Impact of School Infrastructure Development Program on Learning

Contents

Executive Summary

Education prepares an individual for life, through facilitating multiple opportunities for living life up to their full capacity. It is considered as the most promising antidote for poverty. However, for education to affect an individual's life in a useful and meaningful way, the quality matters. In India, there has been systematic variation in the quality of education across socio economic groups, urban and rural population, and various geographical locations. The case is especially severe for rural India, where majority of students attend government run or aided schools through non-government organizations. These schools are plagued with multiple challenges such as shortage of teacher, poor teaching quality through rote learning methodologies, poor infrastructure etc. These quality gaps manifest into low participation rates, high dropout rates and poor learning outcomes.

In India, it is estimated that there are around 10.32 lakh government schools, and they face substantial infrastructure deficit with lack of furniture's, electricity, toilets, water tanks, computers, internet facility, playgrounds etc. Apart from this, in certain cases, the school buildings are also delipidated, making it not only unfriendly but also risky for children to pursue their education. The effect of these infrastructure challenges is observed in all students but have disproportionate impact on certain groups such as girls and physically disabled students.

The Empathy Foundation, in recognition of these infrastructure challenges faced by the schools in the country, began the program of providing school infrastructure to Zilla Parishad schools by building and repairing them in the state of Maharashtra. They prioritized delipidated schools, in urgent need of repair and reconstruction, for intervention. Till now, the foundation has built 232 schools in Maharashtra. They are spread across 16 districts covering 5 divisions.

The current study is analyzing the effects of this school infrastructure program on learning outcomes of student based on surveys and key informant interviews with students, teachers, and parents respectively. The sample consists of 6 students, 2 parents, and 1 teacher from each of the 35 sampled schools in Maharashtra. These schools are spread across program districts to ensure proportionate representation in the analysis.

The student sample consists of 210 students with equal representation of boys and girls. The average age of children is 12 years. The parent sample consists of 70 people, with 39 fathers and 31 mothers.

Key Findings

I. **Classroom Infrastructure-** The classroom sizes were adequate and catering to around 25 students on average. The key classroom changes were as follows,
   - 76% students found the classrooms to be bigger post construction
   - The ventilation in schools increased from 54% to 100%
   - 92% of children found the walls to be clean and well decorated
   - Before construction, 47% found classrooms to be crowded, but now 82% of them consider the classrooms to spacious.
   - Majority of the students (65%) stated that classroom changes improved their attention in class.
   - The average classroom infrastructure consisting of benches, black boards, fans, lights, computers, projectors etc. increased from 4 to 11.

II. **E-classroom Facilities-** When students were enquired about number of classrooms with computer and projector facilities, around 56% stated that they have one e-classroom, 16% stated they have 2 to 3 e-classrooms, and 13% stated that they have more than 3 e-classrooms.
   - Majority of the students (54%) stated that the e-classrooms are used daily, and 37% stated they are used most days of the week. This revealed high usage of the setup among teachers and students especially for teaching Science (94%).
   - Among all students with e-classroom facility, 50% preferred e-classrooms to general classrooms. They stated it to be more creative and interesting for learning (55%).
   - Some of the students also faced issues in e-learning setup due to lack of sufficient electricity (76%), sound issues (36%) and poor visibility on screen (31%).
   - When students were enquired on effectiveness of e-learning in understanding of concepts, 63% highly agreed with the statement, followed by 27% who agreed with it. Only 9% of students were either unsure or didn't agree to its effectiveness.

III. **School Infrastructure-** Post the intervention of the Empathy foundation, the average infrastructure available in school increased from 4 to 8,

amounting to an 100% increase in the facilities provided.

- The most prominent increase of 57% was found in roof coverings, followed by computer labs (increase of 48%), staff rooms and library (increase of 47%), staff room (increase of 44%) and disability friendly toilets (increase of 42%).

IV. Water Facilities- In case of water, 76% of students stated that the outlets have increased and have clean waters provided due to filter systems.

- Prior to renovation, around 20% of students stated that their school did not have water facilities, however, after renovation, all schools had water facilities.
- More than 40% of the students stated that post renovation school had more than 6 water dispenser outlets.
- Several students stated that earlier the water outlets were fewer leading to crowd accumulation around the dispensers especially during lunch and sports time. This reduced their motivation to drink water.
- Additionally, they also faced challenges of irregular and unfiltered water. Some children also stated that they went back home to drink water.

V. Toilet Facilities- Prior to construction of new schools, 13% of schools did not have any toilets. However, post construction of new schools, all schools at least had 1 toilet. Around 53% had 3 to 4 toilets, and more than 20% of schools had more than 4 toilets.

- The study found that in schools, post construction water was always available for 92% of the students. This case was only 32% before construction of new school.
- The cleanliness of the toilets also improved with 92% stating that the toilets are always clean, which was only 30% before construction.
- On an overall level the number of facilities available to students on average increased tremendously post construction from 4 to 10.

VI. School Infrastructure- The students were enquired about the school roof condition prior to the renovation and several of them stated that it was made up of tins. Even in cases, where the roof was made of concrete, it was extremely delipidated, and on a risk of breakdown. Leakage was a universal issue experienced by most of the students during monsoon.

- After the renovation, around 95% students stated that the building can withstand heavy rainfall and other natural disasters.
- It is to be noted that this is an extremely relevant and impactful change through the program of empathy foundation— as it provides secure building for the school safeguarding the right to life of children.

VII. School playground- Prior to the intervention of the Empathy foundation, 81% of students stated that they had playgrounds in school. However, after the intervention, 70% of students stated that the playgrounds are bigger.

- The other changes experienced by some students are increase in greenery (38%) and development of boundary wall (49%). Around 12% however felt that there has been no change in playground.
- The average sports played by children post school construction increased from 2 to 3.
- The participation of children in sports competition also increased by 63%.

VIII. School Library- Prior to the school construction by the Empathy Foundation, only 45% students stated that they had library prior to school construction. However, even after construction, only around 20% to 30% of the students stated that there are certain changes in the library such as in size, books quantity, sitting arrangement, shelfs, ventilation and lighting. These students appreciated the changes in library.

IX. Computer Labs- The Empathy Foundation provided computer labs to schools to encourage computer education among young minds. The number of computers in school pre and post construction increased visibly.

- Earlier, 60% of the students stated that the schools had no computers, and even if they did, they had less than 10 computers as per 31% of respondents.
- The computers labs were constructed by the empathy foundation, and around 43% of students stated that the school had at least 11-25 computers.
- The availability of computers also increased the frequency of computer class, with the students using the computers, on an average 4 times a week.

X. **Disability Friendly Infrastructure-** The Empathy foundation has invested in disable friendly spaces in the school. The most prevalent infrastructure constructed are Ramps as stated by 77% of students, allowing the students to comfortably move around on wheelchairs. There have also been lower locks on doors (61%), and disability toilet constructions (47%).

XI. **Teaching Quality-** In our analysis, to map the change in teaching style of teachers pre and post construction, the students were asked to rate the teachers on certain parameters such as teacher motivation, teacher attendance, usage of e-learning, interactive classes and usage of science kits.
   - In all of the parameters, majority of the students ascribed to 'Highly Agree' rating followed by 'Agree' revealing genuine change in the teacher's approach.
   - One of the most primal changes was shift towards e-learning by using digital tools such as computers and projectors, as stated by 93% (Highly agree and agree) of the students.

XII. **School Performance Rating-** The students were asked to rate the school on various parameters after construction to map the impact of school infrastructure on key outcome indicators of school performance such as student attendance, student admission, understanding of concepts, student performance, student motivation, decrease in dropouts, community recognition and teaching quality.
   - In all of the parameters, majority (more than 60%) of the students ascribed to 'Highly Agree' rating followed by (between 20 to 30% of students) 'Agree' revealing attested change in schools' performance.

Conclusion

Accessibility and quality education is primary right of every child to maximize their potential and experience upward mobility in terms of both, social and economic development. However, this access is skewed towards higher income groups and urban centers in India. The rural areas education systems are distressed with multiple challenges, even to gain primary education— with limited number of schools, lack of infrastructure and basic amenities, poor technology access and lack of funds. These issues bring forth resistance among children to learn and lead to learning losses and dropouts, especially in case of girls and children living in extreme poverty or food insecurity. Hence, providing better infrastructure and

space for conducive learning the need of the hour. Prioritizing education in rural areas will not just demonstrate the progress of the communities at a micro-level but also contribute towards bolstering the region's economic growth by providing strong human capital.

In consideration of these issues, the work of the Empathy Foundation by building infrastructure for rural Zilla Parishad schools in Maharashtra is commendable. It takes into account the primary education needs of rural children, and accordingly facilitate action. The foundation recognizes the infrastructure gaps and need of expansion prior to developing the infrastructure. This unit specific approach instead of centralized approach in catering schools is efficient in terms of saving costs and time. Further the standardization in quality of materials used, and hiring of contractors with clear accountability, provides structure to the school infrastructure development program. This provides safe and secure learning place for children and motivates them to perform better. The good infrastructure facilities also attract more students to join the school, increasing enrollment rates and school relevance. However, it should be noted that since the Empathy Foundation's role is to develop the infrastructure for the community, the maintenance can be a challenge. The community members, student management committee's and Panchayat committees can consider taking up this role to ensure long and sustainable usage of the school infrastructure. The communities should be accountable since good education facilities empower their villages and children's future.

To conclude, the Empathy Foundation's work is well appreciated among the students, teachers, and community members. They have experienced the benefits of good infrastructure and do recognize the comforts better learning spaces can bring, in terms of improved attendance and motivation to learn. The situation also improves the engagement between teachers and students, allowing them space for free and creative thinking, while not thinking about infrastructure barriers and challenges.

Overview of Indian Public-School Infrastructure

Education prepares an individual for life, through facilitating multiple opportunities for living life up to their full capacity. It allows oneself to live a dignified life, and to make decisions for themselves. It is also considered as the most promising antidote for poverty, to a life of prosperity and comfort. However, for education to affect an individual's life in a useful and meaningful way, the quality matters. In India, since inception, the policy level focus has been on countrywide access to education by building networks of schools in rural and marginalized areas, as the first census revealed that only 9% of women and 27% of men were literate. This spurred the government into setting up goals to ensure free compulsory education to all children under the age of 14 by 1960, boosting the literacy rate in the country to 65.5% for women and 82.1% for men in 2011. However, education is intended to have much larger and wider benefits than literacy, in form of human capital development, which can in turn promote growth of the nation, by facilitating a skilled work force. As a result, there should be focus on strong and quality primary and secondary level schooling, such that it builds foundation for higher education.

In India, there has been systematic variation in the quality of education across socio economic groups, urban and rural population, and various geographical locations. The case is especially severe for rural India, where majority of students attend government run or aided schools through non-government organizations. These schools are plagued with multiple challenges such as shortage of teacher, poor teaching quality through rote learning methodologies, poor infrastructure etc. These quality gaps manifest into low participation rates, high dropout rates and poor learning outcomes. This poor learning is highlighted by the ASER report, 2018, which surveyed almost all rural districts in India to estimate the foundational reading and arithmetic abilities of children in the age group 5 to 16 years. The study found that only 44% of fifth grade children from government school were able to read second grade textbook in comparison to 65.1% of private school students, and only 22.7% of grade fifth students were able to conduct simple two-digit divisions in government schools in comparison to 39.8% students from private school. It was also found that, there are only 3.8 teachers on average in government school in comparison to 7.8 in private school.[1]

Figure 1: Competency level of rural students in class V (2018)
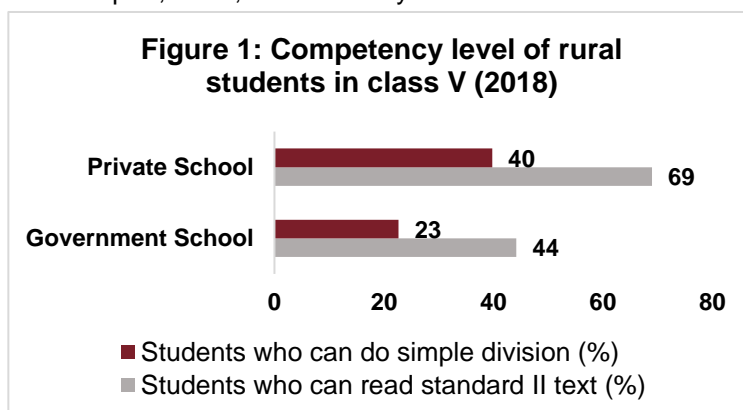
The relatively poor learning outcomes of government school are also results of low attendance and low enrollment of children in school, which prevails due to both demand and supply side barriers. The demand side barriers are low priority on education by parents, and child labor to face low-income challenges. The supply side barriers are lack of understanding of concepts, poor physical school infrastructure, geographical distance from homes etc. The policy and stakeholder level focus to improve learning outcomes should be addressing both these issues, with substantial focus on the supply side, by investing in school development.
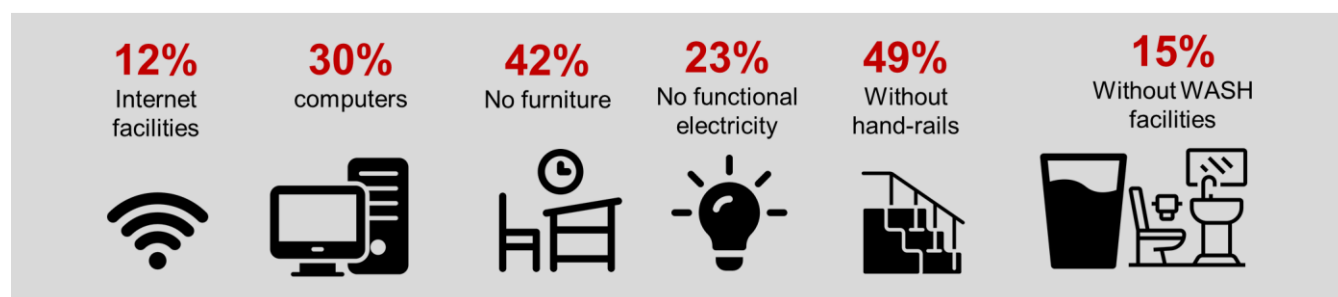
Source: Unified District Information System for Education Plus (UDISE+), Government of India Ministry of Education, 2020-21

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[1] Annual Status of Education Report (Rural) 2018, PRATHAM

In India, it is estimated that there are around 10.32 lakh government schools, and they face substantial infrastructure deficit with lack of furnitures, electricity, toilets, water tanks, computers, internet facility, playgrounds etc. Apart from this, in certain cases, the school buildings are also dilapidated, making it not only unfriendly but also risky for children to pursue their education. These poor facilities morph into low motivation spaces for young minds to nurture. In consideration of these issues and to facilitate safe and enjoyable learning experiences for students, there is an increased need of public funds into the education sector. However, the share of education in the union budget has been declining over the years. The paucity of funds directed towards building infrastructure of these government schools in therefore, visible, in form of weak structures, lack of classrooms, lack of benches, chipped paintings, leakages, dysfunctional electricity setups, lack of toilets, lack of water dispensers, lack of playground, etc.
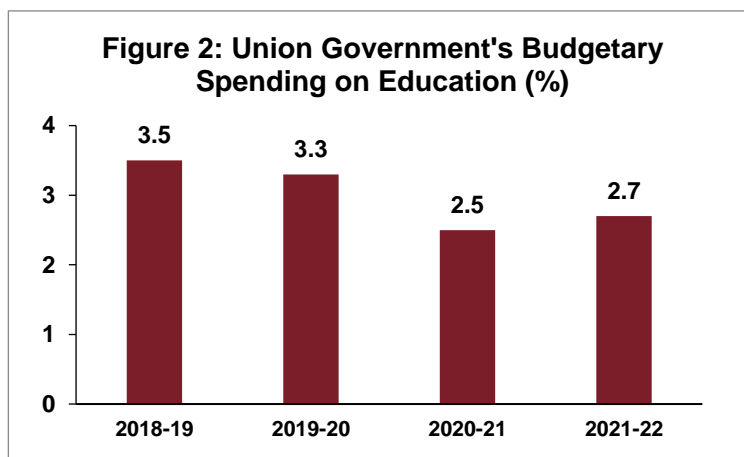
Figure 2: Union Government's Budgetary Spending on Education (%)

Year	Spending (%)
2018-19	3.5
2019-20	3.3
2020-21	2.5
2021-22	2.7

The effect of these infrastructure challenges is observed in all students but have disproportionate impact on certain groups such as girls and physically disabled students. In case of girl children, availing education has always been a challenge in the wake of prevailing social norms, where they are seen as a house maker than a future earning member. This substantially reduces the parent's and communities' motivation to provide them education. In such case, lack of facilities such as separate girls' toilet and safe commute to and fro school further deteriorates their chance to avail education for safety concerns. The governments have also accepted the issue of high dropout rates among girl children, and as a result, under the National Education Policy 2020[2], the need of strengthening the school infrastructure for all students to build an equitable atmosphere is highlighted. The policy suggests developing school infrastructure such that it acts as center point for community connect and growth making the community responsible for its growth and development. The policy also intends to finalize on strategies to ensure that student feel inclined to come to school. This calls for innovative teaching methods and digital learning strategies. It also entails within its gambit, the construction of separate toilet for girls and boys in schools.

The school infrastructure also disproportionately impacts the physically disabled students. It is to be understood that construction in most cases tend to overlook the capabilities of physically disabled people, severely affecting the access of this group. The presence of a disability friendly school infrastructure can bring a lasting change in the life of disabled child and his household in the longer run. As per the Unified District Information System for Education (UDISE) report, 22% of the schools currently do not have ramps for the physically disabled children. The ramps do not just play the role of school environmental support for the respect disabled child, but also creates an atmosphere of inclusion and diversity among the school children and staff. The government has repeatedly worked towards the challenges of inclusive education and construction of ramps has always been a crucial factor. But in the rural interiors where there are existing taboos towards disability, the importance of ramp in the school is yet to be completely realized.

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[2] National Education Policy 2020, Ministry of Human Resource Development, Government of India

As per Right to Education Act, all children between the age of 6 to 14 have the fundamental right to avail free and compulsory education without any form of discrimination based on gender, caste, creed, region, or disability. However, equity in education is achieved in education when all students receive the resources that they need to graduate fully equipped to succeed after high school. Hence, the stakeholders inclusive of governments and civil societies need to ensure an equal and fair distribution of the resources that students need to achieve their goals, including adequate school facilities.

Impact of Infrastructure on Learning

Apart from student's poor accessibility and motivation to attend school, the school infrastructure also has substantial effect of learning through teacher participation, health concerns, learning environment etc. This has been studied by several researchers from leading institutions and universities under varying context. In 2006, a group of researchers made unannounced visits to primary schools in Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda and found that about 19% of teachers were absent. To understand this phenomenon, they constructed 'quality of school infrastructure' index that included whether the school had a toilet, covered classrooms, non-dirt floors, electricity, or a school library. The analysis from sample schools found that "moving from a school with the lowest infrastructure index score to one with the highest (that is, from a score of zero to five) is associated with a 10-percentage point reduction in teacher absence." [3] The study found school infrastructure to be more significant factor in attendance than salary of the teachers. [4]

Another study stated that if conventional school construction falls short of expectations, with teachers, staff, and students often having to work in buildings with leaking roofs, inadequate ventilation and other problems, the education priority declines substantially. The comparison between positive and negative effects of school design on academic outcomes reveals a modest relationship between students' exam results and their subjective satisfaction with the condition of their facilities.[5]

Another pressing issue researchers found was existence of respiratory problems and health issues, in case of closed environment classrooms with poor ventilation. The study found that moisture and dampness in classrooms can cause growth of molds and proliferation of dust mites which can produce allergic respiratory symptoms and foster infections. In 2004, a study of 409 classrooms in US found that student absences jumped by 10% to 20% in rooms with poor ventilation.[6]

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[3] Buckley, J., M. Schneider, and Y. Shang. 2004. The Effects of School Facility Quality on Teacher Retention in Urban School Districts, National Clearinghouse for Educational Facilities.

[4] Thomas, J., and L. A. Pasquale. 2016. Better Spaces for Learning, London: RIBA

[5] Hopland, A., and O. Nyhus. 2015. "Does Student Satisfaction with School Facilities Affect Exam Results?" Facilities 33 (13/14): 760–74

[6] Shendell, D. G., R. Prill, W. J. Fisk, M. G. Apte, D. Blak, D. Faulkner. 2004. "Associations Between Classroom CO2 Concentrations and Student Attendance in Washington and Idaho," Indoor Air 14 (5): 333–341.

Key School Infrastructure Requirements

The world bank group conducted a synthesis of evidence to map the impact of school infrastructure on learning. Through this exercise they were able to identify the most crucial infrastructures, necessary for boosting learning outcomes among students. [7]

Comprehensive Questions to address for School Infrastructure-

- ✓ **Do all children have access to a place at school?**
- ✓ **Does the school building provide a safe and healthy environment?**
- ✓ **Are the learning spaces optimally designed for learning?**
- ✓ **Does the design of school foster current pedagogy and community engagement?**
- ✓ **How can school infrastructure be designed to evolve sustainably over longer term?**

As per the WBG study, these key school infrastructures positively contribute to students' academic outcomes:

- ✓ **Good "natural" conditions such as lighting, air quality, temperature, and links to nature**
- ✓ **Age-appropriate learning spaces that offer flexible learning opportunities for students to adapt and personalize**
- ✓ **Connections between learning spaces that are easy to navigate and that may provide additional learning opportunities**
- ✓ **Stimulation using color and visual complexity**
- ✓ **Schools that are designed from the inside out (classroom to school) so that each space meets the needs of its inhabitants**
- ✓ **Designs that consider local climatic and cultural conditions.**

The evidence states that an optimal physical environment should not be uncomfortable, alienating, or either chaotic or boring for students. It highlights that many of the factors relevant for ensuring a healthy environment as mentioned in the above section are important for learning, but also additional factors like choices about decoration, furniture's, fittings, wall paintings, designs, and space usages.

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[7] Barrett, P., Alberto T, et al., The Impact of School Infrastructure on Learning, A Synthesis of the Evidence, World Bank Group

Overview on Empathy Foundation's Education Program
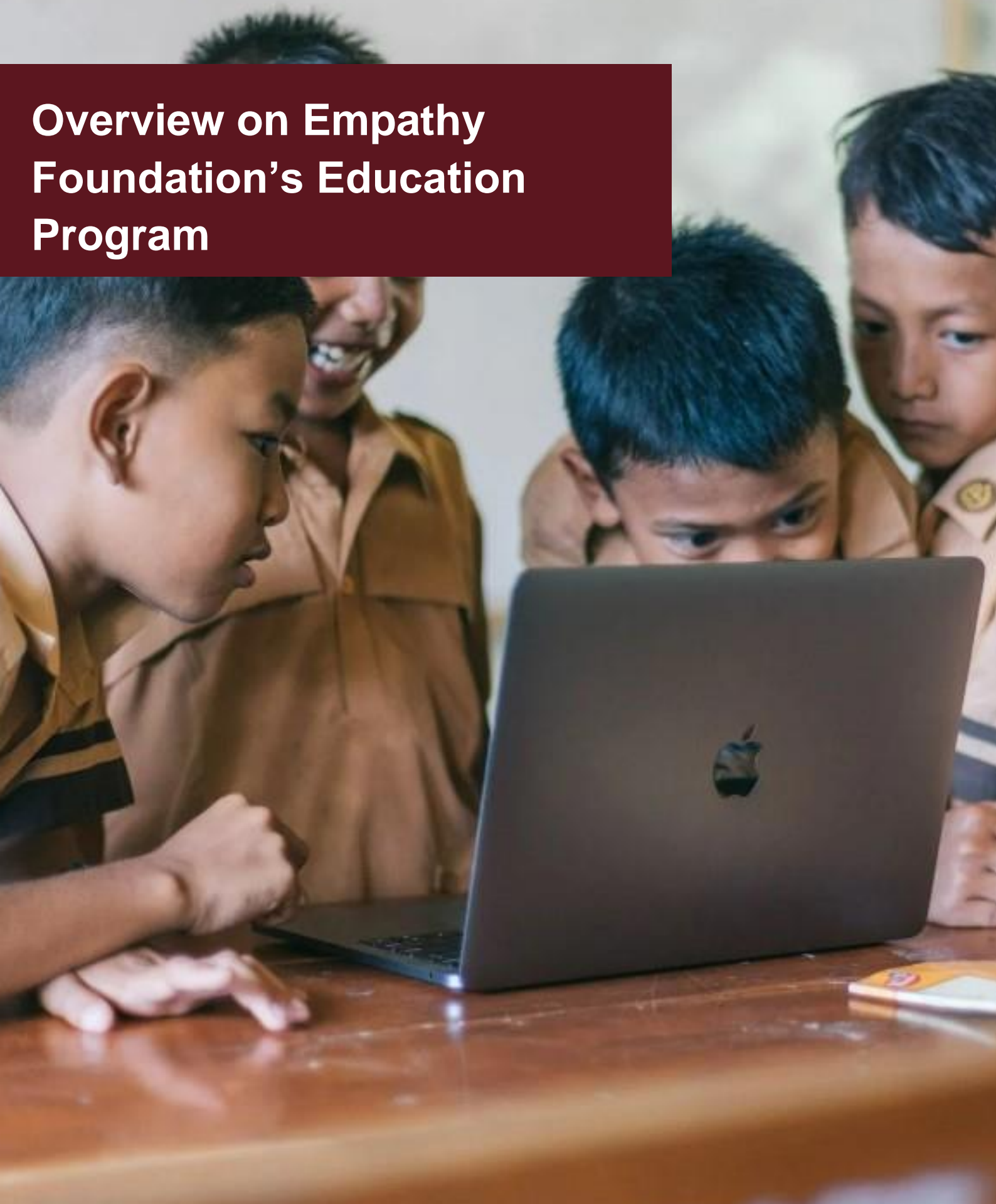
The Empathy Foundation, in recognition of the infrastructure challenges faced by the schools in the country, began the program of providing school infrastructure to Zilla Parishad schools by building and repairing them in the state of Maharashtra. They prioritized delipidated schools, in urgent need of repair and reconstruction, for intervention. Till now, the foundation has built 232 schools in Maharashtra. They are spread across 16 districts covering 5 divisions.
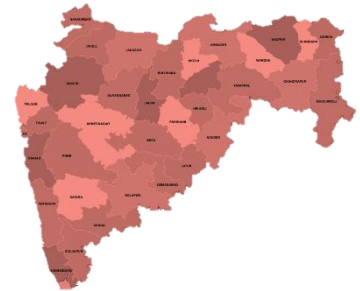
The foundation adopted a structured approach in terms of selection and construction of schools with due focus on community involvement. The process began with Empathy Foundation team members visiting the school sites and explaining the local stakeholders the process of construction and their roles and responsibilities. The community was responsible to receive the due permissions from the government authorities, and in some cases, also contribute a cumulative sum for reconstruction purposes to ensure accountability. Post which, the empathy foundation undertakes soil feasibility and geography study to assess the conditions and develop the necessary pile foundation to support the constructed school building. During the entire duration of construction, the empathy foundation assigns a contractor to supervise the construction. The construction process also has a structured approach, with standardized list of materials to be used, to ensure quality and consistency. After the construction, the empathy foundation hands over the school keys to the authorities to restart education in these newly developed spaces.

The constructed schools are designed with an intention to cater the needs of the child, and facilitate a conducive learning environment, with smaller ventilated classrooms, separate toilets for boys and girls, ramps, kitchen sheds, computer rooms, staff rooms, etc. These buildings are sturdy enough to face natural calamities and disasters, while ensuring safety of children and teachers. Apart from these, in certain schools, empathy foundation has also provided e-learning classrooms, science kits, bore wells and playgrounds. These changes have transformed the environment of schools.

Zilla Parishad School, Bilkheda before (left) and after (right) construction pictures

It is evident that the structural change in school provides the children healthy and conducive space for learning. However, the effect of these structural changes on education outcomes in terms of student's performance, attendance, enrolment, dropouts, classroom participation, etc. is yet to be mapped. The current study in similar regards is to analyse the effects of school infrastructure program on learning outcomes of student based on surveys and key informant interviews with students, teachers, and parents respectively.

Study Rationale and Methodology
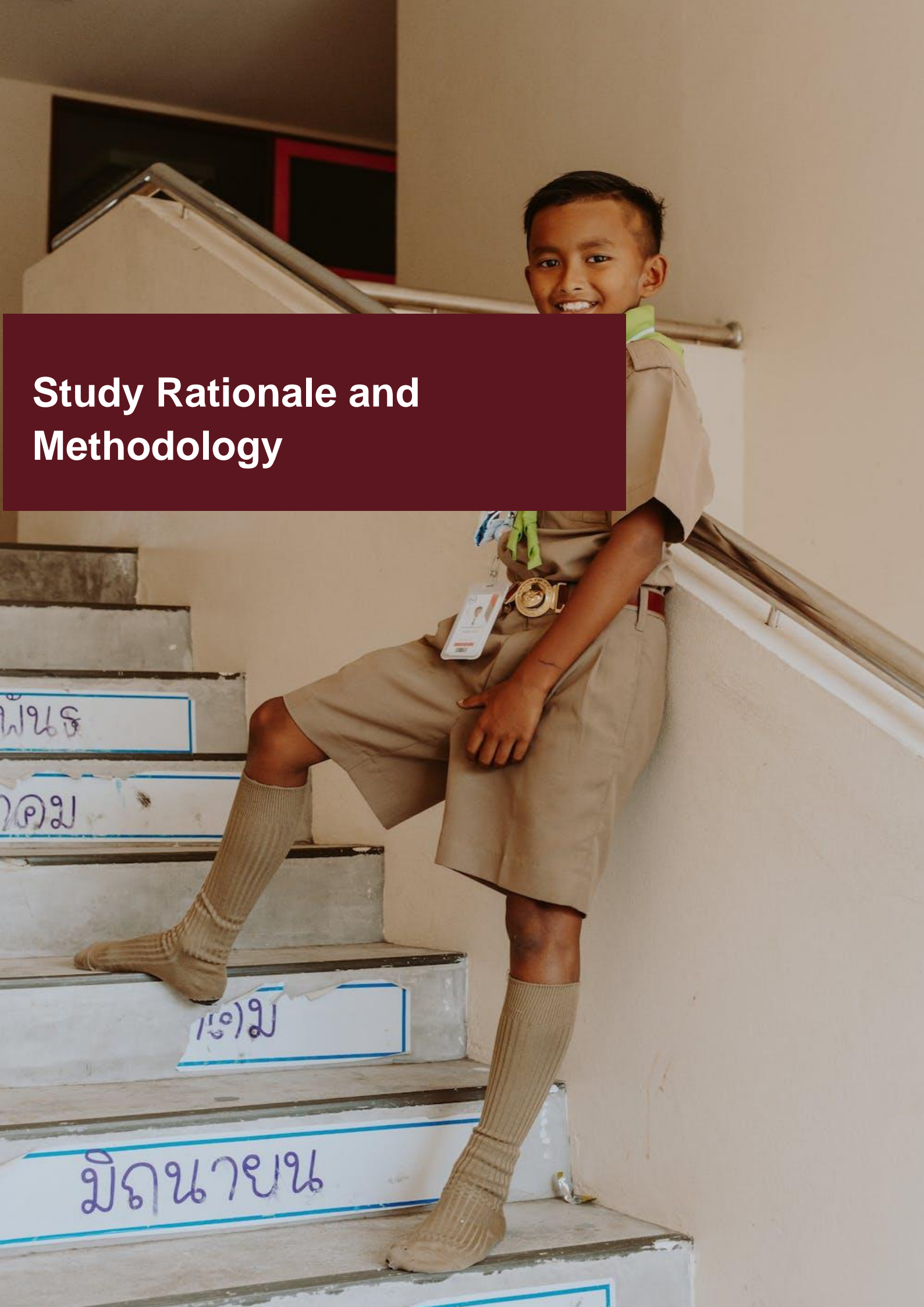
To map the impact of school infrastructure development on learning outcomes, the study adopted both quantitative and qualitative data collection techniques with the engagement of all stakeholders. The key stakeholders identified were students, parents, teachers, and Empathy Foundation officials. The students and parents participated in survey questionnaire, while the teachers and Empathy Foundation officials engaged in key informant interviews.

Our Approach

Quantitative	Qualitative

Random selection of schools for data collection process

Surveys	Key Informant Interviews
➢ Survey of school students to map the changes in their learnings pre and post school construction on each parameter. ➢ Survey of parents to map their perception on school learning pre and post school construction.	➢ In- depth discussions with teachers to map their observation in regards to change in school infrastructure and students approach to learning in terms of their performance, motivation and enthusiasm.

✓ The key results from survey based study are mapped and intersected with qualitative tools to connect the varied changes across interventions and contexts.

From 232 schools, 35 schools were taken as sample for our study. These schools are spread out across program divisions to ensure representation.

	Sampled from each school	Total study schools	Total sample size
Students	6	35	210
Teachers	1	35	35
Parents	2	35	70

The school sampling considered the spread of the program across Maharashtra and ensured representation from all 5 divisions covering 10 districts and 35 schools.

Similarly, for student sampling, the diversity in respect to gender and standards of education was also considered. The details of each school are provided in the annexure.

Division	Districts covered by Empathy Foundation	No. of schools constructed by Empathy Foundation	Districts covered under study	No. of schools sampled for the study
Amravati	1	47	1	5
Aurangabad	2	2	2	1
Konkan	5	74	3	10
Nashik	3	55	2	8
Pune	5	54	2	11
Total	16	232	10	35

Structure of Impact Analysis

To evaluate the end-to-end outcome and impact of the school infrastructure program by the Empathy Foundation on learning, the study has been classified into 2 sections. These sections will look into the granular details of the program, and the extent of impact these changes have created, or can create.

Section I- This section shall cover the student and parents' perception regarding learning outcomes pre and post school construction based on their survey responses. The analysis shall consider both within and outside classroom level changes in school. It shall also take into account the gender effect in respect to certain critical infrastructures. This will be followed by snippets of stories of change.

Section II- Under this section, the study will utilize the data collection tools to map the relevance, coherence, efficiency, effectiveness, impact, and sustainability of the intervention in lines with the Organization for Economic Co-operation and Development Assistance Committee (OECD DAC) framework. The OECD DAC framework provides the guidelines to determine the merit or worth of an intervention. They serve as the basis upon which evaluative judgements are made. Under its ambit, the study will analyze the key components of the overall program.

Relevance Is the intervention doing the right thing?	**Coherence** How well does the intervention fit with country policies?	**Effectiveness** Is the intervention achieving its objectives?	**Efficiency** How well are resources being used?	**Impact** What difference does the intervention make?	**Sustainability** Will the benefits of the intervention continue?

Primary Research Findings

Section I

I. Demographic profiles of the respondents

Our sample consisted of 210 students equitably spread across the 35 schools in 10 districts of Maharashtra with equal representation of boys and girls. The average age of students surveyed was 12 years, and 85% of the sample belonged to the 11 to 14 years age group.

It is widely known that the students from government Zilla Parishad (ZP) schools and other government or aided schools are from relatively poor socio-economic background and lower income groups. Hence, it will be instrumental to understand the diversity in students' background.

The surveyed students were from diverse caste background with representation from marginalized groups as well (scheduled tribes-17%, scheduled castes-11%, and minority groups such as Muslims, Christians- 2% etc.)

Number of schools sampled within districts	
District	Schools
Ahmednagar	2
Amravati	5
Kolhapur	4
Nashik	6
Osmanabad	1
Pune	7
Raigad	8
Ratnagiri	1
Thane	1

Figure 3: Sample Gender, Age, Family Size, Caste and Parents profession of Surveyed Students

50%

Equal boy and girl student representation in surveyed

Average age of students surveyed is 11-12 years old

- Below 9 years: 8%
- Between 10 to 14 years: 85%
- Above 15 years: 7%

1-2 members: 4%
3-4 members: 76%
5-6 members: 20%

Average family size of students is 3.8 members

- General: 35%
- OBC: 24%
- ST: 17%
- SC: 11%
- Minority: 2%
- Others: 11%

Fathers Profession / Mothers Profession

- Farmer: 62% / 38%
- Daily wage worker: 17% / 11%
- Homemaker: 0% / 46%
- Government job: 4% / 2%

- Around 2% of fathers are shopkeeper, 2% have private jobs, 1% have business, and 1% are self employed

17

Figure 4: Literacy levels of parents

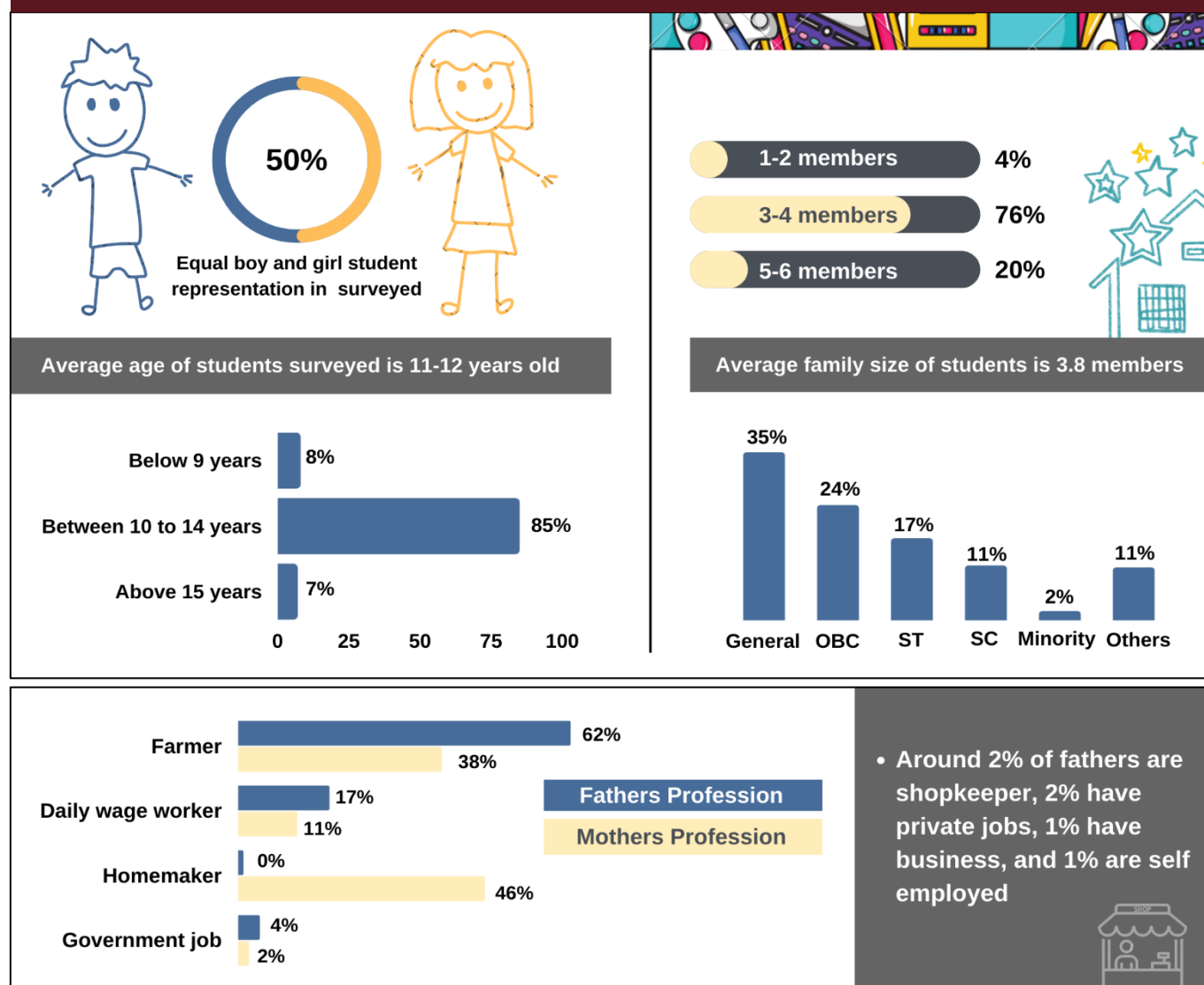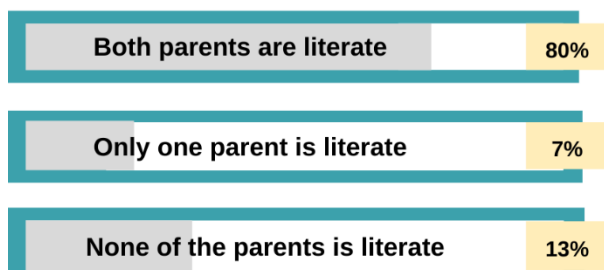Both parents are literate — 80%

Only one parent is literate — 7%

None of the parents is literate — 13%

The average family size of the students was 3.8 members, revealing small and tight family structures. The parents of students are primarily involved in farming (68% of fathers and 38% of mothers), followed by daily wage labourers (17% of fathers and 11% of mothers). The other occupations within businesses, government or private jobs were undertaken by very few parents.

Among all students, 87% of them were not first generational learners, with 80% having both literate parents, and 7% having at least one literate parent. However, 13% of the sample were first generational learners.

Apart from 210 students, the study also surveyed the parents to understand their perception on changes in students' learning outcomes pre and post school construction. The parent sample consisted of 70 respondents, equitably spread across 35 schools. Around two parents represented each school. It had 39 fathers and 31 mothers with average age of 40 and 35 years respectively.

Most of the parents had education up to 10th standard (43%), graduation (16%), and between 6th to 8th standard (14%). The literacy among parents was 91%. Their primary occupation was farming (56%) followed by daily wage labour (7%) and business (6%). Around 14% were also homemakers.

Figure 5: Number of sample parents surveyed

Fathers: 39
Mothers: 31
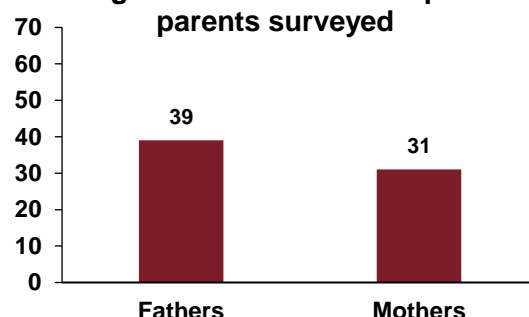
Figure 6: Distance from school (%)

Less than 2 km — 86
2 to 4 km — 7
More than 6 km — 7
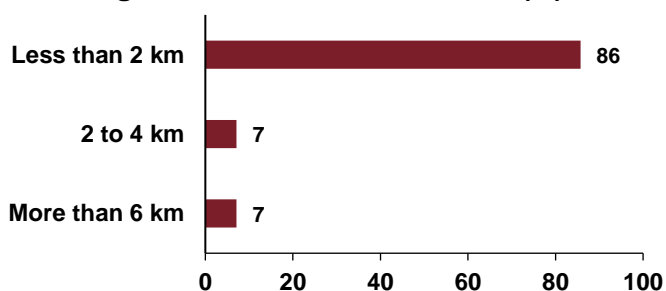
The parents selected the ZP schools primarily because it was near to home and was free of cost. The schools were less than 2 kms away for most students (86%) in our sample, as per parents. They shared positive feedback with respect to quality of education and mentioned of caring and nurturing teachers.

The parents considered education to be important for better opportunities, and fulfilment of aspirations. There was high value recognition in availing a good job post quality education.

II. Classroom Infrastructure

The average classroom size in schools was 24.8 students, of which 13 were boys and 12 were girls. The highest share of students (30%) stated that they had 26 to 35 students in a class and only 3% stated having more than 45 students in a class. This reveals that classroom sizes on an average are adequate and as per the Right of Children to Free and Compulsory Education (RTE) Act, 2009, of 30 children in a class.

Figure 7: Average class size

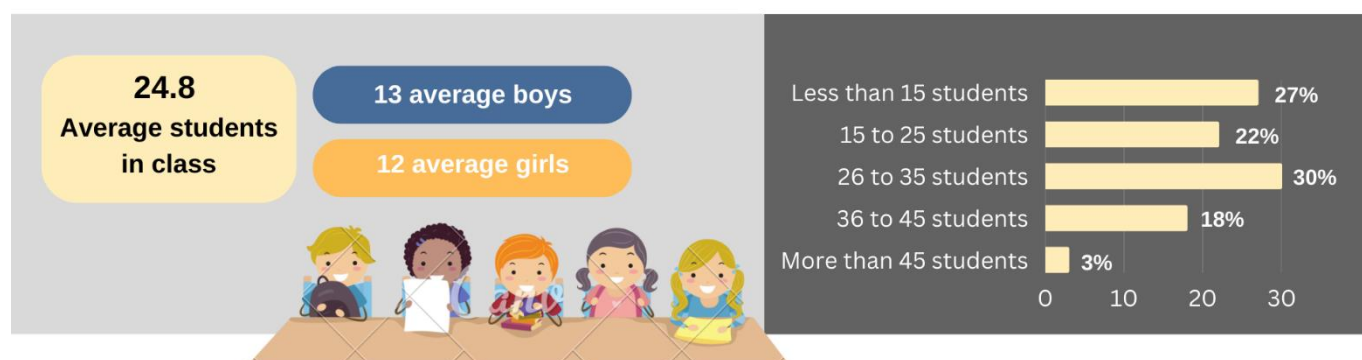The students/ perception on the changes in classroom infrastructure pre and post construction was mapped, and positive changes were observed on almost all parameters. In case of classroom size, 76% stated that the classrooms are bigger, while 17% stated that classrooms are of the same size. The ventilation in classrooms increased by a whopping 56% after construction from 54%. Similar results were also observed in classroom spaces, and classroom walls. The classrooms became more spacious as per 69% of students. Preconstruction, 47% considered classrooms to be crowded, of which, now 82% consider the classrooms to be bigger in sizes. The classroom walls were considered clean and well decorated by 92% of students post construction, which was only 22% pre-construction.

Figure 8: Changes in classroom environment as per student's perception
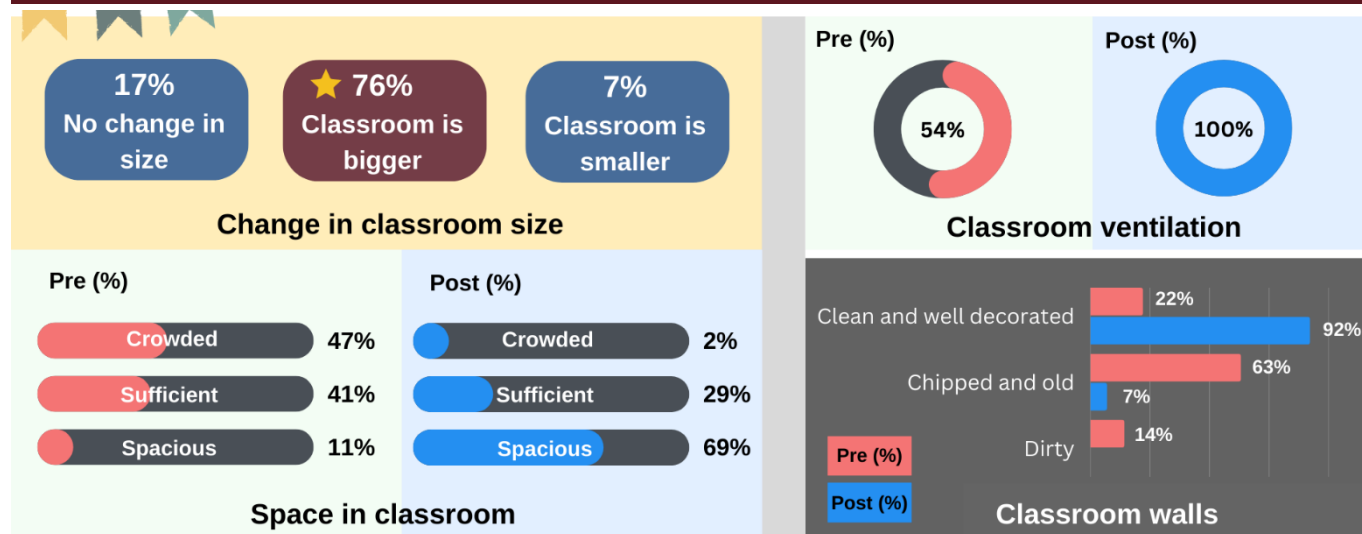
Have the classroom changes improved student's attention in class?	
Highly Agree	65%
Agree	15%
Not Sure	2%
Disagree	6%
Highly Disagree	12%
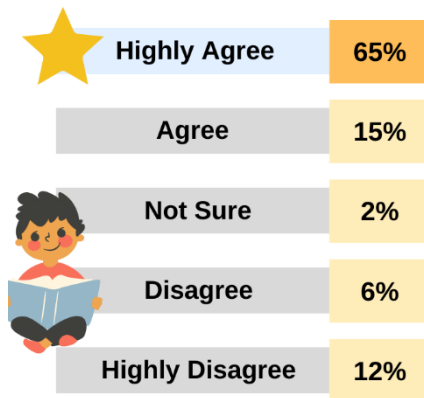
When the students were asked if these changes in classroom environment improved their attention in class, 80% of the students had a positive feedback (65% highly agreed with the statement, and 15% agreed to it).

The qualitative assessment on classroom impressions revealed that the students find the classrooms to be beautiful, with attractive tiles, bigger windows, and curtains. Several students mentioned about the rooms being airy and comfortable enough to focus on learning. One of the students stated that, "The walls exhilarate happiness and are very interactive. We are also asked to be creative by drawing some pictures on the wall. It is very engaging."

The students also appreciated the changes in hygiene and cleanliness post construction of the new school.

Figure 9 provides the list of necessary facilities in classroom, and how their availability has changed pre and post construction of new school. The most prominent change is observed in availability of computers from 17% to 70%, followed by projectors from 9% to 68%.

There has been an overall increase in classroom level infrastructure, with preconstruction average classroom infrastructure being 4 and post construction average classroom infrastructure being 11. This estimates to be an increase of 175% from before.

Average Infrastructure in Classroom (Pre)	4
Average Infrastructure in Classroom (Post)	11

Figure 9: Changes in classroom facilities as per student's perception

Benches		Blackboard		Bulletin Board	
Pre - 58%		Pre - 80%		Pre - 5%	
Post - 74%		Post - 84%		Post - 16%	

Clock		Computers		Fans	
Pre - 36%		Pre - 17%		Pre - 21%	
Post - 71%		Post - 70%		Post - 78%	

Lights		Projectors		Speakers	
Pre - 51%		Pre - 9%		Pre - 19%	
Post - 79%		Post - 68%		Post - 65%	

Chair and table		Whiteboard		Facilities in classroom pre and post construction	
Pre - 83%		Pre - 9%			
Post - 80%		Post - 49%			
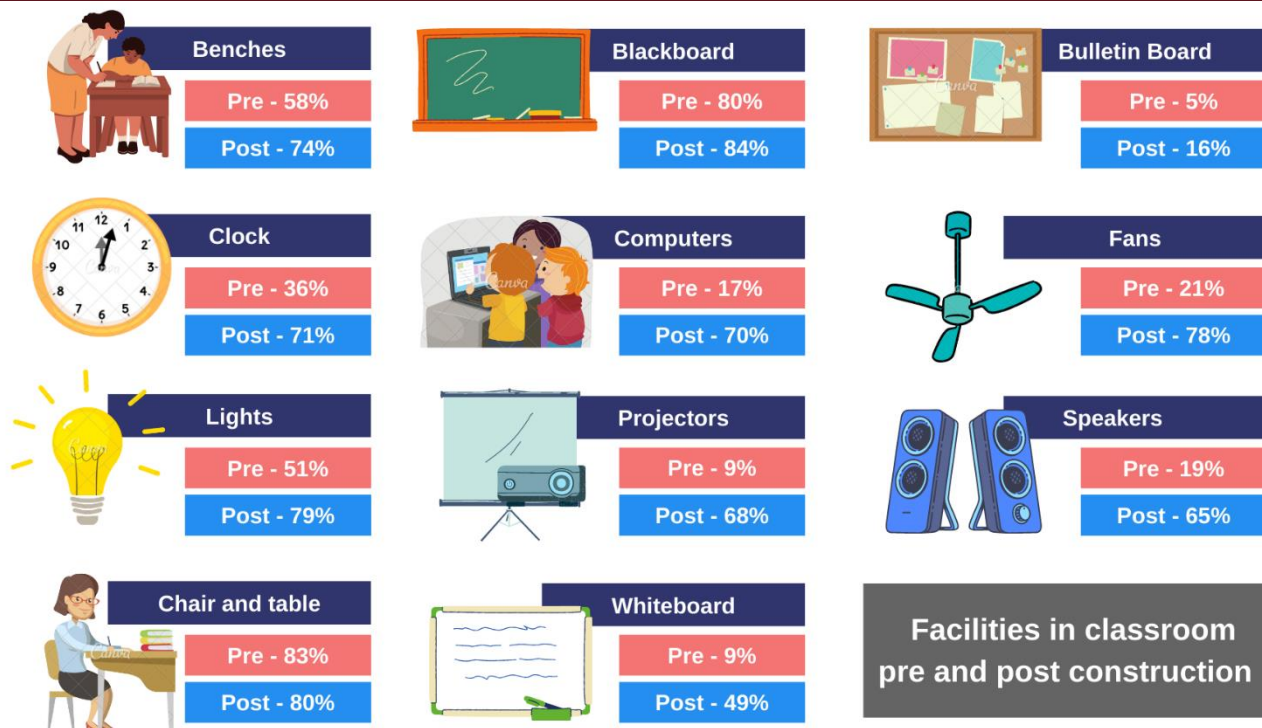
E-Classrooms

The increase in computers and projectors in class is due to Empathy Foundation's vision of e-classrooms. These classrooms are for providing supplementary digital education to students, in a more creative, interactive, interesting manner. Such an initiative is also a quick response to the need of the hour, i.e. digital advancement and technologi\cal adaptation.

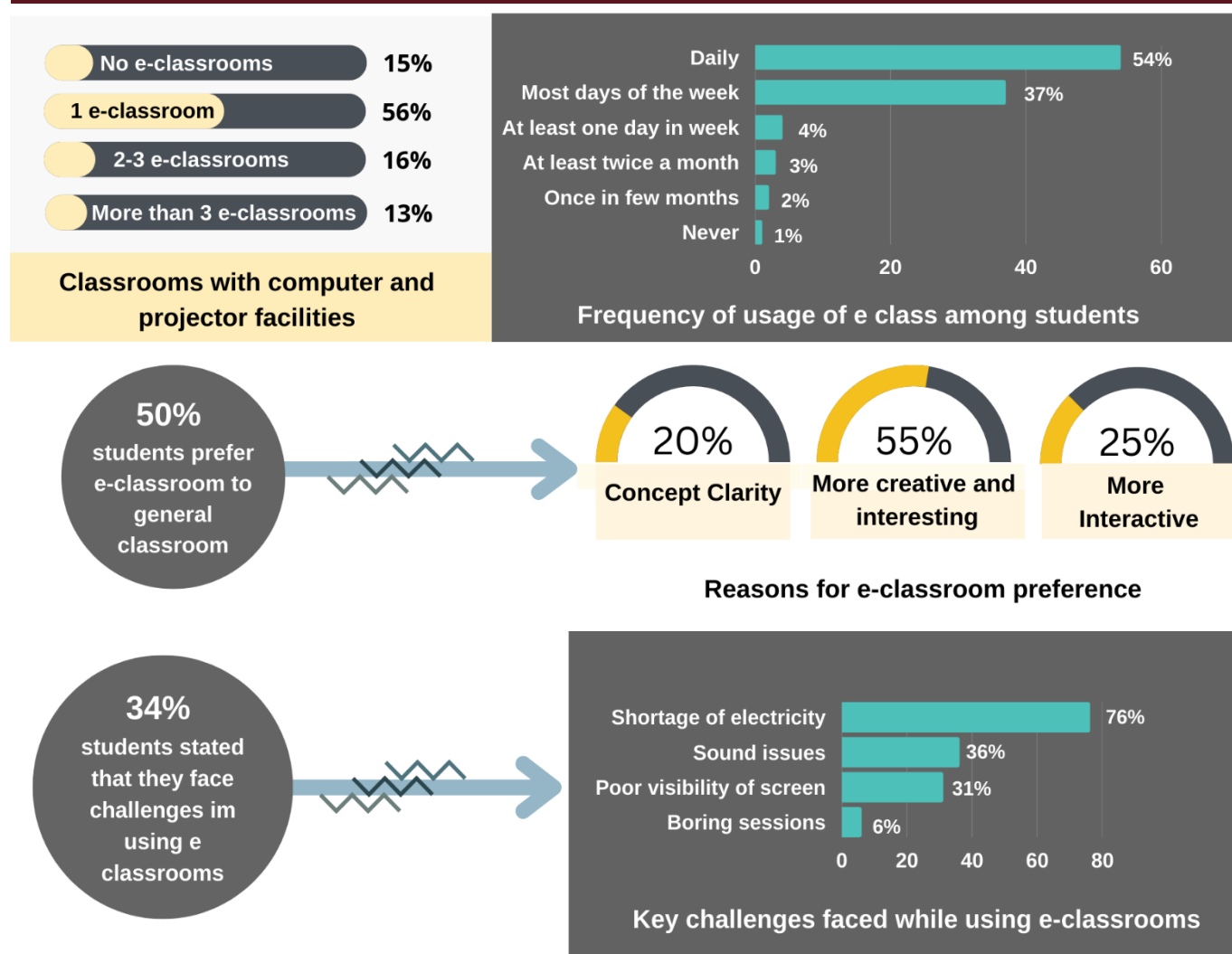When students were enquired about number of classrooms with computer and projector facilities, around 56% stated that they have one e-classroom, 16% stated they have 2 to 3 e-classrooms, and 13% stated that they have more than 3 e-classrooms. The allocation of e-classroom is more prominent in bigger schools, accommodating higher sections of students. Around 15% of the schools did not have any e-classrooms. Majority of the students (54%) stated that the e-classrooms are used daily, and 37% stated they are used most days of the week. This revealed high usage of the setup among teachers and students especially for teaching Science (94%).

Among all students with e-classroom facility, 50% preferred e-classrooms to general classrooms. They stated it to be more creative and interesting for learning (55%). However, some of the students also faced issues in e-learning setup due to lack of sufficient electricity (76%), sound issues (36%) and poor visibility on screen (31%).

Figure 10: E-classroom facilities in school

No e-classrooms — 15%
1 e-classroom — 56%
2-3 e-classrooms — 16%
More than 3 e-classrooms — 13%

Classrooms with computer and projector facilities

Daily — 54%
Most days of the week — 37%
At least one day in week — 4%
At least twice a month — 3%
Once in few months — 2%
Never — 1%

Frequency of usage of e class among students

50% students prefer e-classroom to general classroom

20% Concept Clarity
55% More creative and interesting
25% More Interactive

Reasons for e-classroom preference

34% students stated that they face challenges im using e classrooms

Shortage of electricity — 76%
Sound issues — 36%
Poor visibility of screen — 31%
Boring sessions — 6%

Key challenges faced while using e-classrooms

The parents' survey also highlighted the availability of e-classrooms with computers and projectors for learning. Some of them stated that it's the first school in the village, and nearby villages, to have e-classroom facilities.

When students were enquired on its effectiveness in understanding of concepts, 63% highly agreed with the statement, followed by 27% who agreed with it.

Is e-classroom effective in understanding of concepts?

Highly Agree	63%
Agree	27%
Not Sure	3%
Disagree	4%
Highly Disagree	2%
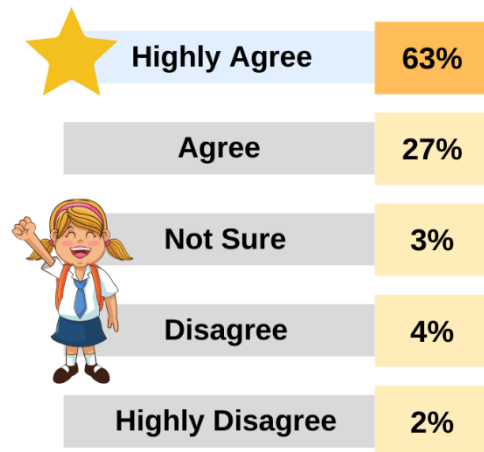
"It feels very good to learn in the school now-a-days. Since the fans & lights are on, it doesn't feel hot. The curtains make the rooms look beautiful and also keep the rooms away from direct sun light. The best thing is that we get our own classrooms, earlier, we had to share it with other classes too making learning very chaotic and crowded."- Arsh (6th standard) from Vidya Mandir Kavatesar, Shirol, Kolhapur

III. School Infrastructure

Apart from classroom, there are numerous supporting facilities needed in a school to facilitate a wholesome and comfortable learning environment for children. Prior to intervention of the Empathy Foundation, the Zilla Parishad and other aided schools, faced a lot of challenge in providing these bare minimum facilities to the students, such as separate toilets, and drinking water dispensers. The prevalence of strong foundation with concrete roofs, and walls was also low.

However, post the intervention of the Empathy Foundation, the average infrastructure available in school increased from 4 to 8, amounting to a 100% increase in the facilities provided. The schools with less than 5 facilities were 56% pre-construction, which became 10% post construction. Additionally, the schools with more than 10 facilities increased from 4% to 49%.

The most prominent increase of 57% was found in roof coverings, followed by computer labs (increase of 48%), staff rooms and library (increase of 47%), staff room (increase of 44%) and disability friendly toilets (increase of 42%).
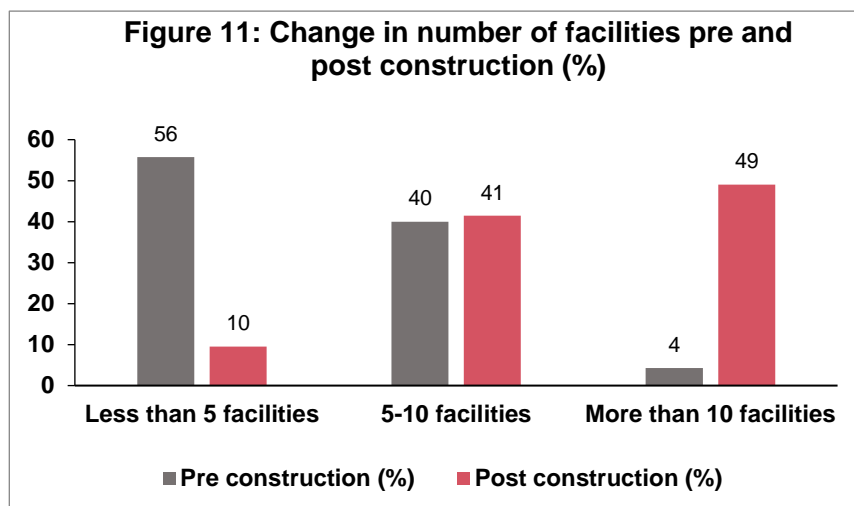
Figure 11: Change in number of facilities pre and post construction (%)

Legend: ■ Pre construction (%) ■ Post construction (%)

Category	Pre construction (%)	Post construction (%)
Less than 5 facilities	56	10
5-10 facilities	40	41
More than 10 facilities	4	49

Figure 12: Change in school facilities as per student's perception

Facility	Pre	Post
Boundary Walls	Pre - 25%	Post - 71%
Computer Labs	Pre - 20%	Post - 68%
Separate Toilets	Pre - 63%	Post - 80%
Disability Friendly Toilets	Pre - 24%	Post - 67%
Drinking water	Pre - 78%	Post - 84%
Electricity	Pre - 50%	Post - 79%
Concrete Roofs	Pre - 14%	Post - 70%
Staff room	Pre - 13%	Post - 57%
Ramps	Pre - 27%	Post - 70%
Library	Pre - 28%	Post - 74%
Playground	Pre - 56%	Post - 79%

Facilities in school pre and post construction
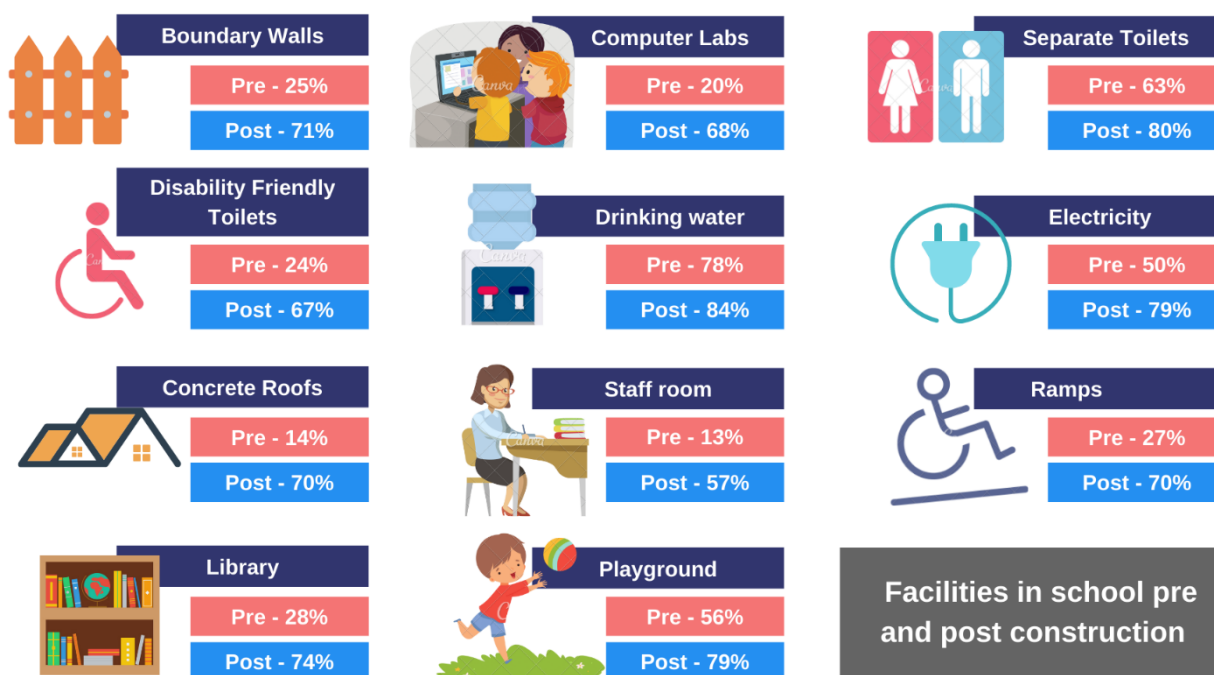
IV.   Water and Toilet Facilities

The Right of Children to Free and Compulsory Education (RTE) Act, 2009 under Section 19 provides for Norms and Standards for a school. The appropriate Governments have the responsibility and mandate to provide school infrastructure including drinking water facility and toilets in schools in accordance with the norms prescribed in the Schedule to the RTE Act, 2009 and respective State RTE. In compliance with the norms, the schools do provide facilities to students, but they are seldom sufficient. In certain cases, the water dispensers and toilets are not in working conditions, while in other cases, they are too less in numbers to cater the demand of children. In case of water, the water facility needs to be complemented with a filtration system to ensure clean water for the students.

The Empathy Foundation provided both water, and separate toilet facilities for girls, boys, and children with disability. In case of water, 76% of students stated that the outlets have increased and have clean waters provided due to filter systems. The number of outlets also increased considerably. Prior to construction, around 20% of students stated that their school did not have water facilities, however, after renovation, all schools had water facilities. More than 40% of the students stated that post renovation school had more than 6 water dispenser outlets. The relevance of providing school with water dispensers and filters was also reiterated in the qualitative answers of students. Several students stated that earlier the water outlets were fewer leading to crowd accumulation around the dispensers especially during lunch and sports time. This reduced their motivation to drink water. Additionally, they also faced challenges of irregular and unfiltered water. Some children also stated that they went back home to drink water.
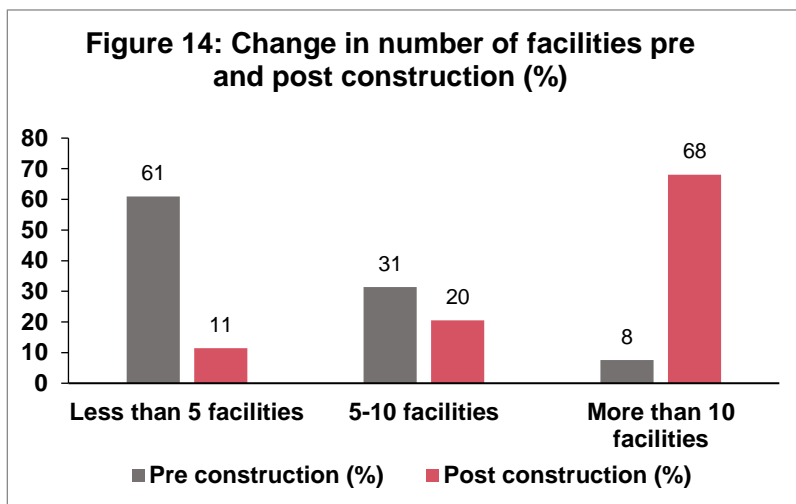

Figure 13: Change in water facilities as per student's perception
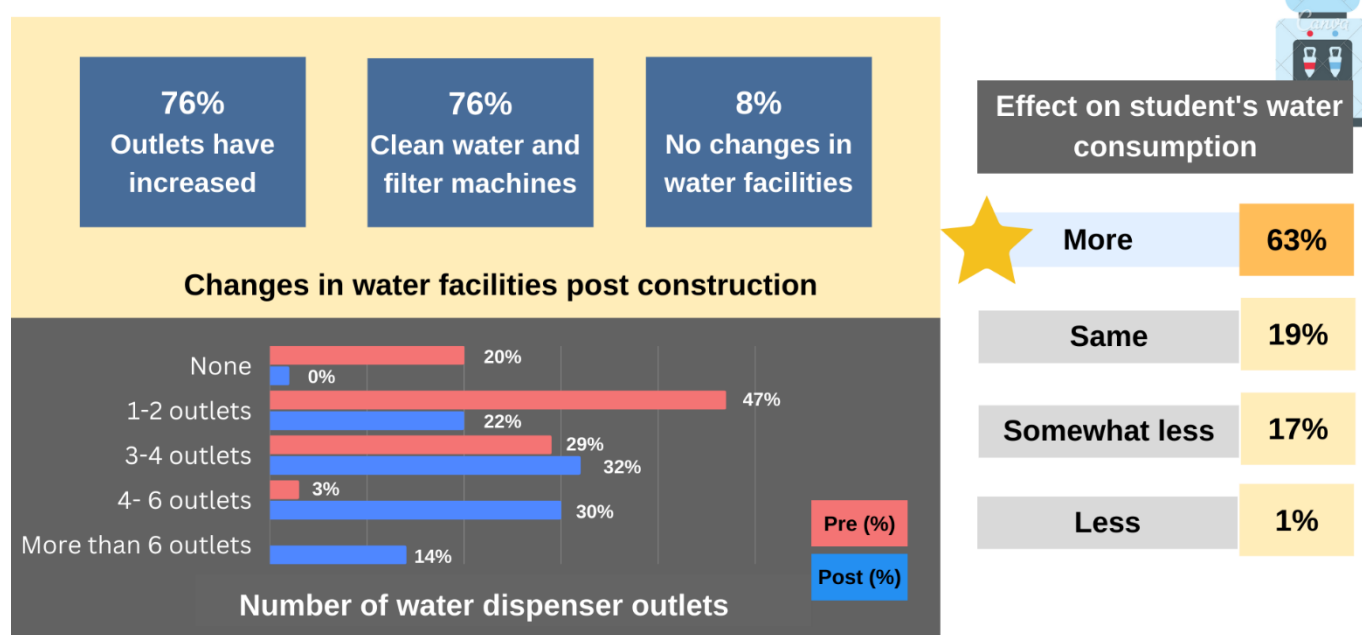
The presence of more water dispensers has increased the students' water consumption considerably. Most of the students find the water to be clean, and safe for drinking. Some students have also observed a decline in the cases of water borne diseases such as diarrhoea and typhoid. Few students also spoke about the impact of water dispensers in their sports involvement, "The presence of water dispensers is very useful while playing sports, as we get extremely thirsty." They also find the queue for drinking water to be short and manageable. The students also mentioned the change in cleaning habits of the school authorities, wherein, they clean the water tanks every 15 days.

However, in certain cases, the students stated that they have received new water facilities, but it lacked filter facility, affecting the quality of water disbursed.

In case of toilet facilities, prior to construction of new schools, 13% of schools did not have any toilets. However, post construction of new schools, all schools at least had 1 toilet. Around 53% had 3 to 4 toilets, and more than 20% of schools had more than 4 toilets. Several literatures on schools in India have proven that toilets alone are not sufficient to ensure usage and maintenance. There is requirement of supplementary infrastructure in form of water, functional doors, wash basins etc. to the minimum. The study found that in schools, post construction water was always available for 92% of the students. This case was only 32% before construction of new school. The cleanliness of the toilets also improved with 92% stating that the toilets are always clean, which was only 30% before construction.

Figure 14: Change in number of facilities pre and post construction (%)

Category	Pre construction (%)	Post construction (%)
Less than 5 facilities	61	11
5-10 facilities	31	20
More than 10 facilities	8	68

At an overall level, the number of facilities available to students post construction increased tremendously in comparison to pre-construction. In figure 15, it can be seen, that before 61% of students stated that they had less than 5 facilities, and after, 68% of students stated that they have more than 10 facilities in their toilets. These facilities are duly reflected in figure 16.

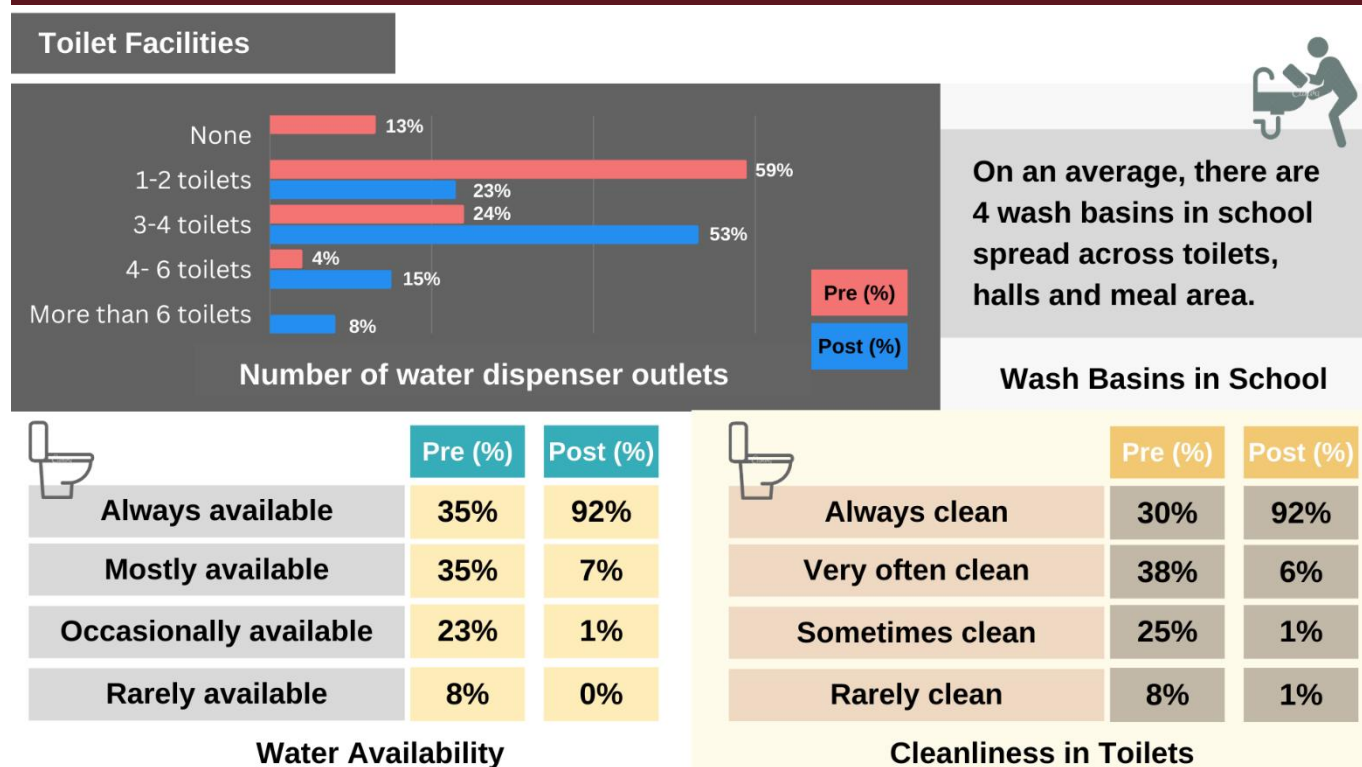**Figure 15: Change in toilet facilities as per student's perception**

Toilet Facilities

Number of water dispenser outlets

	Pre (%)	Post (%)
None	13%	
1-2 toilets	59%	23%
3-4 toilets	24%	53%
4-6 toilets	4%	15%
More than 6 toilets		8%

On an average, there are 4 wash basins in school spread across toilets, halls and meal area.

Wash Basins in School

Water Availability	Pre (%)	Post (%)
Always available	35%	92%
Mostly available	35%	7%
Occasionally available	23%	1%
Rarely available	8%	0%

Cleanliness in Toilets	Pre (%)	Post (%)
Always clean	30%	92%
Very often clean	38%	6%
Sometimes clean	25%	1%
Rarely clean	8%	1%

Figure 16: Change in toilet facilities as per student's perception

Buckets		Door Locks		Dustbins	
Pre - 73%		Pre - 41%		Pre - 27%	
Post - 87%		Post - 82%		Post - 80%	

Floor tiles		Flush		Functional doors	
Pre - 25%		Pre - 27%		Pre - 29%	
Post - 79%		Post - 81%		Post - 68%	

Lights		Mirrors		Sanitary Napkins Dispensers	
Pre - 44%		Pre - 17%		Pre - 12%	
Post - 89%		Post - 79%		Post - 62%	

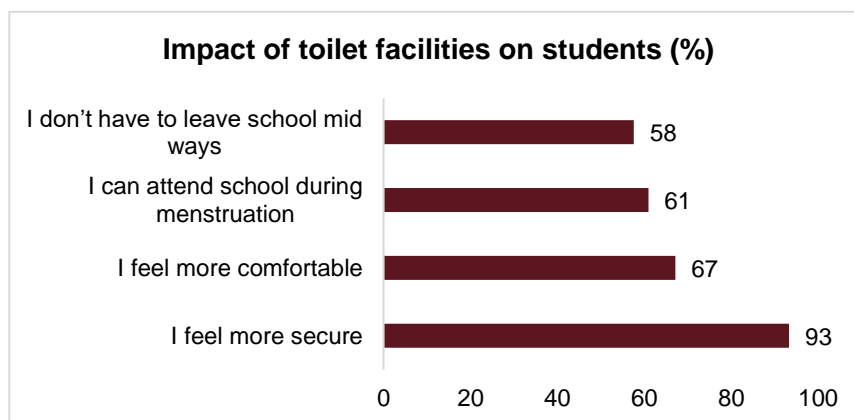| Soaps		Wall tiles		Water taps	
Pre - 22%		Pre - 16%		Pre - 77%	
Post - 81%		Post - 73%		Post - 91%	

The most prominent increase of 62% was found in mirrors, followed by wash basin (64%), soaps (increase of 59%), wall tiles (increase of 57%), flush (increase of 55%), floor tiles (increase of 54%), and dustbins (increase of 52%). Sanitary napkin dispensers were also installed in few girls' washrooms as stated by 62% of the girl students. This also experienced a 50% increase from before.

Prior to the constructions, the students faced considerable challenges for usage, some of which are as follows,

- ➢ Lack of toilets
- ➢ Lack of water facility, forcing students to take water from outside, and leading to unclean toilet seats.
- ➢ Locked toilets
- ➢ Choked and clogged toilets
- ➢ Less toilets leading to queues

The girl students especially faced challenge during menstruation and were likely to miss school for 2 to 3 days in a month. This was widely stated by all girls within menstruating age groups. Several children stated that they had to resort to either open defecation or leave school for the day for defecation affecting their education. As a result, the availability of toilet had huge impact on children. Around 93% stated that they feel more secure in school, followed by 67% who stated that they feel more comfortable in the space.

Impact of toilet facilities on students (%)

| Statement	Value
I don't have to leave school mid ways	58
I can attend school during menstruation	61
I feel more comfortable	67
I feel more secure	93

V. School Roof

The students were enquired about the school roof condition prior to the renovation and several of them stated that it was made up of tins. Even in cases, where the roof was made of concrete, it was extremely delipidated, and on a risk of breakdown. Leakage was a universal issue experienced by most of the students during monsoon. It is to be noted that most of these schools belong to the western parts of Maharashtra, which experience extremely heavy rains from months of June to September.

After the construction, the students stated that they received a building with strong foundation and concrete roof, capable enough to sustain natural disasters and challenges. The students felt safe, as they didn't fear the collapse of roof during monsoon. It has also led to uptake in student attendance.

Figure 18: Ability of school to withstand natural disasters
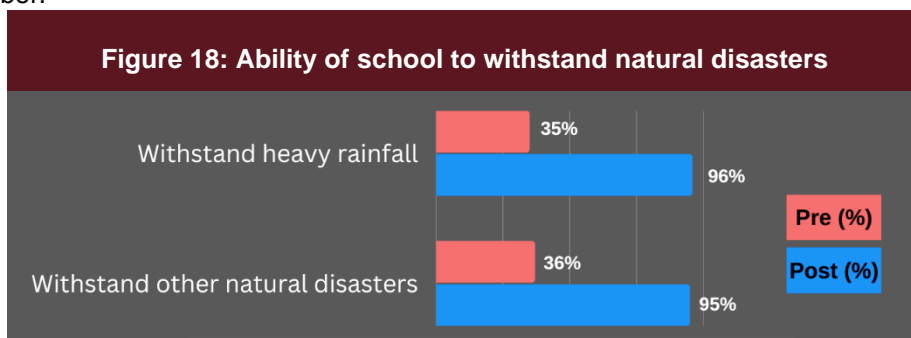
Withstand heavy rainfall — 35% / 96%

Withstand other natural disasters — 36% / 95%

Pre (%)
Post (%)

Around 95% students stated that the building can withstand heavy rainfall and other natural disasters after construction, while only 35% stated the same prior to construction of new school. It is to be noted that this is an extremely relevant and impactful change through the program of empathy foundation— as it provides secure building for the school safeguarding the right to life of children.
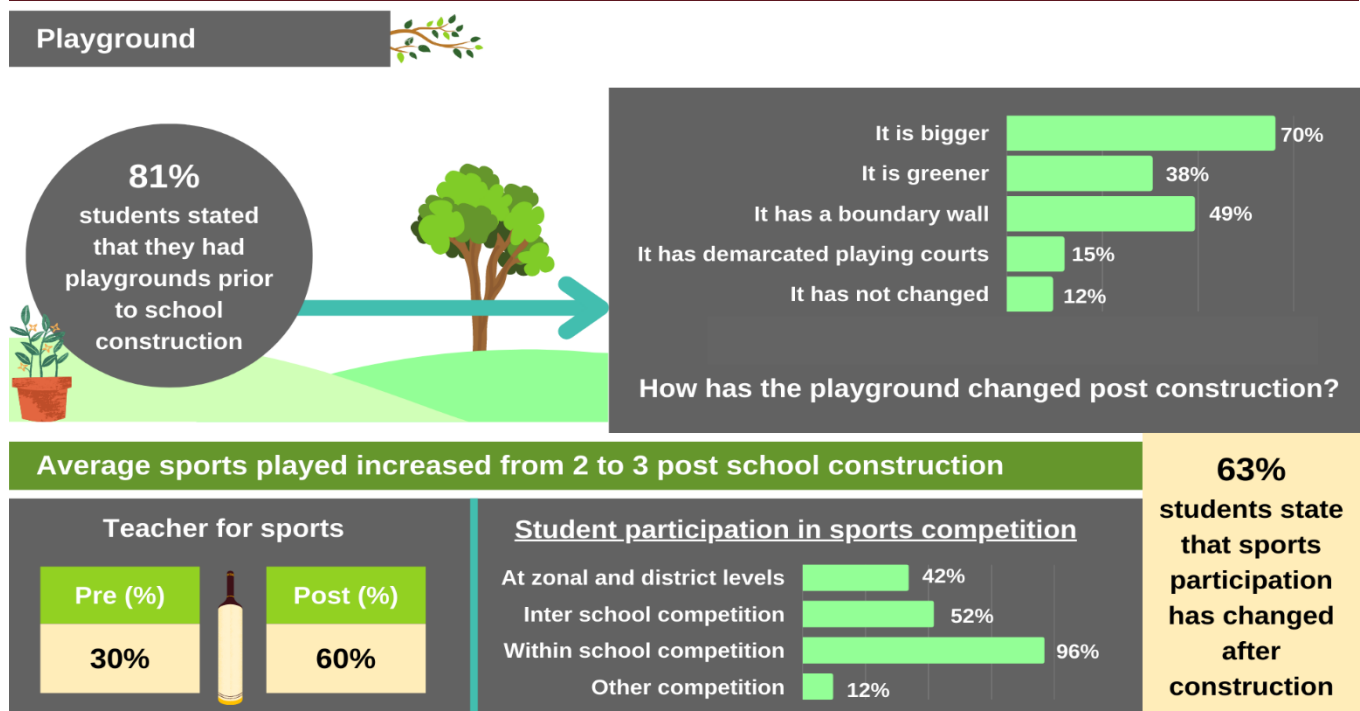
VI. School Playground

School playgrounds provide safe outdoor environments to students to engage into unstructured play. It enables them to use their creative energy and imagination, which facilitates the development of emotional, social and creative thinking skill. These skills are important for life but seldom taught in classrooms. Playing also develops children's self-confidence. Several research on student's skill development in playgrounds show that during play, children come across physical obstacle that frightens them at first, but by observing other kids tackling these physical obstacles and the enjoyment on their faces, each child experiments with their own approach. This assists the child in developing self-confidence.

Prior to the intervention of the Empathy Foundation, 81% of students stated that they had playgrounds in school. However, after the intervention, 70% of students stated that the playgrounds are bigger. The other changes experienced by some students are increase in greenery (38%) and development of boundary wall (49%). Around 12% however felt that there has been no change in playground.

Figure 19: Change in playground as per student's perception

Playground

81% students stated that they had playgrounds prior to school construction

How has the playground changed post construction?

It is bigger	70%
It is greener	38%
It has a boundary wall	49%
It has demarcated playing courts	15%
It has not changed	12%

Average sports played increased from 2 to 3 post school construction

Teacher for sports

Pre (%)	Post (%)
30%	60%

Student participation in sports competition

At zonal and district levels	42%
Inter school competition	52%
Within school competition	96%
Other competition	12%

63% students state that sports participation has changed after construction

The average sports played by children post school construction increased from 2 to 3, and it also led to hiring of more teachers for sport. The participation of children in sports competition also increased by 63%. The voluntary engagement of students in sports and games has increased considerably. Further, the formation of boundary walls has increased the participation of girls in games.
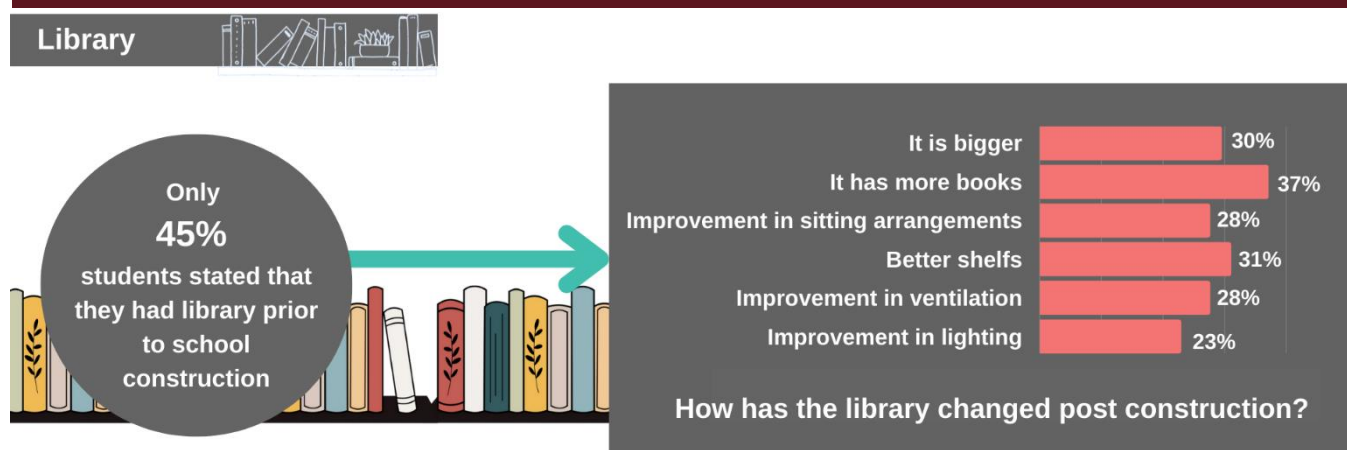
VII. School Library

For students to grow into functioning adults, they must have as much access to learnable resources as possible inclusive books, encyclopaedias, and computers. Hence, libraries are a crucial source of information for children in schools. It creates the essential habit of reading in students and assists in the development of the vocabulary, increases comprehension, and instils the habit of reading in silence.

Prior to the school construction by the Empathy Foundation, only 45% students stated that they had library prior to school construction. However, even after construction, only around 20% to 30% of the students stated that there are certain changes in the library such as in size, books quantity, sitting arrangement, shelfs, ventilation and lighting. These students appreciated the changes in library. One student said that "The new school library has more books, with better seating arrangements and lighting, which encourages us to read more." In several cases, the school library is merged with the computer labs.

Figure 20: Change in library as per student's perception

Library

Only **45%** students stated that they had library prior to school construction

- It is bigger — 30%
- It has more books — 37%
- Improvement in sitting arrangements — 28%
- Better shelfs — 31%
- Improvement in ventilation — 28%
- Improvement in lighting — 23%

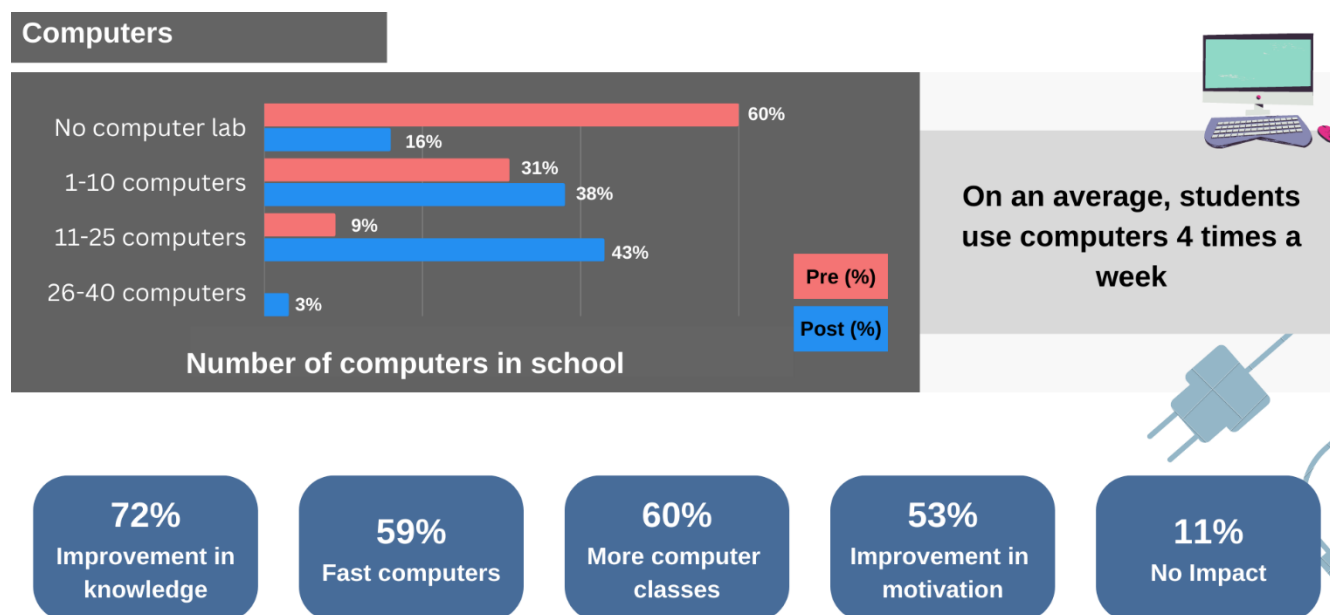How has the library changed post construction?

VIII. Computer Labs

In digital world, it is extremely essential for children to use and become familiar with usage of computers. It shall assist them to adopt the skills required in the real world and equip them to garner more knowledge and understanding from it.

The Empathy Foundation provided computer labs to schools to encourage computer education among young minds. The number of computers in school pre and post construction increased visibly. Earlier, 60% of the students stated that the schools had no computers, and even if they did, they had less than 10 computers as per 31% of respondents. However, post construction of schools, labs were constructed by the empathy foundation, and only 16% of the students stated that the schools had no computer labs. Around 43% of students stated that the school had at least 11-25 computers.

The availability of computers also increased the frequency of computer class, with the students using the computers, on an average 4 times a week. This improved their knowledge on computer usage. They also enjoyed the speed of new computers which motivated them to learn better.

Figure 21: Change in library as per student's perception

Computers

Number of computers in school	Pre (%)	Post (%)
No computer lab	60%	16%
1-10 computers	31%	38%
11-25 computers	9%	43%
26-40 computers		3%

On an average, students use computers 4 times a week

72% Improvement in knowledge

59% Fast computers

60% More computer classes

53% Improvement in motivation

11% No Impact

Impact of changes in computer labs

"We get to play games, learn MS office, and MS paints. It is really fun."- Sanchita (10th standard) from Jawahar Navodaya Vidyalaya, Kagal, Kolhapur

IX.   Disability friendly infrastructure

Education is a fundamental right, and as per RTE act, all children between age of 6 to 14 have the fundamental right to avail free and compulsory education without any form of discrimination based on gender, caste, creed, region, or disability. However, school construction in most cases tend to overlook the capabilities of physically disabled people, severely affecting the access of this group. The presence of a disability friendly school infrastructure can bring a lasting change in the life of disabled child and his household in the longer run.

Considering this, the Empathy Foundation has invested in disability friendly spaces in the school. The most prevalent infrastructure constructed are ramps as stated by 77% of students, allowing the students to comfortably move around on wheelchairs. There have also been lower locks on doors (61%), and accessible toilets (47%).

Figure 22: Disability friendly infrastructure in schools
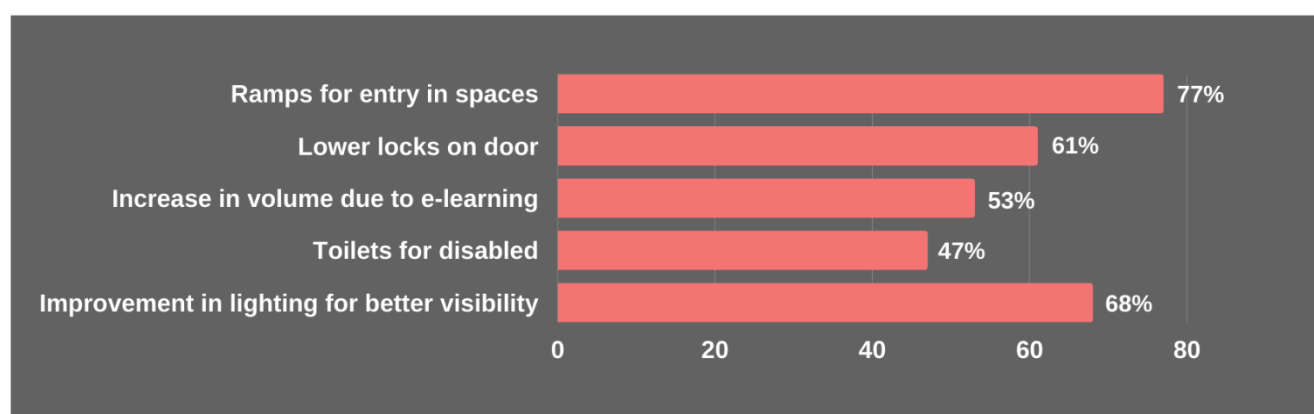
In qualitative discussions, the students felt that plenty has changed for students with disability, however, more efforts are required. They suggested different benches for their comfort in both, class, and computer labs.

X. Teaching Quality

There has been a consensus among educationists that school infrastructure affects the motivation and interest of teachers to engage with students. The teachers require their space to prepare for curriculums, classes, and rest. They also require water facilities, working and clean toilets, chairs to sit, fans, ventilation, lights, and ease of access to teaching materials such as blackboards, chalks, etc. to teach comfortably.

Teaching and learning are a two ways act, which requires motivation and willingness from both parties. Since infrastructure plays a crucial role in developing the same, it has the potential to positively affect the teaching quality. In our analysis, to map the change in teaching style of teachers pre and post construction, the students were asked to rate the teachers on certain parameters.

In all of the parameters, majority of the students ascribed to 'Highly Agree' rating followed by 'Agree' revealing genuine change in the teacher's approach. One of the most primal changes was shift towards e-learning by using digital tools such as computers and projectors, as stated by 93% (Highly agree and agree) of the students. The students also stated that the teacher's motivation was higher, and absenteeism was lower.
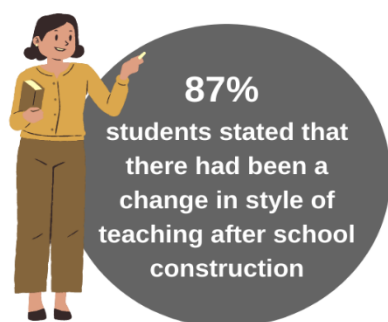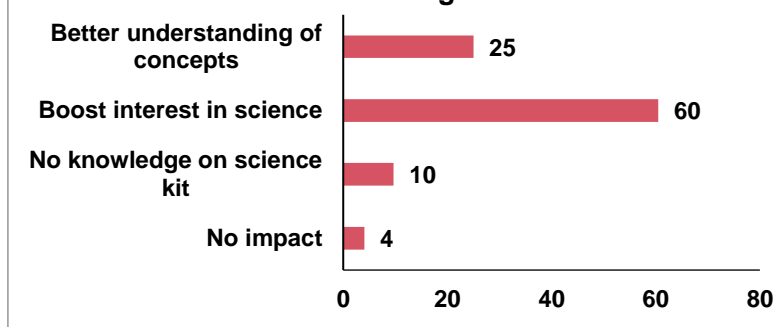
87% students stated that there had been a change in style of teaching after school construction

Figure 23: Rating of change in teachers' style of teaching

	Highly Agree	Agree	Not Sure	Disagree	Highly disagree
Teachers are more motivated	61%	25%	7%	4%	3%
Improved attendance of teachers	62%	31%	2%	4%	0%
Usage of E learning classrooms	64%	29%	1%	3%	3%
More interactive classes	62%	30%	2%	3%	3%
Usage of science kits	41%	18%	31%	7%	3%

Figure 24: Impact of Science kits on learning

Category	Value
Better understanding of concepts	25
Boost interest in science	60
No knowledge on science kit	10
No impact	4

The schools were provided science kit by the Empathy Foundation to boost students interest in science. These kits had equipments for conducting experiments and building scientific temper of students. Around 59% (Highly agree and agree) students stated that it is actively used by teachers to impart science education. Around 60% stated that it boosted their interest in science and 25% stated that it led to better understanding of scientific concepts.

XI. School Performance Rating

The students were asked to rate the school on various parameters after construction to map the impact of school infrastructure on key outcome indicators of school performance such as student attendance, student admission, understanding of concepts, student performance, student motivation, decrease in dropouts, community recognition and teaching quality.

In all of the parameters, majority (more than 60%) of the students ascribed to 'Highly Agree' rating followed by (between 20 to 30% of students) 'Agree' revealing attested change in schools' performance.

Figure 25: Ratings of students on generalized school performance on various indicators

	Highly Agree	Agree	Not Sure	Disagree	Highly disagree
Improvement in student attendance	66%	25%	2%	5%	1%
Increased student admissions	65%	27%	3%	4%	1%
Improved understanding of concepts	63%	24%	7%	4%	1%
Improved student performance	65%	26%	3%	4%	2%
More inclination to attend school	64%	27%	2%	5%	1%
Decrease in dropouts	66%	25%	3%	4%	3%
Decrease in girl dropouts	64%	27%	3%	4%	2%
Increase community recognition	62%	28%	6%	3%	0%
More fun in learning	65%	27%	1%	4%	2%
Improved teaching quality	66%	27%	1%	4%	2%

The discussion with parents also revealed certain insights on each of these parameters. In regard to student attendance, parents stated that good infrastructure reduces the child's discomfort to attend school by providing essential facilities and comfort, thereby, the resistance to leave school is less. It becomes even lesser when there are playgrounds, and other interesting activities for students to engage into, helping them make new friends and connections. The parents felt that increasing attendance, and decreasing dropouts, will eventually convert into better performances of students. They also appreciated the community recognition of school.

> *"Well established school brings a sense of pride to the village."- Manaji Bhola, Parent from ZP School Hattighat*

Analysing changes in school

To map the average changes 11 ZP schools were approached to provide data on certain important parameters such as number of classrooms (pre and post construction), number of teachers (pre and post construction), number of computers (pre and post construction), change in students admitted (pre and post construction) and number of e-classrooms.
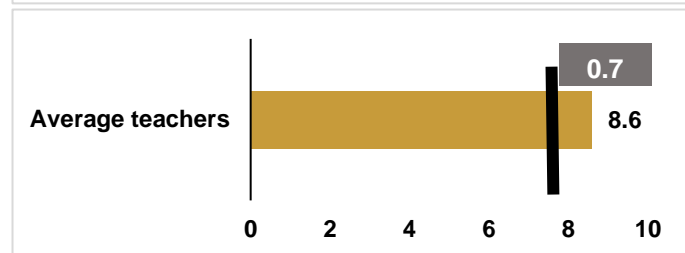
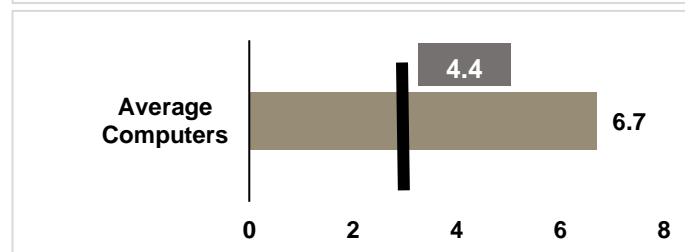The average differences between the parameters are taken to make an estimation on changes in school,

Figure 26: Average changes
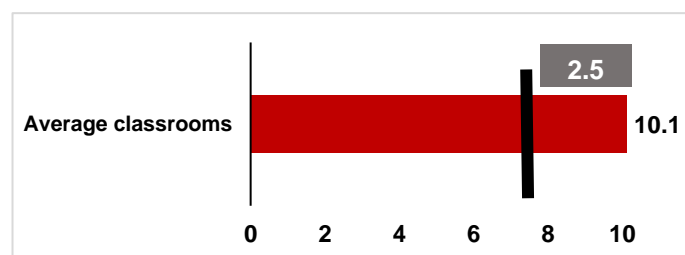
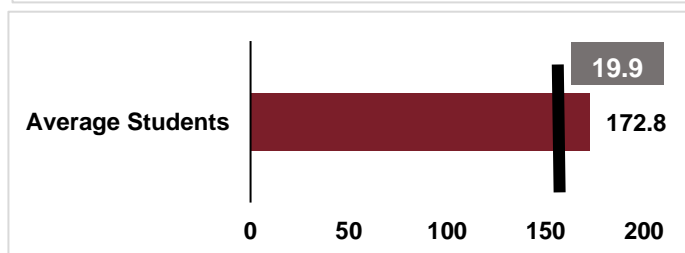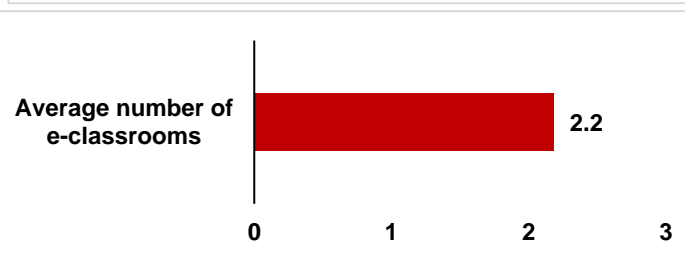| Parameter	Value	Change	Description
Average classrooms	10.1	2.5	Average number of classrooms in 11 ZP schools was 10. However, the distribution spread was wide ranging from minimum of 6 classrooms to 21 classrooms. Post construction, there was increase of 2.5 classrooms on an average in these schools. The difference spread was from -1 classroom to 8 classrooms.
Average teachers	8.6	0.7	Average number of teachers in 11 ZP schools was 9. The distribution spread ranged from minimum of 4 teachers to 24 teachers. These were however outliers. Post construction, there was increase of 0.7 teachers on an average in these schools. The difference spread was from -2 teachers to 6 teachers.
Average Computers	6.7	4.4	Average number of computers in 11 ZP schools was 7. The distribution spread was from minimum of 1 computer to 25 computers. Post construction, there was increase of 4.4 computers on an average in these schools. The difference spread was from 0 computers to 14 classrooms.
Average Students	172.8	19.9	Average number of students in 11 ZP schools was 173. The distribution spread was wide from minimum of 68 students to 324 students. Post construction, there was increase of 20 students on an average in these schools. The difference spread was from 0 computers to 58 students.
Average number of e-classrooms	2.2		Average number of e-classrooms in 11 ZP schools was 2.2. The distribution spread ranged from 0 to 7.

Stories of Change

**Z.P.School, Rajnapurna, Chandur, Amravati (School constructed in 2020)**

Two years prior to the intervention of the Empathy Foundation, the school infrastructure was declared "too risky" for usage by the audit committee. A government circular was also issued citing immediate need of vacancy. However, due to lack of alternate structures and funds, the school was functioning. There was fear within teachers, parents, and students.

The school administration and student management committee tried to avail funds from the administration, but it was extremely inadequate to meet the needs of the school and building. This led to protests from students and parents outside the school premises. At the same time, the situation was communicated to the Empathy Foundation, who visited the school, and decided to extend their support.

The protests led the Zilla Parishad to extend support for 2 rooms, and the rest 6 rooms were funded by Empathy foundation, along with 16 toilets and 8 computers. The local community also contributed INR 1.5 lakh for the school development.

All these changes not only saved the school but also increased its strength from 150 to 192 students. Additionally, the school is also selected for model school program by the Maharashtra government due to the increased enrollment, high attendance, and decent infrastructure.

- **Mr. Satish Malkhede, Principal in-charge of school**
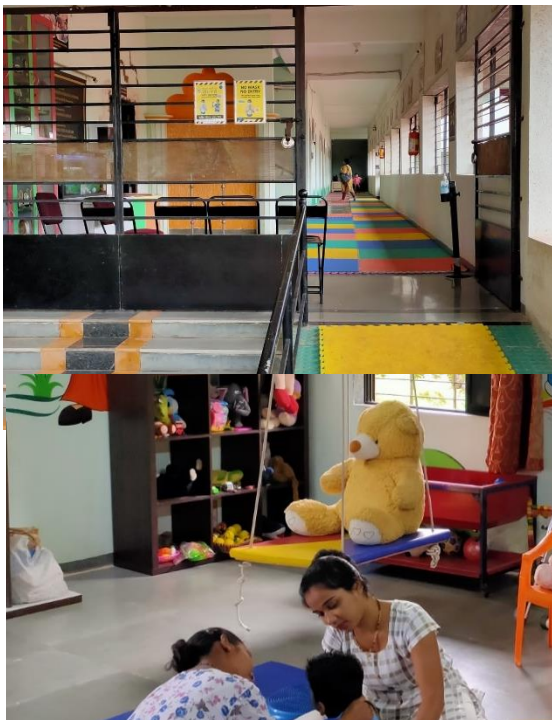
Suhit Jeevan Trust's Sumangal school for mentally challenged and multiple handicapped children at Pen, Dist. Raigad (School constructed in 2018)

The school was built to provide special education as per the needs of mentally challenged and physically handicapped children. The land for the building was provided by the government, however, the infrastructure development was a challenge. The school only had 4 classrooms to cater to the students. Since the children with specialized need require more space, the lack of rooms restricted the ability of the school to admit more children and to provide extra care to the existing children.

The Empathy foundation, in consideration of the issue, constructed 12 classrooms, a computer room, library and vocational training rooms. Empathy foundation also constructed systematic toilets for people with disability.

The changes increased the admissions in the school from 120 to 160. The school was also able to begin a new vertical, known as, early intervention center for children between 0-3 years who are diagnosed with autism, multiple disability, cerebral palsy etc.
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- **Ms. Surekha Patil, Principal of school**

Z.P.School, Asthane, Malegaon, Nashik (School constructed in 2021)

Prior to the intervention of the Empathy Foundation, the school infrastructure was woeful with weak foundation, water leakages and cracks. There was immense disbelief among parents and teachers over the longevity of the structure in face of crisis, such as heavy rainfall. Hence, during monsoon, the teachers conducted classes outside school.

The community was unable to receive assistance from the local government officials. That is when they reached out to the Empathy foundation, wherein, they contributed a sum of INR 4 lakh for infrastructure development.

The foundation built 6 classrooms, 1 headmaster's room, 1 computer room, e learning systems and 2 thousand litre water tanks. This was an upgrade over the previous 4 rooms and 1 common toilet school. These changes have led to remarkable growth in school enrollment increasing the student strength to 200 from 150.

The new school infrastructure is extremely novel for children from remote areas, and it makes me proud, that they will also get an opportunity to study in a good climate. The walls of the school building have the different concepts painted on them and it is viewed by the children every day improving their knowledge.

- **Mr. Daulat Magar, Principal in-charge of school**

Z.P. School Khairewadi, Tal Igatpuri, Nashik (Constructed in 2018)

To reach the tribal area of Khairewadi, one has to walk for 4kms through jungle, making the place extremely remote and devoid of attention from administration. However, the condition of the school was so bad, that in 2008-09, the ZP school had received grant of 7 lakhs for school development. Though, this amount was not sufficient to develop the school. The primary reason was regional challenges, making the labor and material cost expensive.

As a result, the teachers started taking classes in homes of the villagers. There were various distractions and disturbances faced by the teachers and students in the open. Hence, the teachers developed a makeshift school with leftover construction materials and tin roof. Meanwhile, they also looked for assistance, and came across Empathy Foundation.

The foundation approved the schools request and built 2 classrooms, 2 toilets for boys and girls, and solar panels.

- **Ms. Admane, Principal in charge of school**

Section II

The OECD DAC framework provides the guidelines to determine the merit or worth of an intervention. They serve as the basis upon which evaluative judgements are made. Under its ambit, the study will analyze the key components of the overall program.

I.   Relevance

The Empathy Foundation's program, of constructing school infrastructure for Zilla Parishad and other aided schools who have delipidated school infrastructure, is to provide safe space for children from remote areas and poor socio-economic background to learn and flourish. The evaluation revealed that the program goals were broadly consistent with the expected results.

The relevance of the program can be understated by the needs expressed by the schools, in terms of needs of essential infrastructure support.

1) **Existence of school with weak foundation and roof-** Multiple schools in our analysis stated that the earlier school was deemed unfit to deal with natural calamities and was on a verge of collapse. This issue itself marks the relevance of the program in terms of saving lives and providing quality education to children in safe and secure environment.
2) **Poor toilet infrastructure-** Most schools in our analysis had toilets, but they were plagued by multiple issues rendering them to be dysfunctional. They had broken doors, lack of water supply, clogged toilet bowls, etc. This disproportionately affected the girl children, with them leaving schools early and missing school days during menstruation.
3) **Lack of availability of quality water-** The analysis found that even though schools had facilities for water, they were extremely unclean and unfit for consumption. As a result, there was a need for drinking water facility with filtering process.
4) **Small and congested classrooms with no facilities-** The analysis found that the students did not find their classrooms pleasant as it was poorly ventilated, and lacked essential facilities such as fast fans, bright lights, well decorated walls etc. Other than that, the lack of classrooms and space in school forced the teachers to conduct two classes in the same room, making learning a messy and chaotic experience.

The construction of school to address these issues, among many, were most relevant in respect to the support provided the Empathy Foundation. They are also known to have a direct impact of learning, by affecting the child's attendance, attention, and motivation. These facilities are known to directly reduce the 'push factors' from school, thereby reducing resistance and encouraging student participation.

II.   Coherence

The Sustainable Development Goal (SDG) 4 aims to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." It consists of 10 key goals, among which goal 4.5 states that countries must eliminate all discrimination in education. The goal 4A states that countries must build and upgrade inclusive and safe school irrespective of socio-economic background. In congruence with SDGs, the Government of India adopted the National Education Policy (NEP) in 2020 to strengthen the child's right to free and compulsory education. Under NEP, the government intends to provide effective and sufficient infrastructure so that all students have access to safe and engaging school education at all levels from preprimary to grade 12.

As per the government, adequate and safe infrastructure include working toilets, clean drinking water, clean and attractive spaces conducive to learning, electricity, computing devices, and internet, library and sports and recreational resources.

III. Effectiveness and Impact

The effectiveness and impact of the program can be measured against the program goals and objectives of improving school performance and learning outcomes of children.

The school performance can be measured by taking into consideration various parameters along with marks, such as, school accolades, students' attendance, enrollment, participation in extracurricular activities, dropout rates etc. The evaluation attempted to map the effect of infrastructure on all these performance parameters, and the effectiveness of the program was evident.

- ➢ Several schools experienced a sudden increase in student enrollment and were also accorded or considered for the model school status from the government of Maharashtra, for which, increasing enrollment is a mandatory criterion.
- ➢ Some schools also received Swachh Bharat awards for maintaining cleanliness and developing green surroundings.
- ➢ Several schools received a lot of community recognition, and demand of admissions from nearby villages.
- ➢ Most schools experienced improvement in attendance levels of the students
- ➢ The children participation in sports competitions increased

Apart from these findings, the overall perception of the students and teachers towards learning and teaching has seen a shift with more engaging classes, usage of e-classrooms, science kits, etc.

IV. Efficiency

The Empathy Foundation's education program is efficient from the perspective of standardization in their approach. They duly map out the needs and requirements of school, and accordingly devise a plan for construction via hiring contractors and ensuring standardized and quality material use. This planning ensures timely construction of schools, and handovers to the students. Proper planning of structure also ensures durability of the building created.

Additionally, the program aspect of involving community or student management committees, for accumulation of certain amount of funds, and permissions from the administrations builds a sense of accountability among them to maintain and take care of the structures. In ZP School Rajnapurna, the teachers and community itself contribute for supplies for cleanliness such as soaps, toilet cleaners etc. to maintain the school.

V. Sustainability

The new buildings are constructed with an intention of long-term prevalence and sustenance. However, the other program constructions such as toilets, water dispensers, lights, fans etc. will require regular maintenance and care by the authorities. In such case, the sustainability of the program will depend on their enthusiasm. The Empathy Foundation can consider revisiting these schools for maintenance challenges, or they could ask the new schools to provide with maintenance plans.
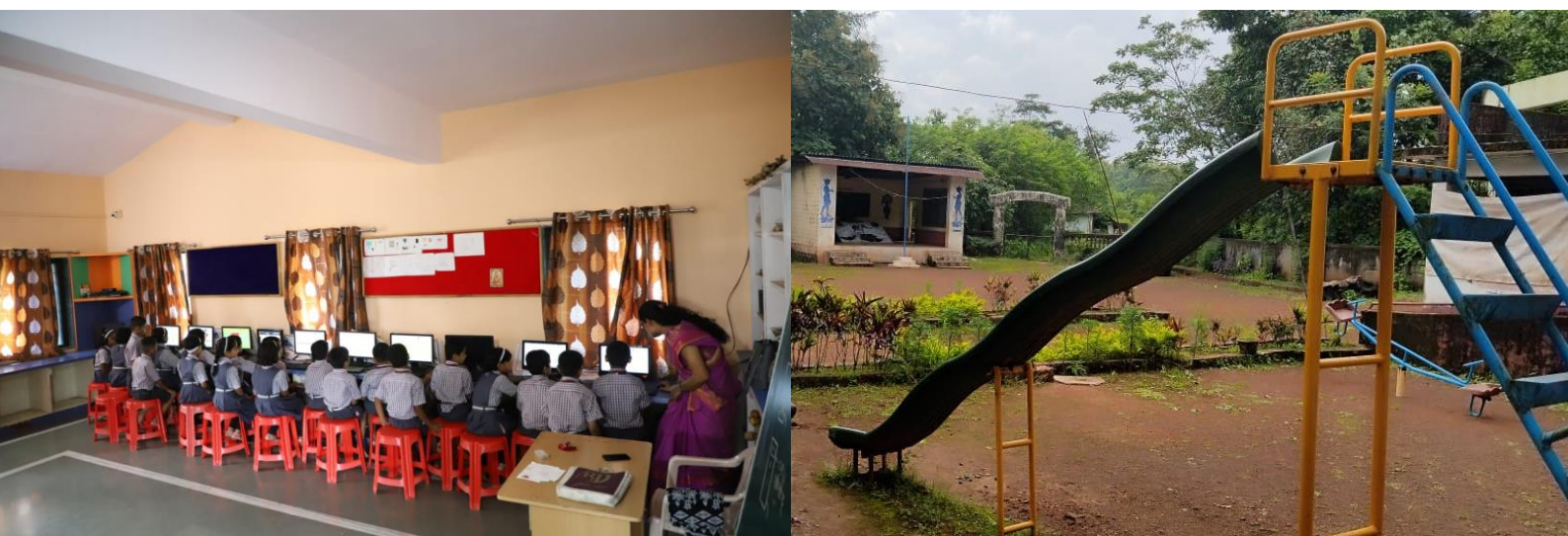
Conclusion

Accessibility and quality education is the primary right of every child to maximize their potential and experience upward mobility in terms of both, social and economic development. However, this access is skewed towards higher income groups and urban centers in India. The rural areas education systems are distressed with multiple challenges, even to gain primary education— with limited number of schools, lack of infrastructure and basic amenities, poor technology access and lack of funds. These issues bring forth resistance among children to learn and lead to learning losses and dropouts, especially in case of girls and children living in extreme poverty or food insecurity. Hence, providing better infrastructure and space for conducive learning the need of the hour. Prioritizing education in rural areas will not just demonstrate the progress of the communities at a micro-level but also contribute towards bolstering the region's economic growth by providing strong human capital.

In consideration of these issues, the work of the Empathy Foundation by building infrastructure for rural Zilla Parishad schools in Maharashtra is commendable. It takes into account the primary education needs of rural children, and accordingly facilitate action. The foundation recognizes the infrastructure gaps and need of expansion prior to developing the infrastructure. This unit specific approach instead of centralized approach in catering schools is efficient in terms of saving costs and time. Further the standardization in quality of materials used, and hiring of contractors with clear accountability, provides structure to the school infrastructure development program. This provides safe and secure learning place for children and motivates them to perform better. The good infrastructure facilities also attract more students to join the school, increasing enrollment rates and school relevance. However, it should be noted that since the Empathy Foundation's role is to develop the infrastructure for the community, the maintenance can be a challenge. The community members, student management committee's and Panchayat committees can consider taking up this role to ensure long and sustainable usage of the school infrastructure. The communities should be accountable since good education facilities empower their villages and children's future.

To conclude, the Empathy Foundation's work is well appreciated among the students, teachers, and community members. They have experienced the benefits of good infrastructure and do recognize the comforts better learning spaces can bring, in terms of improved attendance and motivation to learn. The situation also improves the engagement between teachers and students, allowing them space for free and creative thinking, while not thinking about infrastructure barriers and challenges.

Annexure

Sample schools

Sr.No	Name of The School	Taluka	District
1	Mukbadhir Vidhyalay Savedi	Tal-Dist-Ahmaednagar	Ahmadnagar
2	Z.P.School, Sarole Pathar	Sangamner	Ahmadnagar
3	Govt Madhyamik Mulinchi Ashramshala - Tembrusonda	Tal : Chikhaldhar	Amravati
4	Z.P. School Wadi Ratnagiri (Jotiba Dongar is the landmark)	Tal-Panhala	Kolhapur
5	Z.P.School Shirala	Amravati	Amravati
6	Z.P.School Hattighat	Chikhal Dhar	Amravati
7	Z.P. School Bhilkheda	Tal- Chikhaldara	Amravati
8	Vidya Mandir kavatesar	Shirol	Kolhapur
9	Z.P.School Vidya mandir Malwadi	Panhala	Kolhapur
10	Jawahar Navodaya Vidyalaya ,Kagal,	Tal- Kagal	Kolhapur
11	Maharshi Walmiki Vidhyalay Walhe	Tal- Purandar	Pune
12	Z.P.School, Ghatghar	Junnar	Pune
13	Z.p. School Bortembhe	Tal-Igatpuri	Nashik
14	Z.P. School Khairewadi	Tal Igatpuri	Nashik
15	Z.P.School, Dapur	Sinnar	Nashik
16	Z.P.School kotbel	Baglan	Nashik
17	Z.P.School Asthane	Malegaon	Nashik
18	Z.P.School Thangaon	Surgana	Nashik
19	Z.P. School Shivde	Tal-Sinnar	Nashik
20	Little Star Primary English School Usmanabad.	Osmanabad	Osmanabad
21	Suhit Jeevan Trust's Sumangal school for mentally challenged and multiple handicapped children at Pen, Dist. Raigad	Pen	Raigad
22	Z.P.School Bandhivali Shelu	Karjat	Raigad
23	Z.P. School Hativ No-1	Tal-Sangmeswar	Ratnagiri
24	Z.P. School Aapte	Tal-Panvel	Raigad
25	Z.P. School Kinjloli	Tal-Mahad	Raigad
26	Z.P. School Charai	Tal-Poldpur	Raigad
27	Z.P.School Newalewadi	Mahad	Raigad
28	Z.P.School Morgiri	Poladpur	Raigad
29	Z.P. School Khodad	Junnar	Pune
30	Poladpur Rayat school	Poladpur	Raigad
31	Z.P.School, Tejur Thakarwadi	Junnar	pune
32	Z.P. School Vadgaon –Anand	Junnar	Pune
33	Z.P.School Rajnapurna	Chandur	Amravati
34	Z.P.School, Village-Wadaj,	Tal-Junnar	Pune
35	Z.P. School Dhavadi-Amondi	Tal-Ambegaon	Pune