dimensional Poverty Index approach - a concept used in Macro Economic Analysis to calculate the Poverty Index and Deprivation of households in a country. We remodeled this economic concept to calculate the deprivation index of these BMC run schools in the Mumbai region. The results obtained - though not startling yet reaffirming, indicated that most of these schools can be classified as less deprived withstanding the fact that they do provide what they set out to do - that is basic education.

**Keywords:** BMC Schools, Multi-Dimensional Poverty Index (MPI), UNDP, Education.

## Introduction

Mumbai has been a city of dreams for all of its inhabitants and also for those who come in search of opportunities in this paradise. The city has been transforming on all aspects structurally as well as figuratively to accommodate the ever-increasing population belonging to varied socio-economic backgrounds. With this change comes infrastructural changes ranging from basic necessities such as food clothing and shelter to infrastructural facilities such as roads and medical facilities. Every such necessity comes with a range of offerings which clearly classifies the rich from the not so rich and the poor populace. There are choices based on each’s subsistence levels and boundaries of affordability. And then comes another basic necessity - the right to education which also falls under a similar categorical universe – for the affluent and for the not so affluent and then for the marginals.

The educational land scape with regards to basic primary and secondary education has been changing with the introduction of different boards and schools coming in with their diverse offerings. Education which was once a basic right is slowly venturing into a luxury commodity with hefty price tags under the pretext of the various amenities which come along with it and are termed as value additions. There is clearly a social divide between the people availing these services - a gap which is difficult to bridge, rather a gap which is intentional. And yet then, there are schools run by the city municipal corporations - the BMC which don’t promise such a premise. They simply exist to cater to those on the other side of the bling, those who cannot afford the ubiquitous schools trying to create a social division and with different ideologies.

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The student community which frequents these schools run by the local municipal corporations are often from a poor socio-economic background. But should this translate into lower than basic or necessary education to the wards of such communities? Should they be deprived of the minimum requirements of completion of education? To answer these questions, our research was more of a necessity in order to identify the gaps in the various facilities available in municipality run schools across the Mumbai region.

For this we decided to randomly identify 20 BMC run Schools across Mumbai and to study and analyze them on various parameters to arrive at a deprivation index. The indicators decided were Infrastructure, - Classroom and Sports, Other Collaterals and other developmental activities normally expected to be available in any school.

### **Literature Review**

Schools are an important attribute in the development process of a child. Nuraihan Mohd Ibrahim, Marian Mohamed Osman, Syariah Bachok and Mohd Zin Mohamed (2016) [9] in their paper on Assessment on the condition of school facilities: Case study of the selected public schools in Gombak district in Malaysia tried to examine the condition of various physical school facilities in nine schools located in the Gombak district of Malaysia. The research paper evaluated these facilities using a checklist method to draw inferences and thus provide recommendations to each school for improvement and facility planning.

A study published by the 21st Century School Fund, Washington, USA (2009) on Research on the Impact of School Facilities on Students and Teachers tries to emphasize on the positive relationship between education facilities and its stakeholders – students and teachers. The study shows that schools with better educational facilities have a direct bearing on the educational achievements of the students and the zeal of the teachers to contribute towards the success of the institution. Thus, the studies highlight the importance of the continual endeavor to improve and identify facilities as an instrumental factor to achieve higher outcomes.

Amilia Hasbulla, Wan Zahari Wan Yusoff, Maziah Ismail, Prima Vitasari (2011) [10] in their research paper on ‘A framework study of school facilities performance in public primary school of Batubara district in Indonesia’ empathized on the importance of school facilities and its impact of performance of the school. The paper tries to create a framework for measuring the performance of school facilities in public primary schools in the Batubara district in Indonesia and is intended to bring quality improvements in the education scenario in

Indonesia.

Pallab Jyoti Boruah (2017) in his research paper on ‘A Study on Availability of Educational Facilities for The Teachers and Students in Primary Schools with Special Reference to Nazira Sub-Division of Sibsagar District of Assam’ stresses on primary education as the keystone for higher education. He studied the physical infrastructure of the government primary schools in Assam and its impact on the teaching learning process. He concluded that most schools lack the physical structure necessary for sustainable learning and thus recommended that schools should try to focus on improving the same.

### **Objective**

To study the multiple deprivations faced by BMC run schools in different wards of the Mumbai region using the Global MPI technique.

### **Statement of The Problem**

Schools are pivotal in the foundational development of a child and hence we have to place more emphasis to leverage this aspect of a student’s early years of development. A school is complimented and goes hand in hand with the facilities that it provides to strengthen its institutional and core values and achieve its main objective of providing education with a difference. Many studies conducted so far highlighted the importance of these facilities on the performance of the schools and its stakeholders i.e. its students and teachers. The studies showed that there is a direct relationship between physical facilities and its impact on the holistic development and performance of the schools. Most of these studies have been conducted outside India and used survey techniques to assess the facilities provided by the schools. This necessitated the need to study the and evaluate the physical infrastructure and other educational facilities in the schools in Mumbai region. Also, the study ensured that instead of using the generic survey technique, a different method referred to as Multi Dimensional Poverty Index technique, is used, for more concrete results.

### **Scope of The Study**

The study is limited to schools in 5 wards of the Mumbai suburban region. A total of 20 BMC schools were visited. The following schools were surveyed.

Ward	Sr. No.	Name of the School	Area in Mumbai
G Ward	1	Dharavi T.C. Municipal School	Dharavi
	2	Matunga labour Camp	Matunga
	3	Prabhadevi Municipal School	Dadar
	4	Dharavi Kalakilla Municipal School	Dharavi
M Ward	5	Tilaknagar Mumbai Public School	Kurla
	6	Chembur Naka Municipality School	Kurla
N ward	7	Ramabai Sahakar Nagar Municipal School	Ghatkopar
	8	Jayantilal Vaishnav Municipal school	Ghatkopar
	9	Pantnagar Municipal school	Ghatkopar
	10	Maneklal Mehta Bmc School	Ghatkopar
	11	Vikhroli Parksites Municipal School	Vikhroli
S Ward	12	Kannamwar Nagar BMC School	Vikhroli
	13	Tembipada Municipal School	Bhandup
	14	Tulshet Pada BMC School	Bhandup
	15	Ganga Vidyamandir BMC School	Bhandup
	16	Tirandaz Municipal School	Powai
T Ward	17	Gavanpada BMC Marathi School	Mulund
	18	Veena nagar municipal school	Mulund
	19	Mithagar MPS Eng Primary School	Mulund
	20	Nahur marathi school	Nahur

**Table 1**

The school infrastructure was covered under four broad heads viz. Classroom infra, Sport Infra, Other collateral infra and Other Development activities. Most of the students registering in these schools were from lower income group families. Classroom infra was studied to assess the basic quality of education being provided to students, while sport infra was studied because sports is a neglected area in Govt Schools and money spent is negligible.

The other collateral infra includes bare minimum requirements like potable water, washrooms availability, compound wall, gate, security etc. Effort taken by schools on other social and mental development of the students was also assessed.

Following is the detailed list of indicators which have been studied to arrive at the MDI (Multidimensional Deprivation Index.)

Sr. No.	Indicators	Sub Indicators	
1	Classroom Infrastructure	1	Non-availability of Digital Models of Teaching like ICT
		2	Non-availability of Proper Blackboards, Benches, Tables, etc.
		3	Non-availability of Sufficient Space in Classrooms
		4	Non-availability of Proper Ventilation and Air Quality
		5	Non-availability of PA System (Centralized Speaker)
		6	Non-availability of sufficient lighting
2	Sports Infrastructure	1	Non-availability of Playground
		2	Non-availability of Indoor Sport Area
		3	Non-availability of Sports Material / Equipment
		4	Non-availability of Sports / PT Teacher
3	Collaterals for a Municipal School	1	Non-availability of Library
		2	Non-availability of Sick Room / 1st Aid Medical Treatment Facility
		3	Non-availability of Potable Water
		4	Non-availability of Clean Washrooms
		5	Non-availability of Mid Day Meal Facility
		6	Non-availability of Security Guard

		7	Non-availability of Compound Wall with Gate
		8	Non-availability of a Computer Lab
4	Other Developmental Activities	1	Non availability of field trips/visits
		2	Non availability of activities for boosting creativity
		3	Non availability of activities for boosting research aptitude
		4	Non availability of a counsellor for career aptitude and other purposes
<b>Sr. No.</b>	<b>Indicators</b>	<b>Sub Indicators</b>	
1	Classroom Infrastructure	1	Non-availability of Digital Models of Teaching like ICT
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		4	Non availability of a counsellor for career aptitude and other purposes

**Table 2**

### Limitations of The Study

The study was conducted across a sample of 20 randomly selected schools in different wards of Mumbai. The wards were also randomly selected. Hence, this sample though sufficient may not necessarily paint the picture for the entire city. Also, the study is based on personal visits to schools, the feedback collected from the school staff and students enrolled in the school. Hence, there is a minor possibility of participant bias in the study.

### Research Methodology & Data Collection

The entire project is based on primary data collection where we visited BMC schools in our vicinity and surveyed the availability / deprivation

of various infra heads and other educational facilities. A total of 20 BMC schools were visited and were then classified based on their wards in Mumbai. After collecting data from the different schools mentioned in Table I and against the parameters mentioned in Table II, we have used the MPI (Multidimensional Poverty Index) indicator to calculate the deprivation index of the schools. The research tries to use this technique as most research conducted in this field uses the survey method or checklist method to draw inferences and observations. The MPI technique is capable of incorporating a range of indicators to reflect the current status of the schools, and thus provides a comprehensive statistical measure which can be

used for analysis and interpretations.

### **What is MPI?**

The Multidimensional Poverty index is a global index constructed by the Oxford University and the UNDP to measure the multiple deprivations that poor people face in various areas covering health, education and standards of living. It is used to measure poverty in the developing countries of the world. We have used the technique of this index to measure the deprivations faced by the BMC run schools in Mumbai. The calculation of this technique has been illustrated further.

### **Calculations of The Index**

1. The indicators on which the schools are evaluated were decided. As mentioned in table III we have four main indicators and each of them have different criteria of evaluation. For example, under classroom infrastructure we have 6 criteria, under Sports infrastructure we have 4 criteria, under collaterals we have 8 criteria and under Other Developmental activities we have 4 criteria.

2. Calculation of weights: Based on each criterion and their indicators, the weights are calculated.

Thus,  $\text{weight} = 1 / (\text{No. of Indicators} \times \text{No. of Criteria})$ . Hence in our case we have 4 indicators and each indicator has their own criteria. So, weight of classroom infrastructure is  $1 / (4 \times 6) = 1/24$ , weight of sports infrastructure is  $1 / (4 \times 4) = 1/16$  and so on.

3. The schools have been classified into wards and their cumulative score against each criterion has been marked as 0 or 1 where 1 represents non-availability of the criteria while 0 represents availability. For ease of calculation, for each ward the scores have been marked based on a 2/3rd majority, that is, if 2/3rd of the schools in a ward report to have a facility, the entire ward has been

marked as 0 and vice a versa.

4. After marking scores against each ward, a cumulative score ( $C_i$ ) has been arrived at by multiplying all the 1's (representing non-availability) with its respective weight.

5. Based on the cumulative scores each ward has been classified as deprived or not deprived. This has been decided on the universal scoring pattern of 0.33 or 33%. A score of less than 33% represents non-deprivation while a score greater than or equal to 33% represents deprivation.

6. A censored score ( $K$ ) is arrived at, by allotting 0's to schools of non-deprived wards and rewriting the  $C_i$  score of the deprived wards.

7. A multidimensional headcount ( $H$ ) is calculated using the following formula:  $\text{Total number of deprived schools} / \text{Total number of schools}$ . This is  $11/20$  in our case.

8. The intensity of deprivation ( $A$ ) is calculated by multiplying the number of schools with their censored scores.

9. Finally, the MPI score is calculated by multiplying the multidimensional headcount ( $H$ ) with the intensity of deprivation ( $A$ ). Thus,  $\text{MPI} = H \times A$

After recording, tabulating and evaluating the data collected from the survey, the MPI score was calculated and it was 0.32. This indicated that most schools run by the BMC belong to the less deprived category and thus fulfil their objective of providing basic education to all sections of the society. Hence, their role in provision of education as an important institution cannot be ruled out.

Sr No	Indicators	Number of BMC schools surveyed					Weights	
		S WARD	G WARD	M WARD	N WARD	T WARD		
		5	4	2	5	4		
<b>I</b>	<b>Classroom Infrastructure</b>							
1	Non availability of Digital Models of Teaching like ICT.	1	1	1	1	1	1/24	0.0417
2	Non availability of Proper Blackboards, Benches, Tables, etc.	0	0	0	0	0	1/24	0.0417
3	Non availability of Sufficient Space in Classrooms	0	1	0	0	0	1/24	0.0417
4	Non availability of Proper Ventilation and Air Quality	0	0	0	0	0	1/24	0.0417
5	Non availability of PA System (Centralised Speaker)	0	1	0	1	0	1/24	0.0417
6	Non availability of sufficient lighting	0	0	0	0	0	1/24	0.0417
<b>II</b>	<b>Sports Infrastructure</b>							
1	Non availability of Playground	1	0	1	0	0	1/16	0.0625
2	Non availability of Indoor Sport Area	0	0	0	1	0	1/16	0.0625
3	Non availability of Sports Material / Equipment	0	0	0	1	1	1/16	0.0625
4	Non availability of Sports / PT Teacher	0	0	0	0	0	1/16	0.0625
<b>III</b>	<b>Collaterals for a Municipal School</b>							
1	Non availability of Library	0	1	0	1	0	1/32	0.03125
2	Non availability of Sick Room / 1st Aid Medical Treatment Facility	0	0	0	0	1	1/32	0.03125
3	Non availability of Potable Water	0	0	0	0	0	1/32	0.03125
4	Non availability of Clean Washrooms	0	0	0	0	0	1/32	0.03125
5	Non availability of Mid Day Meal Facility	0	0	0	0	1	1/32	0.03125
6	Non availability of Security Guard	0	0	0	0	0	1/32	0.03125
7	Non availability of Compound Wall with Gate	0	0	0	0	0	1/32	0.03125
8	Non availability of a Computer Lab	0	0	1	1	0	1/32	0.03125
<b>IV</b>	<b>Other Developmental Activities</b>							
1	Non availability of field trips/visits	0	0	0	0	0	1/16	0.0625
2	Non availability of activities for boosting creativity	1	0	0	0	1	1/16	0.0625
3	Non availability of activities for boosting research aptitude	0	0	0	0	0	1/16	0.0625
4	Non availability of a counselor for career aptitude and other purposes	1	1	1	1	1	1/16	0.0625
Score C <sub>i</sub> (Sum of each deprivation multiplied by its wt.)		0.2292	0.2188	0.1979	0.3333	0.2917		
Is School Deprived of Facility? (C <sub>i</sub> ≥ 0.333)		N	Y	Y	Y	N		
Censored Score C <sub>i</sub> (K)		0	0.2188	0.1979	0.3333	0		
Multidimensional Head Count (H)		(4+2+5)/(5+4+2+5+4)						0.5500
Intensity of Deprivation (A)		0	0.8750	0.3958	1.6667	0		0.5875
MPI SCORE = H*A		(0.55*0.5875)						0.32

## Data Analysis and Interpretation

The following points were observed:

1. Most of the BMC schools did not have any digital teaching aid such as projector or smart boards or any other audio-visual means of education. The teachers resorted to traditional method of chalk and board for classroom teaching. However, it is to be noted that during the COVID outbreak with the lockdown imposed, students had to use smart phones to attend their classes from their homes. The teachers conducted the lectures in the school classroom using their personal phone cameras such that the black board was visible while teaching. Some teachers used other personal devices such as laptop and computers. Hence, the use of digital media cannot

be totally ruled out.

2. Classroom equipment such as benches and desks, blackboards, tables and chairs were available in all the schools, irrespective of location. This was a welcome change as opposed to students sitting on floors which is especially observed in some rural areas.

3. Space management was observed to be a challenge in some schools. Most schools in Mumbai are challenged by space constraints. Hence availability of sufficient classrooms for each section of the school was an area where all schools did not fare equally. Some schools housed multiple divisions of a particular standard while some had a

space challenge in managing their primary and secondary section.

4. Most of the schools had classrooms that were adequately ventilated and had proper lighting arrangement. Availability of sufficient windows for free movement of air and availability adequate sunlight was observed in every school. Apart from that each classroom was equipped with at least one fan and a tube light. Some schools also used led tube lights to reduce power consumption.

5. Around half of the schools surveyed did not have a centralized speaker system. On further enquiry it was observed that the school assembled the students in a common space for any important announcements or even assembly or transmission of any important information.

6. Many schools fared badly in the sports heads due to budgetary constraints of the municipal government. As mentioned earlier, space has always been a challenge in most educational institutions in Mumbai. To further that, it was even more difficult to identify schools having sufficient play area for students. Some schools had a playground but was not equipped with manpower for physical training and sport activities. Hence students had to bail out and manage the sports activities on their own. On further enquiry it was inferred that such lack of man power was attributed to lower remunerations offered in such institutions. Government neglect in filling vacant positions was another factor which aided this depravity.

7. Adding to the issue of space constraints, there were at least 7 schools where availability of a library as well as a computer lab was a not seen. However, many schools had dedicated a room for storing books to inculcate reading habits amongst the students. Availability of sufficient computers or a dedicated computer room was another challenge. On further probing this was attributed to high costs of procuring computers, availability of clean storage conditions for the computers, lack of teachers for training students and government neglect. It was a disappointment to acknowledge that government neglect was one of the primary reasons, especially when the schools had shown interest for such facilities.

8. Further, facilities such as availability of first aid in case of emergency was observed in every school. The schools may not have necessarily had a separate room for the same, but basic first aid kits were available in each school studied.

9. Another observation was the availability of potable water. Most of the municipal schools had water purifiers on their campuses and/or water coolers with inbuilt purifiers to ensure availability of safe and clean drinking water to the staff and students. Some schools did away with makeshift filters attached on regular taps, which may not necessarily assure completely safe water.

10. Another facility emphasizing on the hygiene

aspect was availability of clean restrooms. All the schools surveyed had a clean restroom for both girls and boys. The state of the washrooms as far the interiors go may not have been up to the mark but washrooms were sufficiently clean.

11. Midday meal programs were not a common occurrence at each school. Hence most students had to carry their own food to the school. On further probing it was identified that not all schools are entrusted with this activity and those who are, avoid the same due to quality of food and adulteration issues. Some schools ensured clean and hygienic food preparation for the students. Also, during lockdown most of the mid-day meal schemes were discontinued due to lockdown and closure of schools.

12. Every school had a dedicated security guard. Availability of a guard on the premises ensures that unlawful or illicit activities do not take place within the school premises. Similarly, almost all schools had a compound which marked the periphery and expanse of the school and also restricted outsiders from entering the school.

13. Other developmental activities such as availability of a counsellor for student aptitude and other purposes were totally missing in all the schools. All the schools carried field trips under the pretext of a picnic or visit to nearby parks for botanical or zoological studies. Another factor to be noted is that each school carried some activities to boost the research aptitude of the students. Activities such as yearly science exhibitions were undertaken to reinstate this point.

## Suggestions and Conclusion

Based on our research, analysis and observations we can conclude that schools run by BMC may not be state of the art vis a vis other educational institution. However, these schools have been performing an important role as a pillar in providing education to every sector of the society. With minimal fee structures and government funding, the schools adhere to this basic function and come out as compliant entities. They may be deprived of some infrastructure, but that doesn't stop them from continuing with their endeavor. The role of the government is primal in this entire effort. If the government allocates more funds and also fills vacancies in these schools, most problems associated with man power and infrastructure would be ironed out. As far as quality of education is concerned, it has always been consistent and serves the interest of the population. On the contrary these schools have also produced rankers in the 10th standard examinations.

Thus, on the whole, our MPI index suggests that these schools run by the BMC can be classified as less deprived, but a score of 0.32 which is marginally close to the depravity index score

suggests that more can be done to augur the spirit and enthusiasm of each stakeholder involved to achieve over all development of the young genius. And now with the introduction of the game changing New Education Policy, a lot of opportunities and challenges will be available for every educational institution in this country – which will ensure the universal application of Darwin’s theory – survival of the fittest.

The implications of this research can be extended to the entire Mumbai district and thus can encompass other regions of the country. Further research can be carried to evaluate physical facilities in higher educational institutions in India. The research can also include the relationship between the MPI statistic and the ability of these higher educations to establish themselves as centers of excellence.

### Conflicts of Interest

The author declares there are no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript. The study involves only human participants who volunteered for this study and informed consent was obtained from them.

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