Impact Assessment

HANDS-ON SCIENCE EXPERIENCE PROJECT

Honeywell Hometown Solutions India (HHSIF)

Goodera

Powering the world of good

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1. EXECUTIVE SUMMARY

Introduction

The National System of Education in India is systematically structured from kindergarten to university, including institutions of technical and professional education and training. It requires that up to a given level, all students, irrespective of caste, creed, location or sex, have access to education of a comparable quality.[1] The reach of government primary schools in India is quite comprehensive at a little over 15,22,346 schools from primary to senior secondary in 2016[2]. India, however, routinely ranks quite low in international indices based on Science and Technology indicators.[3] For example, the World Bank's Knowledge Assessment Methodology and the World Economic Forum rank India poorly in global terms. Part of the contributing factors to this is the fact that the schools in India are still unequipped in terms of lack of qualified teachers, lack of infrastructure facilities including science and computer labs, high pupil-teacher ratios[4], lack of proper teaching materials and sometimes proper school premises. [5]

With this backdrop, Honeywell with Agastya International Foundation started the Science Experience program in 2016 aimed to foster their science learning through experiential learning opportunities among students with underprivileged backgrounds from Indian government schools. Later in 2020 & 2021, due to the COVID pandemic, the program has also supported virtual interventions among the children.

The project has multiple activities designed to promote science learning among the students such as Science centers, Mobile Science Labs (MSL), Young Instructor Leaders (YILs), Science Fairs, virtual interventions and digital content, Community outreach program and iMobile Labs to provide access to computers.

The program aims to **create awareness about alternative experiential methods** of learning and teaching science in order to promote **confidence and self-awareness among students**. It focuses on **fostering curiosity and abilities to explore, investigate, observe**, and constantly keep learning among the students through various **scientific concepts and their application**. The Project activities and interventions are spread across 25 science centers and 35 Mobile labs in 10 cities covering 7 states in India. The total **beneficiaries are 1,50,163 students** including 3000 student Youth In Leadership (YILs).

The impact assessment study is conducted to understand the experience of all the stakeholders in the project, and to measure the impact and outcomes it has brought towards promoting science learning among students. A **Logical Framework Analysis** was conducted initially against the **expected theory of change**, to understand the **measurable parameters and indicators of output, outcome and impact**. A mixed method was used in the study which involves collecting and analyzing quantitative and qualitative data. Interviews and surveys were conducted with all the stakeholders of the program as per the derived sample size for each. Descriptive

[1] *Science Education for Diversity: Wp2 India Report published by Homi Bhabha center for Science Education, Tata Institute of Fundamental Research 2010, Accessed on 6th October 2021 https://www.hbcse.tifr.res.in/data/pdf/sugra-publications/sed-wp2-india-report/view*

[2] *EDUCATION - Statistical Year Book India 2017 published by Ministry of Statistics and Programme Implementation, accessed on 6th October 2021 http://mospi.nic.in/statistical-year-book-india/2017/198*

[3] *India Science Report – Science Education, Human Resources and Public Attitude towards Science and technology, published by National Council of Applied Economic Research, 2005, Accessed on 6th October 2021 https://www.insaindia.res.in/pdf/India_Science_report-Main.pdf*

[4] *Live Mint Article, 6th October 2021 – India's school system faces acute shortages of teachers, says UNESCO report, Accessed on 6th October 2021 https://www.livemint.com/education/news/indias-school-system-faces-acute-shortage-of-teachers-says-unesco-report-11633465243149.html*

[5] *Financial Express Article, 26th November 2018 - Why rural India still has poor access to quality education?, Accessed on 6th October 2021 https://www.financialexpress.com/education-2/why-rural-india-still-has-poor-access-to-quality-education/1393555/*

statistics, comparative analysis and content analysis were done to analyze and interpret the data collected. Student surveys were conducted with **156 students, 52 YILs and 4 volunteers** as part of the impact assessment by Goodera. Further a total of 11 interviews and 1 group discussion was held with relevant stakeholders such as the **school headmasters, Government Department officials, Agastya Program team, Honeywell program team and Agastya Finance team**.

The study found that the program has **been instrumental in instilling science knowledge, interest, confidence and curiosity** among the students. The **virtual learning** classes have provided the students an opportunity to continue studies despite the disruption of academic calendars due to the pandemic. This program has helped students develop their interest and learn science by applying scientific concepts and practicing experiments over and above theory. The program has constructively used feedback mechanisms to effectively adapt, innovate and reinvent the program activities. The program had plenty of opportunities for volunteering activity, which was effectively leveraged along with usual activities of interactions and workshops.
The major drawback is that the **program does not have a proper data collection plan and a sustainability plan.** The teacher trainings were given good feedback although **many have not practiced what they have learnt in the trainings**. Additionally, the study found that the **YILs did not have cognizance and a clear understanding of their roles and responsibilities.**

2. INTRODUCTION

One cannot underestimate the scope of science in today's world. Science is the backbone of human existence. The practical effects of science can be seen in motion everywhere. From path-breaking discoveries in atomic science to the discovery of newer vaccines in life science, to technological advancements in the field of communication, transportation and even weather prediction, science has left no aspect of humans untouched[6]. The development of science and technology in any country will be a key factor in determining its status and power in an open economy. In many parts of the world, science education occupies a comparatively insignificant place in primary-school education and unfortunately what is taught in the classroom under the label of science is often inadequate. The case is not very different in India.

India has a multi-layered formal education system with around 260 million students enrolled in more than 1.5 million schools and approximately 39,000 colleges and universities. Among that, the worst-hit sector continues to be primary school education, in terms of lack of equipped teachers, lack of infrastructure facilities including science and computer labs, high pupil-teacher ratios, lack of proper teaching materials and sometimes even a proper school premises. Although science centers and scholarships for pupils were introduced in many states

[6] *India Education – Science Education in India https://www.indiaeducation.net/science/*

to address these concerns in relation to science education, the situation has remained the same mainly because of the lack of flexible subject and course combinations and of classroom demonstrations, which has further stifled the joy of learning[7]. To imbibe science as a life & professional skill, children should have access to a primary science education that is engaging, interactive, and relevant.

With this backdrop, Honeywell, one of the biggest technology-based corporation in the world, having one of its five global pillar being the promotion of STEM education, has tied up with Agastya International Foundation, an NGO working with students on science promotion. Together they have started the Science Experience program aimed to develop creative-thinking and problem-solving abilities in children of underprivileged backgrounds in Indian schools and to foster their science learning through experiential learning opportunities and teacher participation. The program also tries to cultivate curiosity, nurture creativity and instill confidence among middle and high school students at government schools. Honeywell believes in investing in future scientists, starting from middle school aiming to create amenable students who accept science as an interest rather than a subject of their dislike, while Agastya came in with their rich experience, greater reach, scalable plug & play models and good rapport with government, which were necessary for a seamless implementation.

The spread of the COVID-19 disease across the globe and the consequent shutting down of schools with no clear reopening dates have necessitated that schools conduct classes remotely. The pandemic has transformed the old chalk-talk teaching model into one driven by technology. Virtual mode of learning comes with a lot of new opportunities and benefits, however, the questions about the preparedness of the education ecosystem and effectiveness of e-learning is still not clearly understood, particularly for a developing country like India. The challenges of online education are multifaceted. While India enjoys a wide geographic and cultural diversity, it also suffers from a huge socio-economic divide. Only a small part of the Indian population has access to online education right now.

Honeywell-Agastya Science Experience program has adapted itself and transformed its service delivery model into digital platforms and other multiple interventions with reach-out mechanisms amongst economically and technologically backward students having limited opportunities of continuing their education.

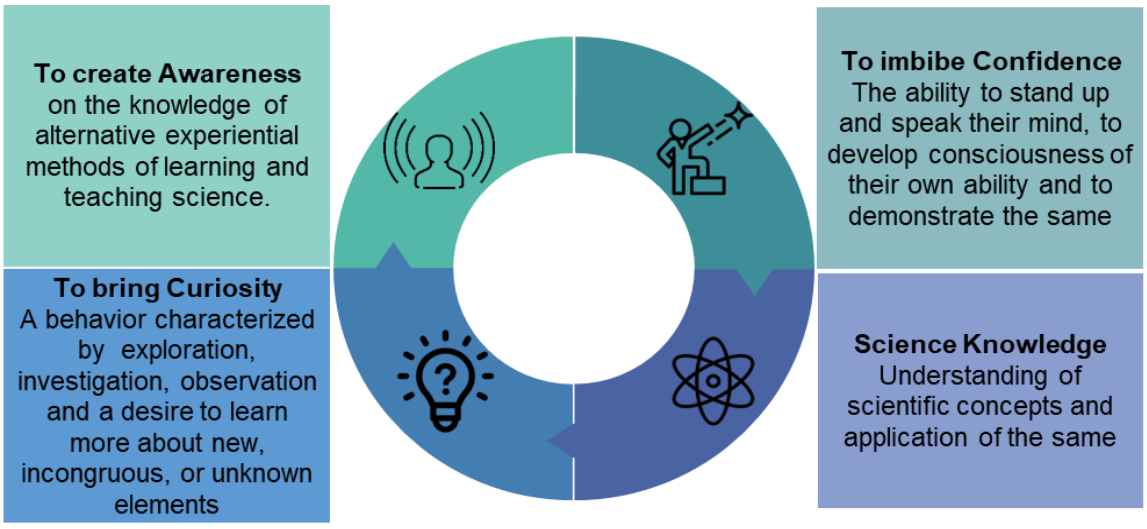
[7] Norman, Ssempa Nurudean; Singh, Surjit; Improving Primary Science Education in Uganda and India

3. PROJECT BACKGROUND

Honeywell Science Experience program is an integrated learning experience program launched to cultivate curiosity, nurture creativity, and instill confidence among middle and high school students at government schools. Through its uniquely scalable, hands-on teaching-learning methods, the program aims to develop creative-thinking and problem-solving abilities in children, foster children to learn science and improve teacher participation in experiential learning thereby giving a much-needed boost to science education. The project was commenced in the financial/academic year of 2016-17 and has been running for the last five years.

3.1 Project Objective

The science experience program is designed with four major impact objectives as illustrated below:



- The program envisaged increasing the access to practical, hands-on science education for the economically disadvantaged government school children.
- The program aimed to create an impact by sparking curiosity, creativity, critical thinking, and leadership skills among the underprivileged children
- The program supplemented the government schools with experiential learning.
- The program also focuses on training teachers from the government schools in hands-on pedagogy
- The programs tried to promote peer to peer teaching and learning methods
- The program indirectly helped the local schools with a strong and dynamic learning resource base
- The program aimed to catalyze local schools to improve their content and quality of education

3.2 Project Activities

The project has multiple activities designed to promote science learning among the students, they are:

- **Science Centres (SC):** The program uses the hub-and-spoke model, wherein science centres act as hubs where experiments will be exhibited for students and teachers from nearby schools and localities to visit.
- **Mobile Science Labs (MSL):** As the name suggests, these are vans with science experiments and necessary equipment in them to encourage students to perform experiments and learn basic principles of science. The mobile labs act as spokes, reaching out to students and teachers in more remote areas. The MSLs visit the schools within its territorial range in accordance with the plan decided mutually between the school and the MSLs. Each MSL will have one or two instructors in it, who will guide the students with doing the experiments.

- **Young Instructor Leaders:** Selected students are given trainings on leadership skills, communication skills, personality development. They are given more exposure to the program and are motivated to conduct peer to peer learning in their classrooms and even in their communities.
- **Science Fairs**: Platform for students to exhibit and explain their own-made science models.
- **Virtual interventions**: As a rapid response to the unprecedented lockdown the program shifted its service delivery entirely on digital platforms with its digital content creation, trainings and reach-out mechanisms amongst economically and technologically backward students having limited opportunities to continuing their education. This digital hands-on science learning experience were conducted amongst the beneficiaries with cost-effective platforms like WhatsApp, Google meet etc. with focus laid primarily on student engagement and learning continuity.
- **Community outreach programs**
- **iMobile Labs:** Access to computers
- **Impact Assessment tests:** Pre & post-program assessments are carried out through comprehensive assessment methodologies

3.3 Project Scale

The program was conducted in ten different cities as Delhi, Noida, Faridabad, Gurugram, Pune, Mysore, Bengaluru, Chennai, Hyderabad and Madurai. Approximate unique student outreach and YILs in each city are as given below:

City	No. of Science Centers	No. of Mobile labs	Unique students	YILs	Total Students + YIL
Hyderabad	3	4	11,888	500	12,388
Madurai	2	3	12,470	200	12,670
Chennai	1	4	11,410	200	11,610
Mysore	1	4	11,269	500	11,769
Noida	2	-	3,984	0	3,984
Faridabad	1	-	830	0	830
Gurgaon	2	1	5,133	250	5,383
Delhi-NCR	-	6	22,025	250	22,275
Bangalore	9	9	55,470	600	56,070
Pune	4	3	15,684	500	16,184

4. OBJECTIVE AND SCOPE OF STUDY

The study aims to understand the implementation pathways of the Honeywell Science Experience Program and its impact on the targeted beneficiaries, i.e the student community. The impact assessment study will try to capture whether each activity was conducted against the plan, how they were executed and try to quantify the outcome effects of activities among the beneficiaries and the collective impacts created by them. The major objectives of the study are as follows:

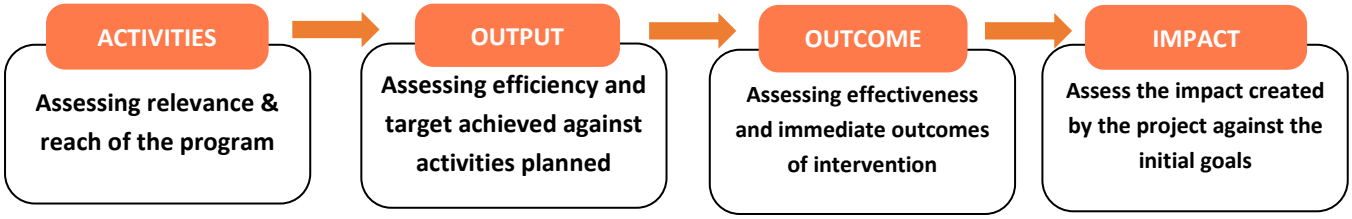
- To assess the impact of the intervention among the beneficiaries; How the program has brought about curiosity, confidence, science knowledge and awareness among the students.
- To precisely assess the mechanisms by which beneficiaries are responding to each of the intervention. Here, the study will try to understand what are the factors of the program that helped in creating an impact among the students in engaging with the program and what are the perceptions it has created
- To assess the relevance and efficiency of the intervention: to review the implementation pathways - assessing processes and activities
- To measure the awareness level of beneficiaries and other stakeholders about the program
- To understand the effectiveness of the intervention - How each activity has led to creating the desired outputs
- To understand the beneficiary and other stakeholder perspectives about the intervention
- To understand the major success factors and challenges in the intervention
- To find the areas of improvement across all the factors from program design to implementation and to provide effective recommendations

Limitations Of Study

- The study could not conduct the desired number of interviews and surveys due to the challenges faced in reaching out to many students. The study was only conducted with students' parents who own a phone (since the surveys are conducted through phone calls), and the ones who were willing to talk to the surveyors, which may have resulted in a respondent selection bias.
- The study can't capture long-term impact of the program among the students such as influence of a digital learning space on their further studies. This could be effectively done through a longitudinal study by tracking the beneficiaries regularly over a period before and after the they exit the program. Within the scope of this impact assessment, we can only assess the outputs and outcomes of the project activities undertaken as on date. The impact of the program in the long term will depend on the changes in the program model, stakeholder expectations and contributions and efficient management of threats.
- The scope of the impact study is limited to the Honeywell supported intervention and hence doesn't factor in the influence of any other interventions or happenings (exogenous factors) while analysing the impact of the program on beneficiaries.
- The study is conducted virtually, due to the ongoing COVID Pandemic and is not able to triangulate the findings through any physical school visits.
- Sampling is done within the available data and not with the total population

5. ASSESSMENT FRAMEWORK

The **THEORY OF HANGE FRAMEWORK** for the given program is illustrated below:



Activities	Input	Output	Outcome	Impact
Mobile Science Labs & Science Centres	Mobile Science Labs & iMobiles Science Centres	Students have access to hands-on science experiments	• More interest among the students towards learning science. • Improved science knowledge	Improved curiosity, confidence, and awareness on science education Improved level of science learning among students - pursuing STEM education for higher classes and later science related jobs
Digital interventions	Online classes	Students have access to classroom sessions in lockdown	• Learning continuity • Improved student engagement	
Training to Teachers	Training to teachers on Science & Experiments	Teachers are competent to conduct experiential based science classes Teachers are well versed with the Science pedagogy and content	• Better learning experience to students as teachers adapt the learnings in their classroom • Improved interest and knowledge about science among students	
Young Instructor Leaders	Young instructor leaders are selected and trained	Selected students are provided with leadership level trainings along with science focus	• Peer to Peer learning • Community level learnings	
Assessments	Pre & Post program assessments	Assessments are conducted and evaluated	Students and teachers can assess the performance and reorient accordingly	
Science Fairs	Science Fairs are conducted	Students have access to attend and exhibit in science fairs	• Improved confidence and exposure among student exhibitors • Inspiration for attendees to pursue similar models	

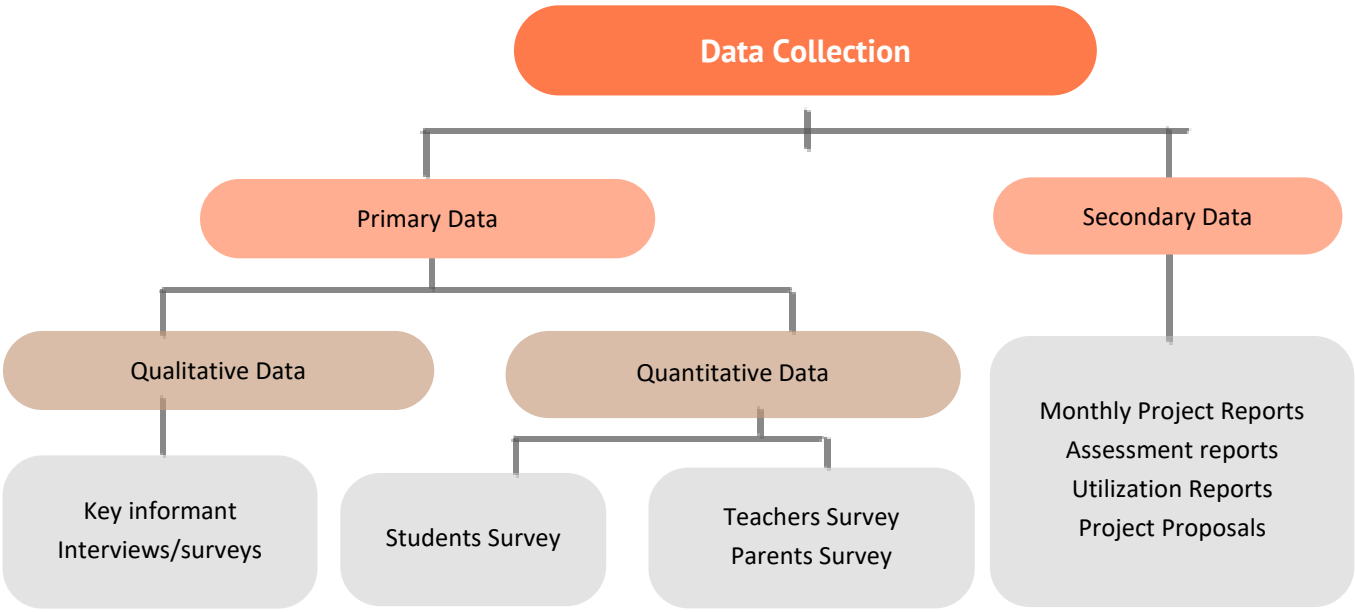
A **LOGICAL FRAMEWORK MODEL** is created against the identified ToC to reflect the identifiable indicators, means of verification and assumptions, as given below:

	Summary	Indicators	Mode of Verification	Assumption/Risk
ACTIVITIES	• Establishment and operation of MSL/SCs • Virtual Classes • Teacher trainings • YIL program • Science Fairs • Assessments	• No. (Number) of schools with MSLs/ SCs • No. of virtual classes conducted • No. of training programs conducted for teachers • No. of assessments conducted • No. of science fairs conducted	• Monthly reports • Proposal doc • Assessment documents	• Schools are interested in science experience program/ virtual sessions • Students have access to smartphones/laptops and internet • Assessments will help in proper evaluation
OUTPUT	• Students have access to hands-on science experiments • Access to virtual classes • Teachers are well equipped to conduct experiment-based science classes • Assessments are conducted and evaluated • Students have access to attend and exhibit in science fairs	• No. of unique students who got exposure to MSL/SC • No. of students having access to virtual classes • No. of teachers trained • No. of students taken assessments • No. of students attended science fair • No. of students with YIL training	• Students' attendance lists • Teachers' attendance • Attendance list of assessments • Attendance list of science fairs	• Science experiments will improve interest among students to learn science • Access to online classes and interesting content will increase the engagement and involvement of students.
OUTCOME	• Students are interested in science classes and experiments • Students are getting the best alternative learning platform through virtual classes • Students are engaging in the classes and completing their worksheets and tasks • Students are confident to attend fairs	• The level of interest for attending program and learning science • Interest level to attend online classes • Students are confidently explaining in science fairs • YILs are conducting peer to peer learning	• Impact assessment reports • Annual reports • Assessment reports	• Increase in interest level and engagement in classes will result in achieving better results in learning and education • Experiential learning will imbibe better curiosity and knowledge
IMPACT	• Students Improved curiosity, confidence, and awareness on science education • Students pursue STEM education for higher classes and later science related jobs	• Students learning level and science knowledge has improved • Continuity of education	• Impact assessment report • Classroom evaluation reports	

6. METHODOLOGY

A 'Mixed – Method Approach' is applied in the study, which ensures that factors such as processes, outputs and outcomes are captured in the study along with the impact. The mixed-method approach will include both qualitative and quantitative data capture and analysis. The **quantitative tools** would provide values to key indicators related to access, awareness, perception, outputs vs targets and outcomes perceived by the beneficiary stakeholders and the overall impact. Quantitative analysis is used to extract the data from students and parents. **Qualitative method** and approaches will provide a better understanding and help to build a storyline for the achievements and gaps in the program from the lens of immediate stakeholders involved in the program implementation, other than students and parents. A qualitative study gives substantiated evidence for a better understanding of the processes involved in the program implementation. The mixed approach thus helps in developing a framework for gap identification, enhancing inclusion and providing recommendations instead of mere calculation of outcome and impact parameters.

6.1. Data Collection



Secondary Data

For secondary data, the reports of the project were referred including the Monthly reports submitted by Agastya to Honeywell team. The reports have given insights about the project including the overall program structure, inception and implementation phase, processes followed, and feedbacks received. Other external reports in the likes of journals, articles and newspaper reports were studied to get an understanding about

the various interventions happening in science- related and online learning in India as well as around the world.

Primary Data

Primary data collection is key to collecting evidence from the beneficiaries and stakeholders on the intervention, the benefits and challenges and the analysis for recommendations to assess the impact it has created. The sample has been selected based on a quantitative and qualitative approach to ensure factors are both quantifiable (to capture and extrapolate the data to generalize the findings) and qualifiable ones.

Sample Size

The total population for the direct project beneficiary (students) is approximately 150000+. The sample size for conducting surveys and KIIs were calculated through the formula given below with a confidence interval of 95%, and a 5% allowable error.

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 N}\right)}$$

N= Total stakeholder population (taken as 35000)

z = Z Score (Z-score is the number of standard deviations a given proportion is away from the mean and 1.282 here corresponding to an 80% confidence interval)

e = Margin of Error (Percentage in decimal form; here taken as 0.055 (+/- 5.5% error)

p = likely sample proportion (0.5)

Calculated Sample size ~ 385 (This sample size was distributed among normal students (289) and Young Instructor leaders (96). Due to unavailability of stakeholders for response and other challenges, the final sample size was revised to 208 with 156 student surveys and 52 YIL surveys at a confidence interval of 85% and 5% allowable error.

Sampling Techniques

1. For students, a multi-stage sampling procedure was adopted to justifiably accommodate good representation students from each city into the study as described below:
   - Each city was considered a strata. A proportionate representation of each city was achieved through this without any bias in the result with good statistical precision.

- Within the schools selected an un-proportionate equal-size sampling was done to select the students (here the strata are defined as per their classes). i.e an equal number of students from each school and grades were selected.

2. For parents, a convenience sampling was done.
3. For teachers, an equal-size stratified sampling was done
4. For other stakeholders, purposive sampling was adopted.

Qualitative Data Capture

1. **Key informant Interviews:** Questionnaires are designed for each stakeholder interview. Questions out of the questionnaire relevant to the subject were asked and responses were captured. Stakeholders were selected through **Purposive Sampling.**

NO.	STAKEHOLDER GROUP	NO. OF INTERVIEWS
1	School Headmaster	2
2	Government Department	3
3	Agastya Program Team	5
4	Honeywell Program Team	1
5	Volunteers	4
6	Agastya Finance Team	Discussion

Quantitative Data Capture

1. **Beneficiary Survey (Students & YILs):** A structured survey questionnaire was developed, after considering multiple factors mentioned in the study proposal. The survey with students was designed to capture the access, interest, skills, perception, preferences, challenges, and experience of students in the science experience program. A total of 208 surveys were planned, of which 52 were with Young Instructor Leaders (YILs have all same questions as that of a normal student with few additional questions at the end)

2. **Parents Survey:** An objective-type survey questionnaire was developed for parents. The survey was designed to understand the awareness level of parents regarding the program, their engagement with the

students in study matters, their understanding of their child's interest and their perception of the benefits of such a program. A total of 12 surveys were done.

3. **Teachers Survey:** With teachers, the survey was conducted to understand their experience in training workshops, their perception and observations about the program and the outcomes they achieved through the program. A total of 38 surveys were done.

Data Collection

The collection of data was conducted by the investigators of Goodera through Google Forms. All the stakeholders were called through phone and the responses were fed into this platform. After capturing the data, it was further downloaded in .csv/ .xlsx format and cleaned before analyzing.

6.2. Challenges Faced

The study has faced multiple challenges is collecting the data from the stakeholders especially with student beneficiaries and Young Instructor Leaders. Given the COVID-19 circumstances the surveys were conducted through virtual mode of phone calls. The response rate against the number of dials and against number of connected calls were poor. A detailed summary of these statistics along with the reasons of not being able to complete the survey with the connected calls are given below:

Total sample size: 156 student and 52 YILs						
Stakeholder Group	Total Dials	Total Connect	% Calls connected	Survey Filled	% Surveys completed- Survey response rate	Project Benchmarks – Avg. Survey response rate*
Students	1,194	748	62.65%	143	19.11%	80%
YILs	469	326	69.51%	51	15.64%	85%
Total	1663	1074	64.58%	194	18.06%	NA

** Goodera Benchmark across projects of a similar nature*

Out of the 64.58% of calls connected only around 19% of them could materialize into survey form filling.

The reasons for these poor ratios are summarized below:

Stakeholder Group	Total Connect	Non-Responsive to survey				Survey filled
		Wrong Numbers	Not Interested	Do not Call	Call back	
Students	748	170	158	47	283	143
YILs	326	128	73	59	79	51
Total	1074	298	231	106	362	194
%	100%	27.75%	21.51%	9.87%	33.71%	18.06%

The study has **covered up to three calls per beneficiary** before dropping them from the survey. As shown in the table the major reasons for not filling the survey included a call back request, where the student was not near the parent who carries the phone. There were also a good proportion of calls where the surveyor was informed that the parent or student is not interested in the survey. **Around 21.5% of the dialed numbers were received by a different person** than the mentioned student or his/her parents. These were wrong numbers provided. Instances where the respondent asked the surveyor to not call again while not stating any particular reason for the same was also observed.

Overall, the data quality of the data with the contact details provided by the implementation partner was poor which was one of the major reasons of such a poor success rate of survey. Hence, it is imperative to establish a better M&E and data capture system.

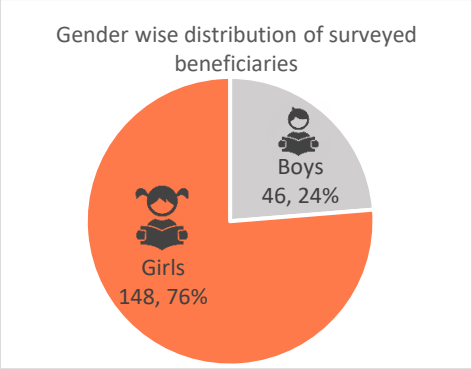
7. ANALYSIS AND FINDINGS

Descriptive statistics (basic features of the data like frequencies, counts, percentages), comparative analysis (before and after comparisons) and content analysis (for qualitative data to interpret and analyze unstructured textual content into manageable data) were done to analyze and interpret the data collected.

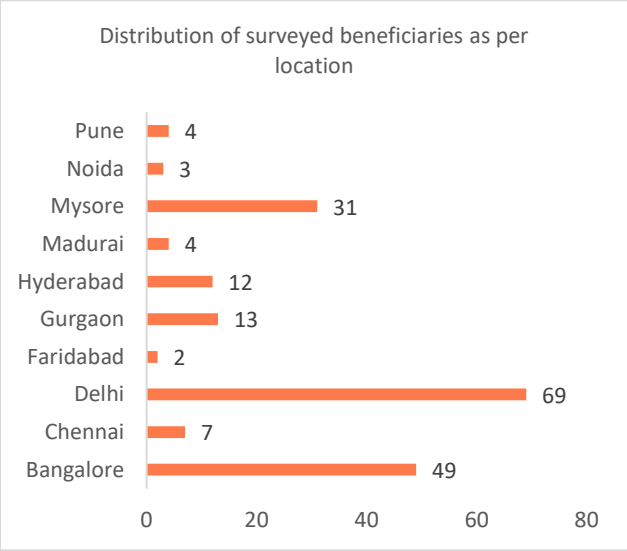
7.1 Students' Profile

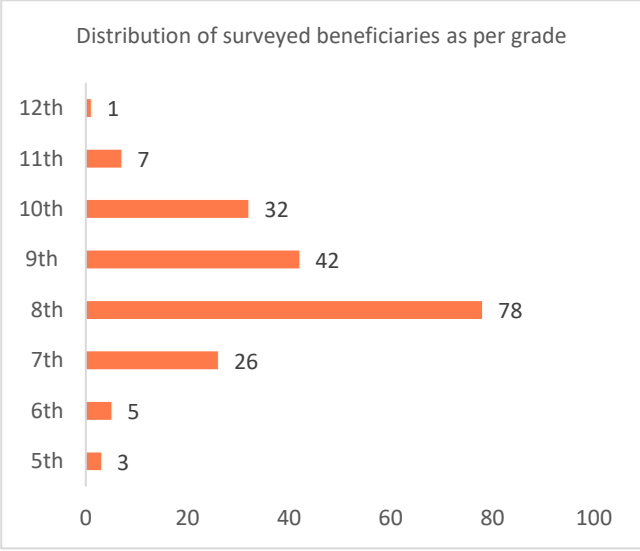
A total of 194 surveys were conducted with the students to understand their access to the programs, their perception of the progress they have achieved through the program, their interest areas, challenges they faced in the program, experience with the instructors and their overall experience.

Among the 194, 57 students were also part of the Young Instructor Leaders while others have participated in Mobile Science Lab, Science Centre or virtual interventions conducted by Agastya. **Among the 194 student respondents, 46 were boys (24%) and 148 were girls (76%).**

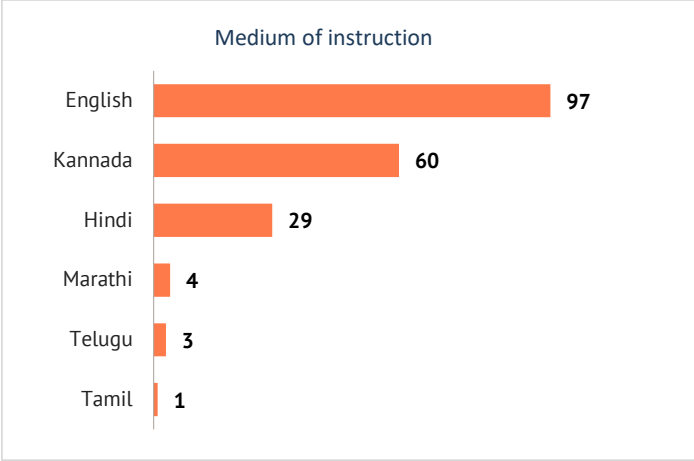


The programs were conducted in **10 different cities of the country**, with a different number of student beneficiaries from each. The study has tried to include the representation from each city.
Majority of the student respondents were from the three cities of Bangalore, Delhi & Mysore, comprising of around 77% of the total.





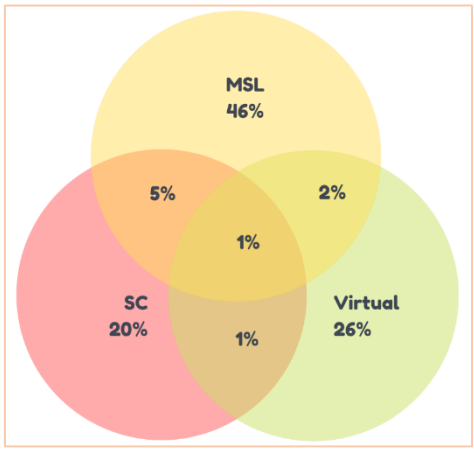
The program was conducted with the students studying in different mediums (language of conducting classes) given that the intervention happened in multiple states and cities of India. **Among the total 194 surveys, 97 were conducted with English medium students (50%),** 60 with Kannada medium (31%), 29 with Hindi medium (15%) and the rest 8 with Telugu, Marathi & Tamil Medium (5%).



Although the **programs are focused on students between 6 to 10**, given that the program happened in last five years, many are in different grades now. The survey has only tried to capture the present grade of the respondents and is as illustrated below

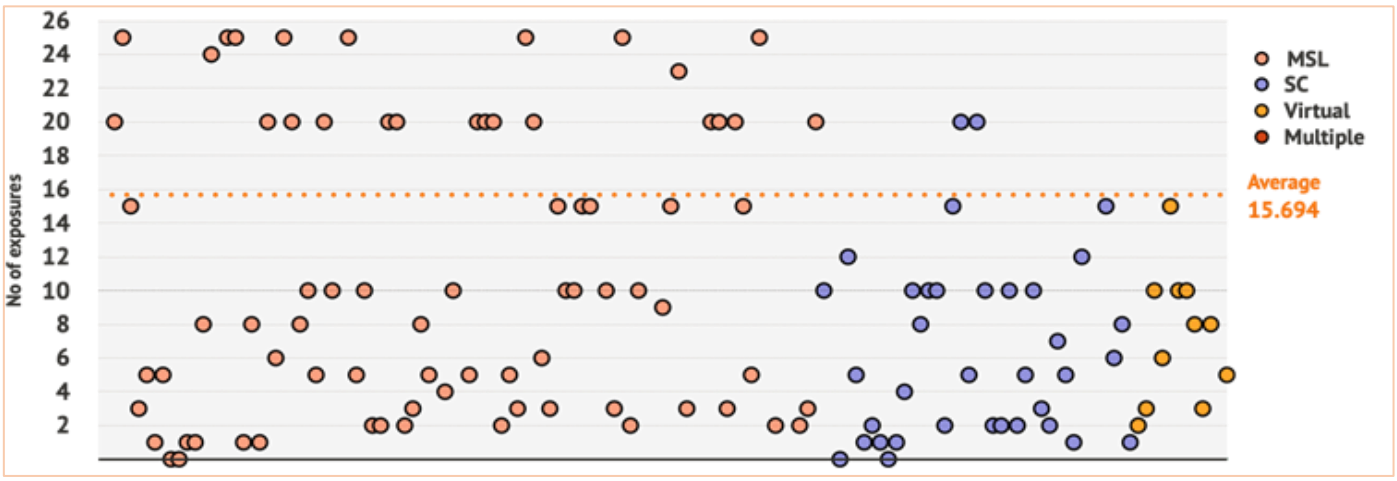
7.2 Students' Profile

The program has multiple projects and activities - most of which has been planned from the inception while some of them had evolved along time. The study has captured the specific interventions the students were a part of. Here it was noted that few of the students were beneficiaries of more than one program. **A majority of 46% of students were beneficiaries of the Mobile Science Lab (MSL) Program**, while 20% got exposure towards Science Centre (SC) and 26% of respondents got part of the virtual interventions. Apart from these specific interventions, there were also programs like iMobile (computer labs), innovation centres and community outreach.

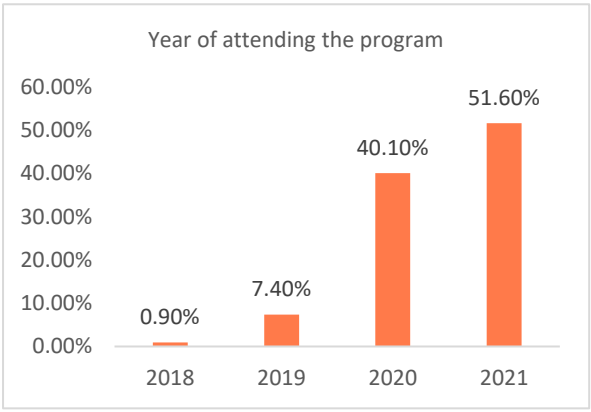


Instances of Exposures

The average number of times a student got exposed to any of these classes is calculated as 16. This includes mobile labs, science center and virtual classes. The scatter plot given below shows the number of times each student was exposed to the programs (few outliers excluded).



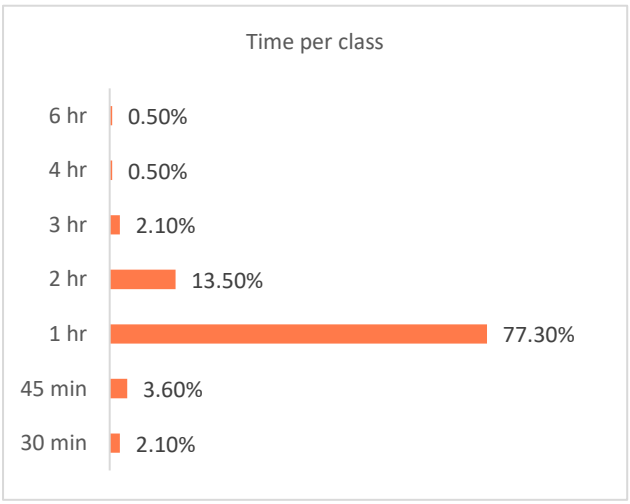
Year of Attendance

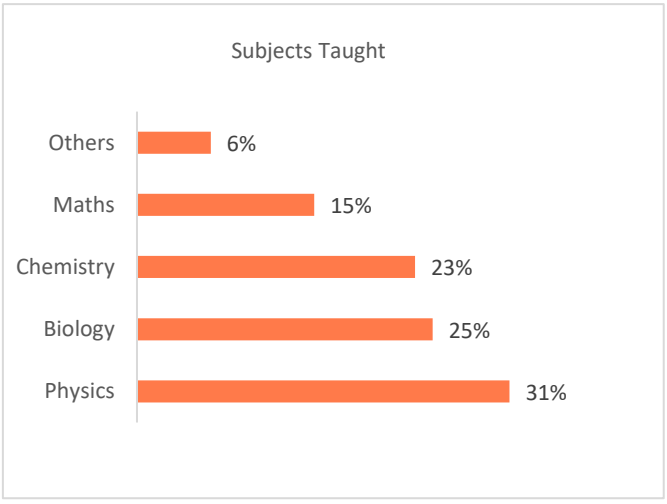


The intervention sponsored by Honeywell has been running for the last 5 years. The study has asked the respondents to mention their year of attending the program, and most of them were exposed to the program in the years 2020 & 2021. Here, around 18% of the students have attended in both 2020 & 2021, while around 2% attended in both 2019 & 2020.

Length of each class

The students were asked about the exposure time of each class in the sessions and a majority has replied that it lasted for one hour.





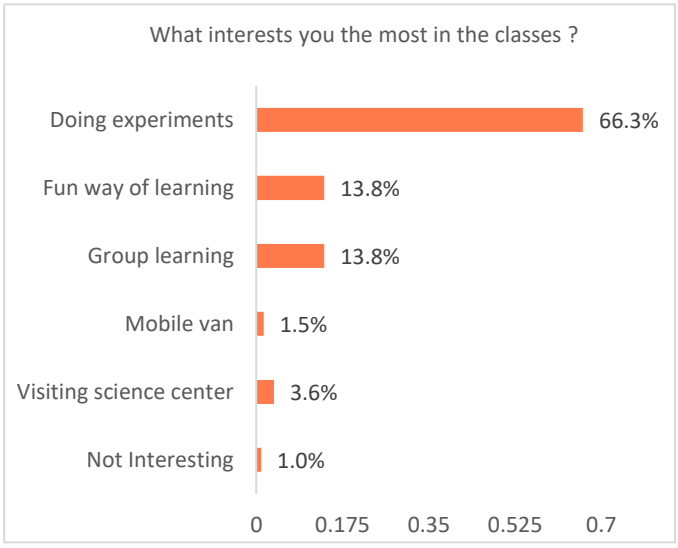
31% of the students reported that they were taught physics in the classes, while 25% said Biology was taught. The question was to understand the children's awareness regarding the subjects they were being taught through the science sessions. The answers were multiple and quite a majority recalled all the science subjects as the subjects taught to them.

7.3 Program Recall

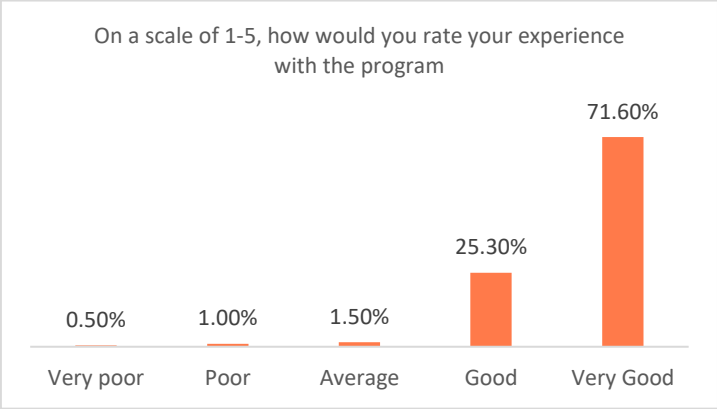
The respondents were asked to mention any three things that come into their mind when they hear about the Science Experience program. Most of the students responded with words like experiments, science, learning, activity, teachers etc. A word cloud is created from these words as given below. (Word Clouds are a visual representation of the frequency of words within a given body of text. The words that were repeated more are projected in larger fonts. The size of the font is proportional to the number of times that particular word was repeated in the answer.

7.4 Program Perception

The study has tried to understand the interest and perception of the students towards the program. **When asked if the program was interesting to you, a majority of 99% responded with a yes.** Performing different **experiments was the most interesting part for more than half (66.3%)** of the respondents. Around 13.8% of children found the sessions a fun way of learning, while group learning was the interesting factor for around 13.8% of them. Few of the students have responded that the mobile van or science centre itself was interesting to them.

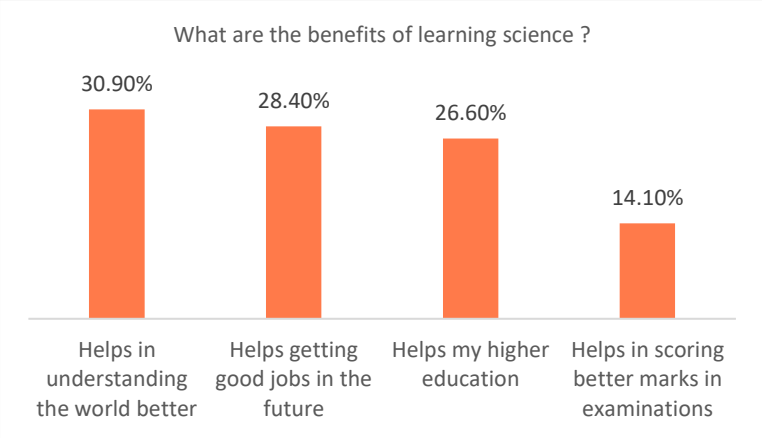


The students were asked to rate their experience with the program on a scale of 1 to 5, **and a majority of 71.6% has responded that the program was very good and gave a 5 score,** while around 25.3% has rated it with a four. The average score obtained from the responses was 4.66. Only a small proportion of students rated the program with a score of three or less.



Benefits of learning science

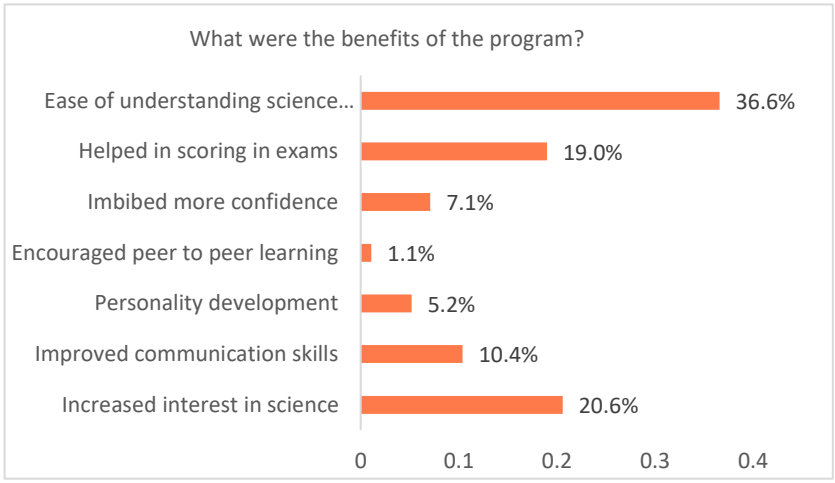
Students were asked to share their understanding and perception about learning science and how it will benefit them**. A majority of the students (30.9%)** said that it will help them in **understanding the world in a better way, while 28.4%** said it will **help them in securing better jobs in the future**. A good majority (26.6%) have also mentioned that this will help them in their higher education. Around 14.1% of the students think learning science will help them score better marks in the exam.



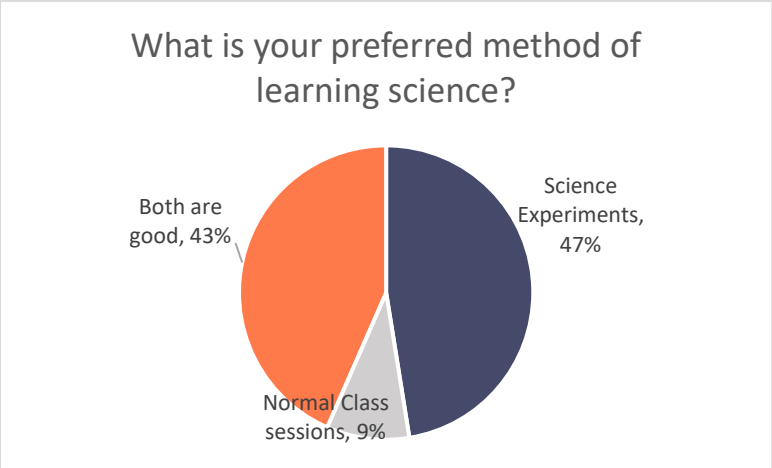
The study captured this to understand the idea of students on learning a subject, and it was clear that most of the students are seeing science as a medium to develop their skills and achieve greater things in life.

7.5 Program Effectiveness

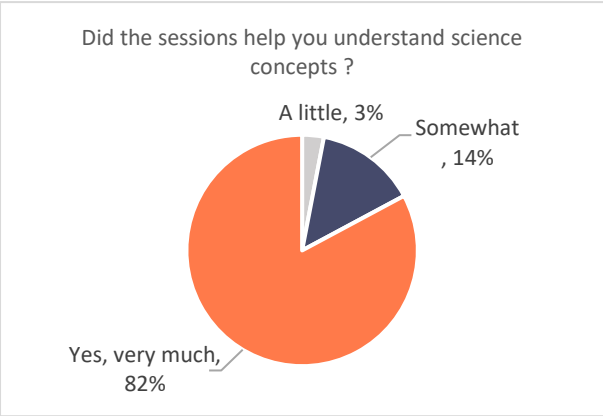
Program effectiveness was measured using multiple indicators, one of the major one being the improvements students have perceived to be achieved through the program. **The ease of understanding different science topics, which otherwise were difficult to understand was the major benefit that36.6% respondent reported.** A good proportion of students (20.6%) said that they have an increased interest in science due to the program activities. Due to the alignment of the program with the school curriculum, the program has also helped students to score better marks in the science exams (19%). Other benefits students have perceived to achieve through the program are more confidence (7.1%), personality development (5.2%), communication skills (10.4%) and peer to peer learning opportunities (1.1%).

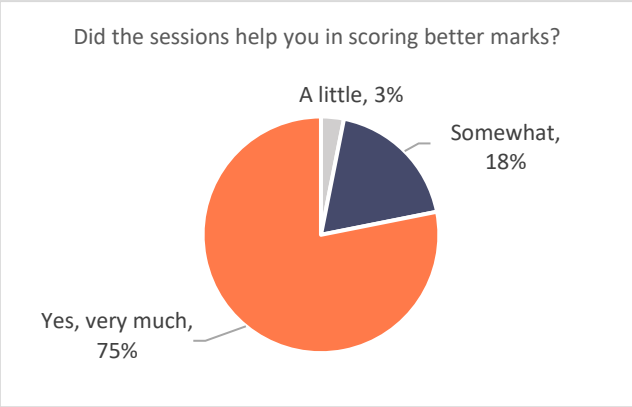


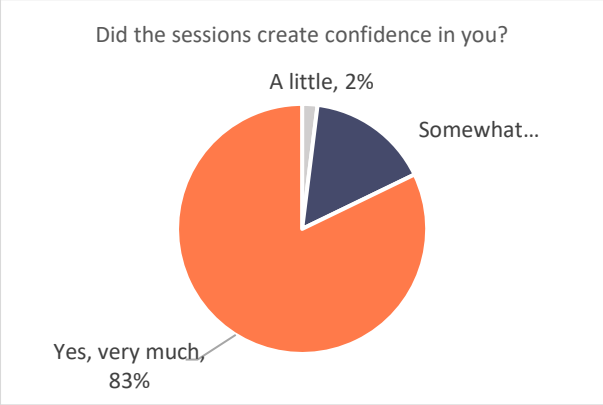
To understand the student priority, it was asked which mode of learning they prefer better. **47% said they prefer experiments**, while only 9% choose normal classroom sessions. The rest said both are good. When asked if they like to do science experiments, 92.3% of them said yes.

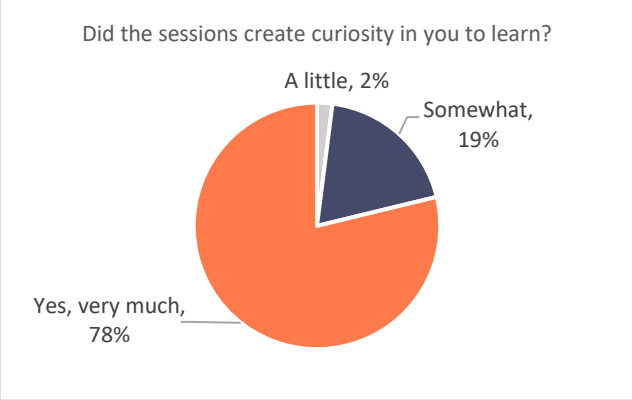


Students were asked a few more similar questions and the results are as given below:





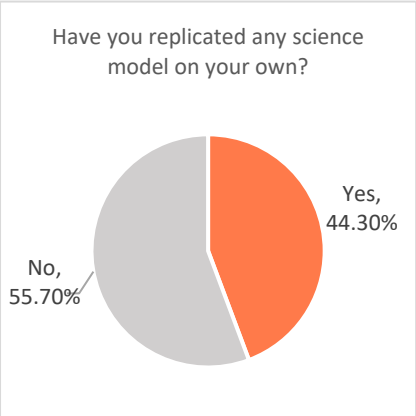


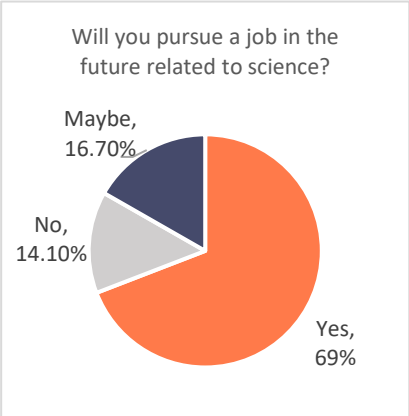


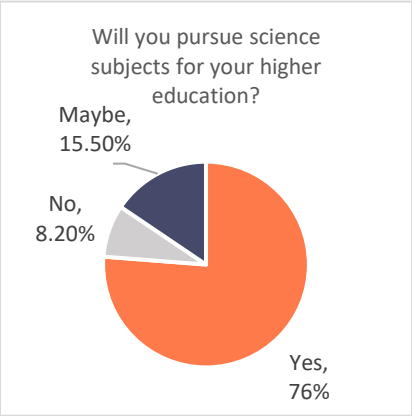
7.6 Program Outcomes

The study has limitation on capturing the long-term outcomes and impacts that could've happened through the program. To mimic such outcome indicators, the study has tried to ask students several questions regarding the changes they have brought in after the programs and the plans that they have for the future, which we can correlate as an outcome of the program. A few before-after questions were also asked to quantify the change that happens before and after the program.

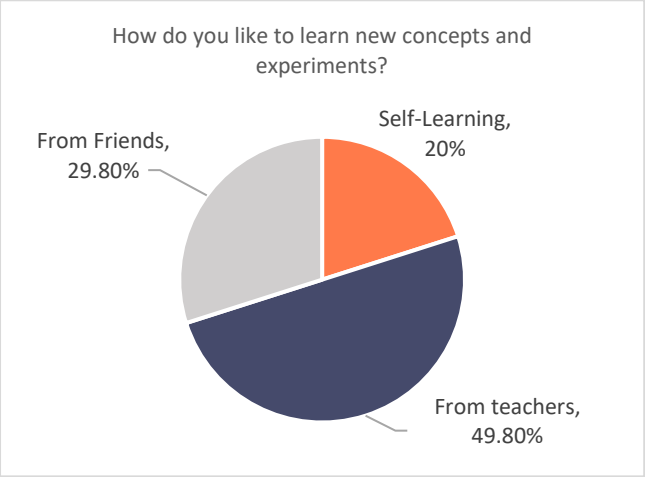
The students were asked if they have replicated any science model after learning from the sessions. Around 56% responded yes. This implies that a good majority of students have developed the trait of creativity, to innovate their own models or even to replicate the ones that were shown to them in the program sessions. Around 44% responded that they have not replicated any models on their own after the programs.

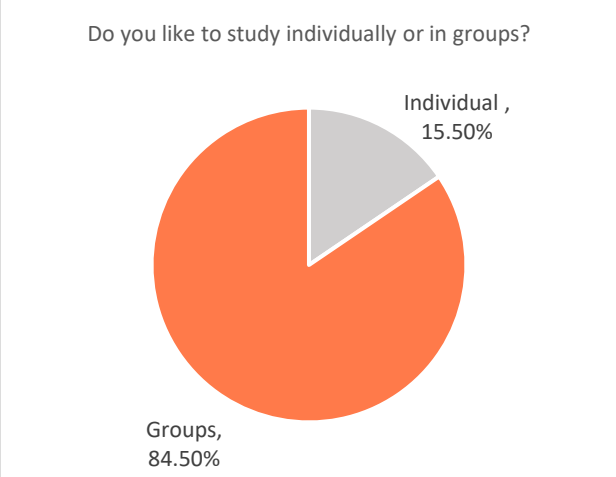






To understand how much the program has imbibed the culture of group-learning or co-learning among the students, two questions were asked to them. If they like to learn new concepts and experiments from teachers, friends or self-learning. **Around 49.8% of the students responded that they would like to learn from teachers**, approx. 20% chose self-learning and 29.8 % from friends. As a probe-question, they were asked if they like to study in groups or individually, where a majority of around **84.5% chose group study as their preference.**





To understand the level of interest instilled among the students about science it was asked if they will pursue science for higher education and if they will go for a job in a field related to science. For both the questions around 69-76% students have responded with a yes, saying that they will pursue education and profession on the lines of science. Around 16% said they were not sure as such while 14% said that they will not.

"The program was very much useful for me. It was very interesting, and I enjoyed it very much. I'm sure this will help me in the future for my studies." - a student's feedback

BEFORE-AFTER

BEFORE \ AFTER	1	2	3	4	5
1	0	0	2	1	1
2	0	2	3	6	17
3	1	0	4	18	26
4	0	0	1	19	29
5	1	0	3	14	46

% of students with
One step change: 46.9%
Two step changes: 12.9%
Three step changes: 7.7%

% of students with 5 rating
Before: 30%
After: 59.3%

Interest to learn science

Students were asked how much they like to learn science now and before the program. They were asked to rate their interest in a scale of 1 to 5, 1 being very poor interest and 5 being very much interest.

Interest to do science experiments

BEFORE \ AFTER	1	2	3	4	5
1	0	0	1	3	3
2	0	1	4	7	12
3	0	0	4	23	15
4	0	0	3	15	45
5	0	0	2	16	40

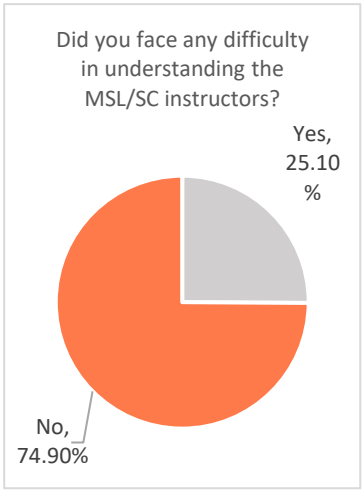
% of students with
One step change: 33.5%
Two step changes: 19.6%
Three step changes: 9.3%

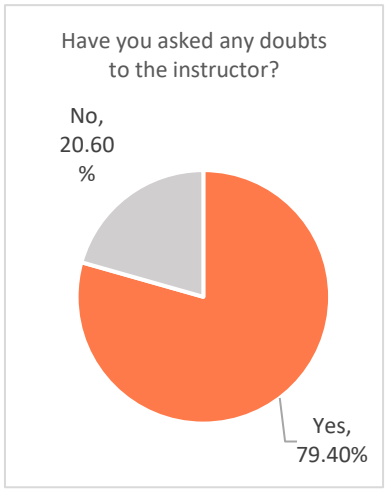
% of students with 5 rating
Before: 33%
After: 61.3%

Students were asked how much they like to do experiments now and before the program. They were asked to rate their interest in a scale of 1 to 5.

INSTRUCTOR-STUDENT INTERACTIONS

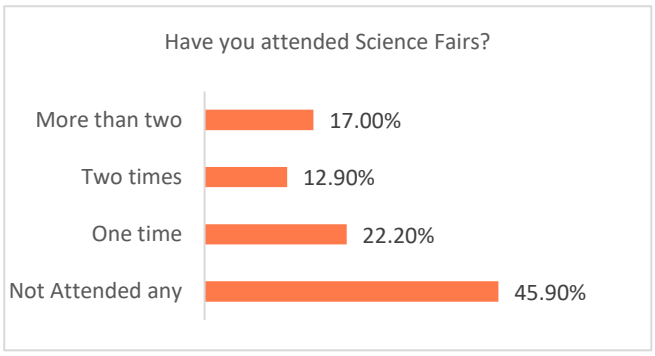
To understand the level of understanding among the students regarding the program topics, it was asked if the **students have faced any issue in understanding the instructors, and around 74.9% students responded that they have no-issues in understanding the instructor**, while around 25% said they faced some difficulties in understanding them. It was also asked if the **students have asked doubts to the instructors, to which around 79.4% said that they have**. This indicated the interactive way of classes and the level of confidence and development of a new habit among students of asking their doubts without fear.



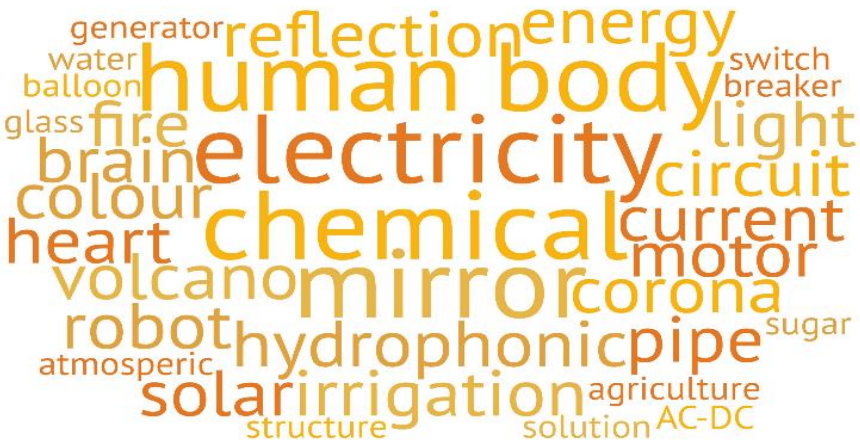


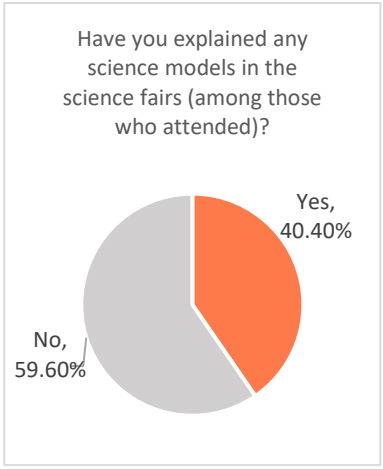
SCIENCE FAIRS

Science fairs were part of the program where students got chance to showcase and explain the science model they developed after going through the program. **Around 54% of the students have attended the science fairs at least one time out of which around 40.4% have explained their models in front of others.**



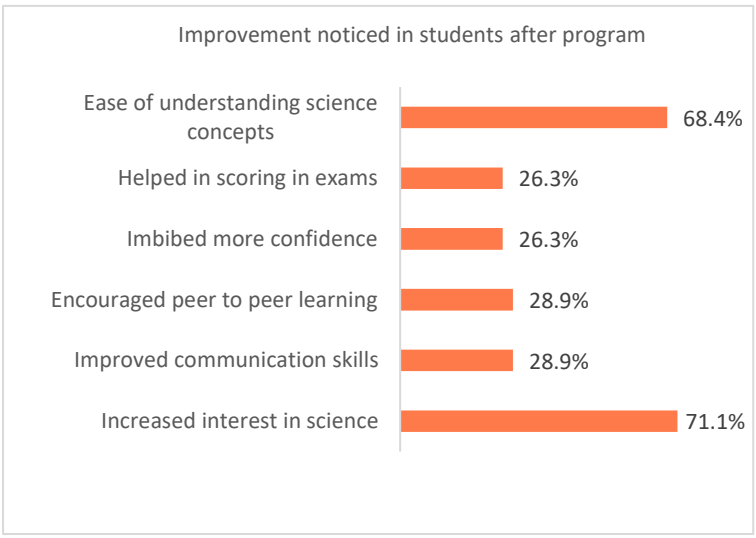
To understand the kind of models and experiments they have made and explained, students were asked to explain their models and a word-cloud is generated from the various answers captured as given below:

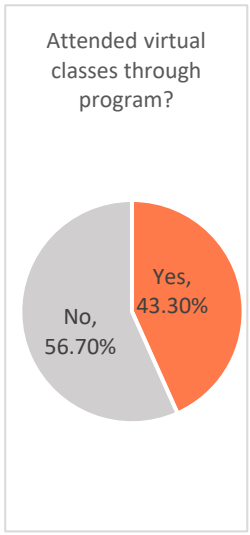


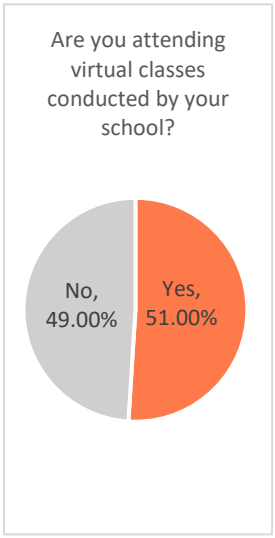


7.7 Virtual Classes

In 2020, the world was facing an unprecedented challenge in the form of COVID -19, which forced the nations to go into lockdown and schools to shut down its operation. The study has tried to understand how the program has adapted to the new challenges and the impact of the new modes of teaching among the students.



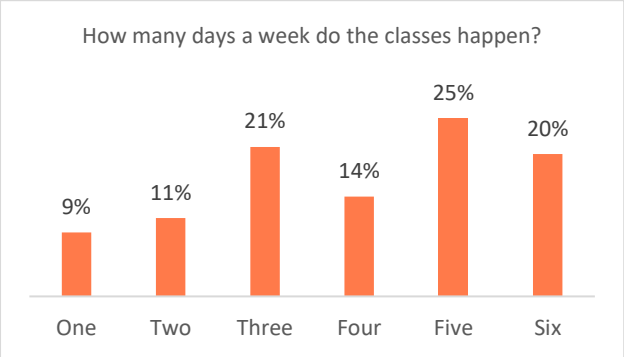




One among the many pandemic-related program changes was the shift to a digital academic year where students had to learn from their homes virtually.

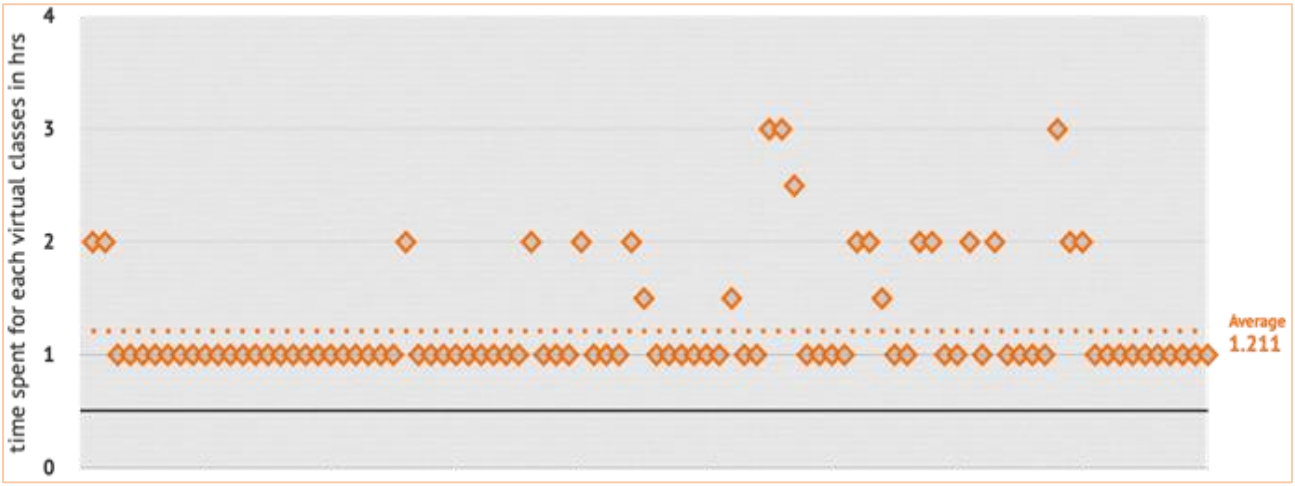
Among the 194 student respondents, 43.3% said that they are receiving the virtual sessions from the program, **while the majority of around 56.7% said they are not**. Apart from the program, students were asked if they

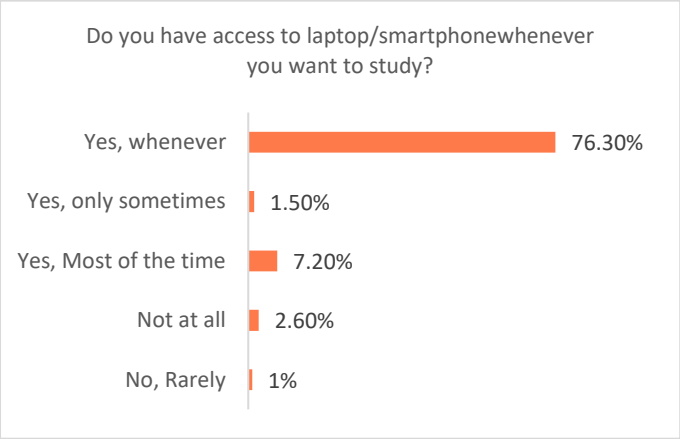
are attending the online classes conducted by their schools or government to which 51% said yes. **Around 51% of the students are receiving neither of the program,** while around 23% of them are attending both online classes.



The frequency of the online classes varies from one day to six days. Many students said that they are attending classes six days a week (20%). Around 21% said they are attending classes three times a week. **When 25% said they are attending for five days**, 14% said they're attending for four days. The average number of days of attendance in virtual classes is calculated as 3.97 days.

Further, the study also tried to understand the time spent by the students for virtual classes. The result obtained is given as a scatter plot below. **Average time was noted as 1.2 hours a day**.





The study has found that among the **children interviewed there is good access towards devices to attend the virtual classes.** Although, the figures obtained here are not in parallel with the national status of access or the responses from other stakeholders. This has to be **attributed to the selection bias**, given that the study was conducted online through mobile phones and there were multiple failed calls that happened where it was not able to connect to the students and only the responses of students who had access to phone were recorded.

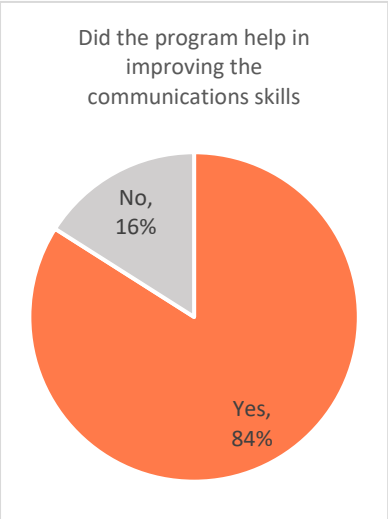
A good proportion of the students said that their parents engage with them in their studies and motivate them to attend the virtual classes. Only 18% of the students interviewed knew who the sponsor of the program is.

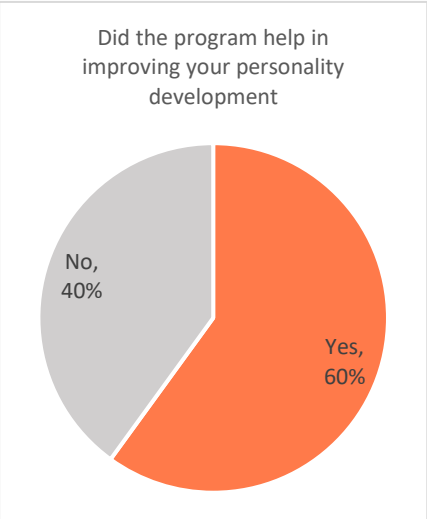
7.8 YOUNG INSTRUCTOR LEADERS (YIL)

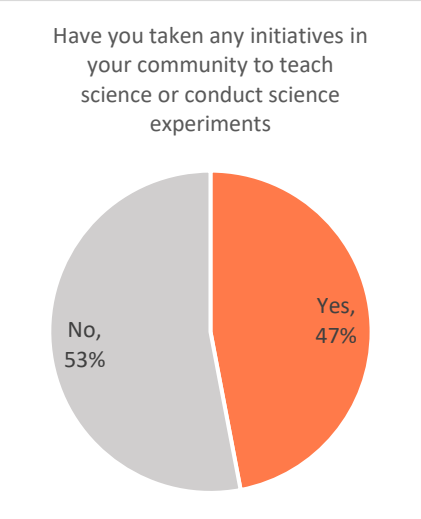
Along with student surveys, 57 of them were conducted with the young instructor leaders. The analysis of the specific questions addressed to them is given here.

87% of the YILs replied that they helped other students on studies, although 66.7% were not clear about their roles as a YIL. In fact, the study found difficult to conduct interviews with many as they were not either interested in replying or are not aware of being a YIL. **Only one among the seven was able to explain the leadership skills they have acquired through the program.**

Success Factors
Availability of proper instruction manuals
Feedback system
Knowledgeable Instructors
Product quality is good
Team participation
Good cooperation from teachers
Punctuality
Interesting pedagogy
Synchrony with the school curriculum

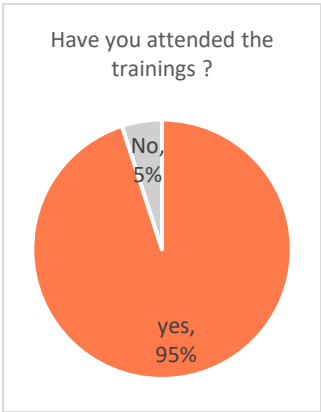






84% respondents said that the program has helped them in improving their communication skills while 60% of them acknowledged it also helps them in personality development. 47% of YILs have taken any initiatives in their communities to teach science or conduct science experiments to which only two have said yes.

7.9 TEACHERS' RESPONSES

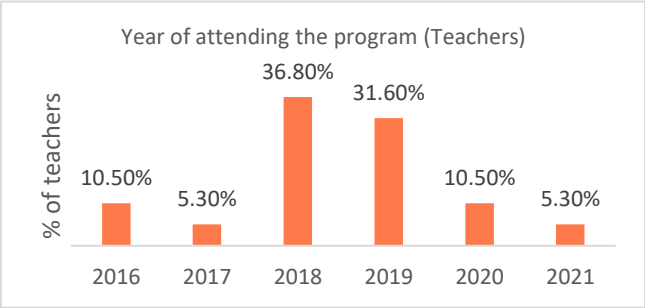


After students, teachers are the major indirect beneficiaries of the program. Many of the teachers were given trainings and workshops to augment their skills to conduct the science classes in a more experiential way rather than the traditional methods. Teachers were also observers and participants of the science Center and lab sessions happened with the students. Hence it is imperative to understand the teacher's perception of the program, their experience of trainings and the outcomes they achieved through attending these sessions, if they have brought any changes in their way of teaching. **The study conducted survey with 38 teachers from different cities where program happened**. Most of the teachers who attended the survey were teaching science as their major subject and were teaching students of class between 5 to 10.

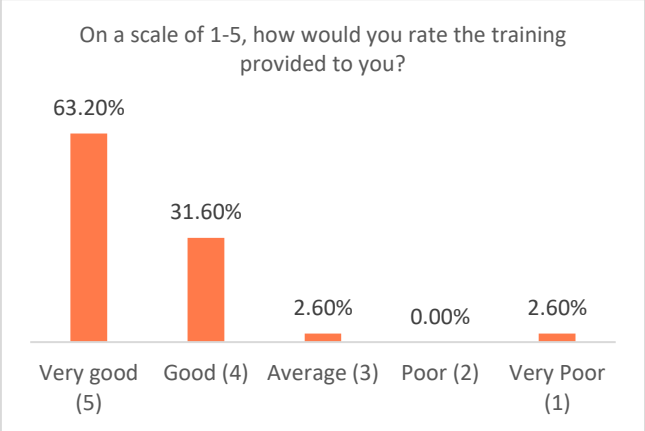
It was asked to the teachers about the average student strength in their school and the responses varied from as low as 36 to as high as 1700. Average student strength is calculated as 300 from the survey. Among the

total respondents**, 95% responded that they have attended the training workshops conducted by the Agastya** team, while 5% said they have not.

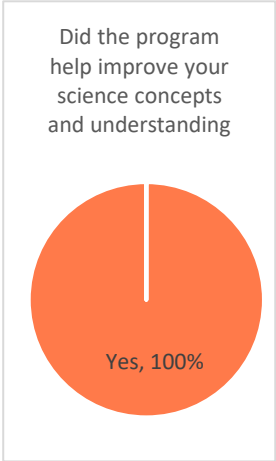
Teachers were asked about the year of their exposure to Agastya program and a majority of them responded that they attended the workshops in 2018 or 2019.

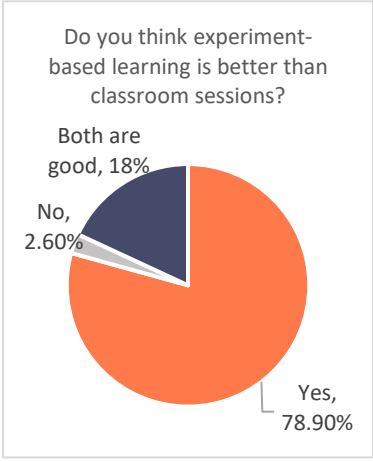


The teachers were asked to rate their **experience of training sessions** on a scale of 1 to 5 and they have given an **average rating of 4.52** to the program.



The major improvements noticed by teachers among the students are ease of understanding the subject and an increased interest in learning science. The major success factors of the program shared by the teachers are listed below:



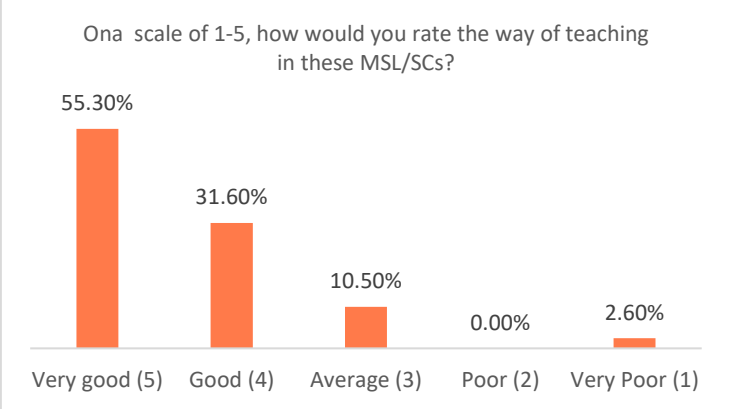


All the 38 respondents said that the program has helped them to improve their science concepts and understanding. All the teachers have also responded that the program helped them in teaching the students in a more effective way. They have responded that they have brought more activity sessions into their normal classroom sessions also from the learnings they got from the training programs. Teachers were asked if they have faced any challenges in the training session and a majority responded that they have not. Although a few teachers have expressed their concerns over time and language issues they faced during the sessions.

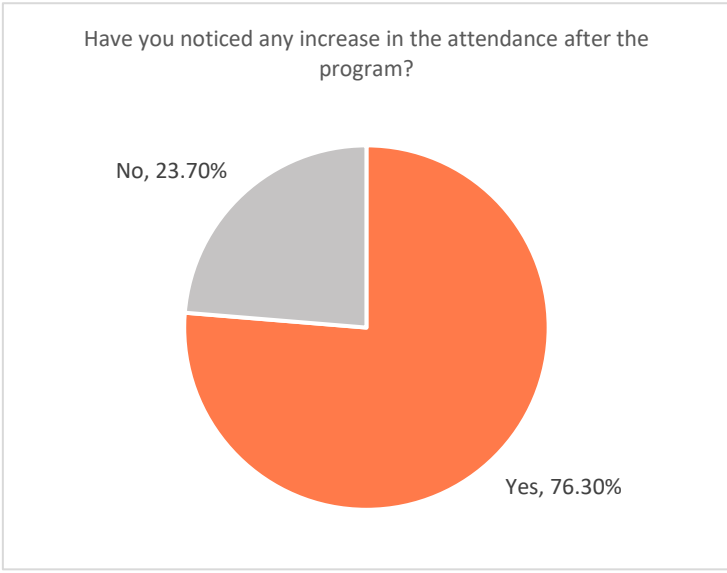
"My way of teaching has changed after the training sessions from the program. I started following the practical way of teaching the students. Even in normal theory classes, I started bringing real-life scenarios so that the children can easily relate to the topics we are teaching. The training sessions have surely had a good impact on my teaching methodology" a teacher acknowledged.

It was observed that almost all the teachers have attended either of the programs (MSL or SC), and there were also teachers (~24%) who have attended both. When asked whether they think experiment-based learnings are better than the classroom sessions, **a majority of about 79% of teachers said yes, they think experiments are better to imbibe the science concepts into students**, while around 18% responded that both are equally necessary.

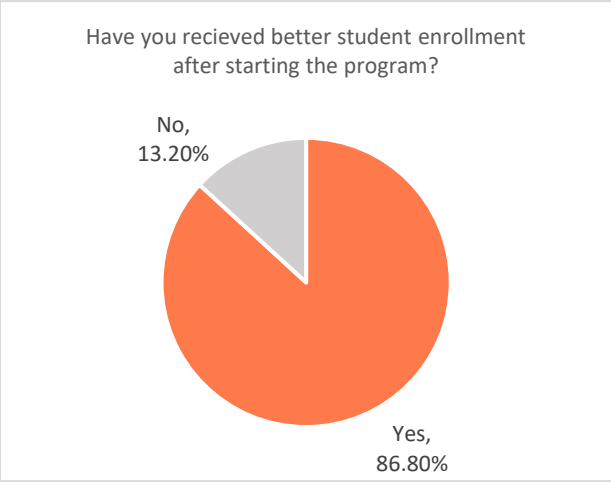
Given their experience in participating and observing the MSL & SC classes, teachers were asked to rate the way of teaching by the instructors**. A majority of the teachers have given a rating of 5 or 4,** while around 10% have said the program was just average. Only one respondent gave a rating of very poor to the program. **(Average rating 4.36)**

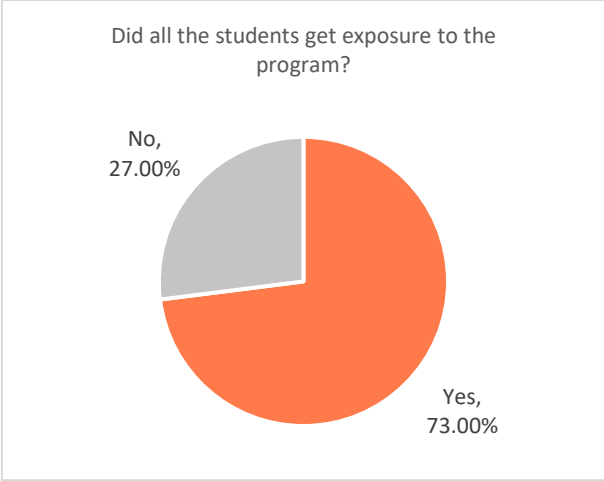


To understand the behavioural changes brought in students through the program, it was asked to the teachers if they had **observed an increase in attendance in the classrooms after the program, to which almost 76% of them responded that they have**, while 24% said that they have not observed any such increase in attendance. It was also asked if they have received a better student enrolment after the program has started operating in their school.



Around 87% of the teachers responded said that they have received better enrolment due to the program. It was shared that, having such programs in the school gave a better perception about the school among the parents and students. The schools were able to fill the gap of lack of infrastructure facilities for science labs or computer centres through the intervention.



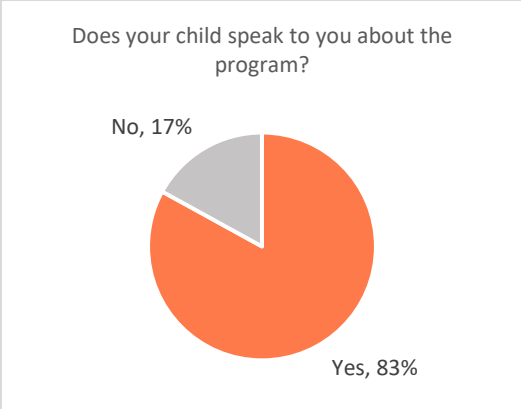


To understand the access of students within the schools, teachers were asked if all the students between the **6th standard and 10th standard were given exposure towards the program, to which 73% responded with a yes**, while 27% told that not everyone was given exposure to the program, for the reasons of time unavailability, and the clashes between school timetable and MSL visits.

7.10 Parents' Responses

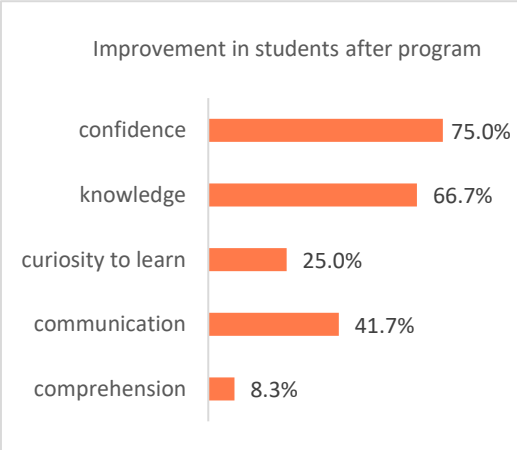
SCIENCE EXPERIENCE

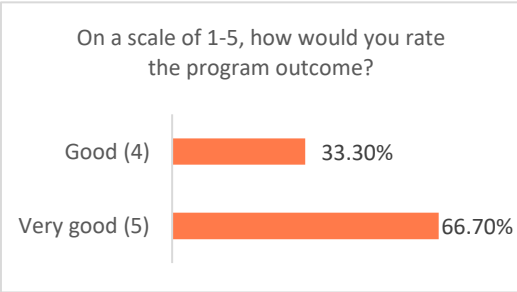
Parents have a crucial role to play in their children's education. In recent times where most of the classes are happening virtually where students attend them from their home space, this role has only increased.



The study has tried to understand the perception of the parents regarding the Science experience program and the subsequent virtual mode of learning students are conducting at home. A total of 12 parents were interviewed in the process to understand their awareness, perceptions and suggestions regarding the program. Among the 12 respondents, 9 of them were mothers of the children while three were fathers.

All the 12 parents surveyed responded that they are aware of the science experience program happening in their child's school. **Around 83% of the parents responded that their children talk about the science experience program and the experiments** they learned in the school. It was asked to the **parents if they have noticed any improvement in their child after the program and a majority of around 75% responded that they have** observed better confidence among their children. Approximately 67% responded that they have noticed improved knowledge in science and around 42% better communication. Parents have also noticed an increased level of curiosity to learn and comprehension skills among the children.





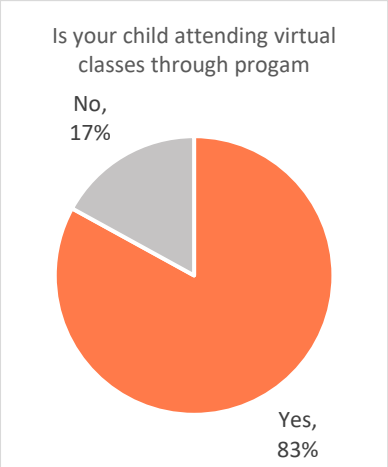
All the parents interviewed has said that they have observed an increased interest among their children to learn science while around **83% responded that they have seen their children doing science experiments in their home**. All the parents responded that they would like to see their child working in the areas of science in future.

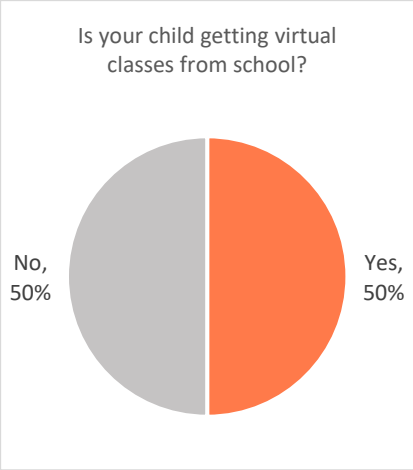
Average rating for the outcome of program: 4.67

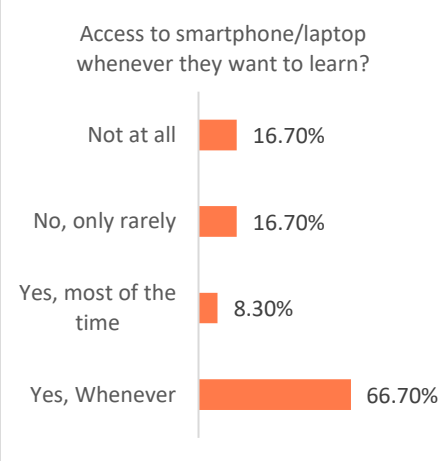
VIRTUAL CLASSES

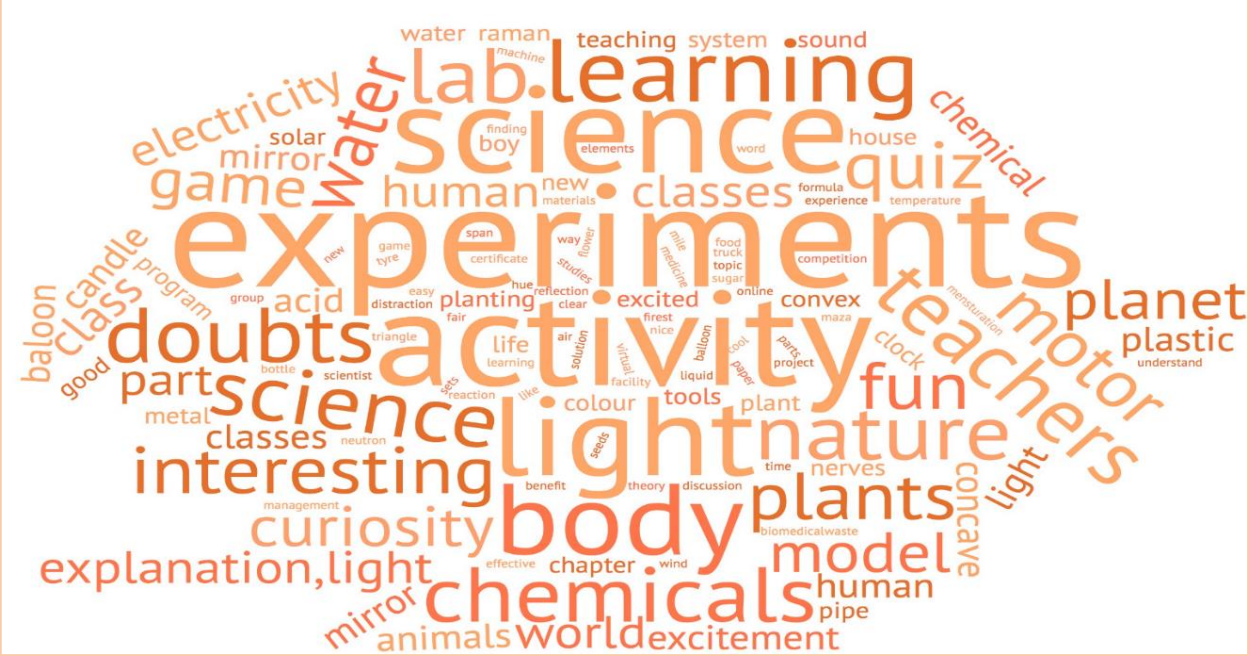
Among the parents interviewed, 50% said that their children are attending the virtual classes conducted by the school, **while 83% responded they are receiving the virtual classes by the program**. All the parents found these virtual classes beneficial to their children.

To understand the access to the smartphone/laptop parents were asked about it, and a majority has responded that their child has access to these devices to conduct virtual learning whenever they want. Although **around 34% told that their child either doesn't have access to them most of the time or have no access at all**. Most of the parents said that they encourage their children to study although not everyone sits with them while studying.









7.11 OTHER STAKEHOLDERS' RESPONSES

The study has tried to understand the impacts, outcomes, outputs, and perspectives from the side of students, teachers, and parents. Now, it will analyze the responses received from other stakeholders including Headmasters of school, program implementation team, government department officials, program sponsoring team and the volunteers

SCHOOL HEADMASTERS

Two Key Informant Interviews were conducted with the school headmasters regarding the program. The headmasters said that they also attend these sessions along with the students and have an overall positive outlook towards the program. The other major insights from the responses are tabulated below.

IMPROVEMENT IN LEARNING LEVEL
• There is a **visible improvement in learning levels** among the students after the science experience program • **Improvement is limited to students who are having access to mobile phones and internet**, which is not the case for many. • Students are getting a lot of **new facilities such as science labs, iMobile Labs through the program** to improve their science knowledge • The easy way of explanations and experiments are **effective teaching/learning methods**
TEACHERS' TRAINING
• An improvement/**change in teachers' approach to their conduct of classrooms** after attending these trainings were observed - the teaching ways have changed, and they are now focusing on more experiment-based teaching methods
OUTCOMES
• There is an **increase in school attendance** after the program - a spike in this is observed especially on the days of **Mobile Science lab or Science Centre visit**, as the students already know the timetable. • There is an **improvement in school enrolment** observed in the subsequent years of program implementation. This is attributed to the fact that many students and parents consider the **program as an alternative facility for science labs** and other infrastructure the schools lack. • An **increase in interest to learn science** is observed among the students. • Students were able to **comprehend the school curriculum easier** as the program is aligned to it. • Students have started being **more inquisitive in the normal classroom** sessions also after the program.
RATINGS

- Training provided to teachers: **4** (total average rating)
- Overall program effectiveness: **5**

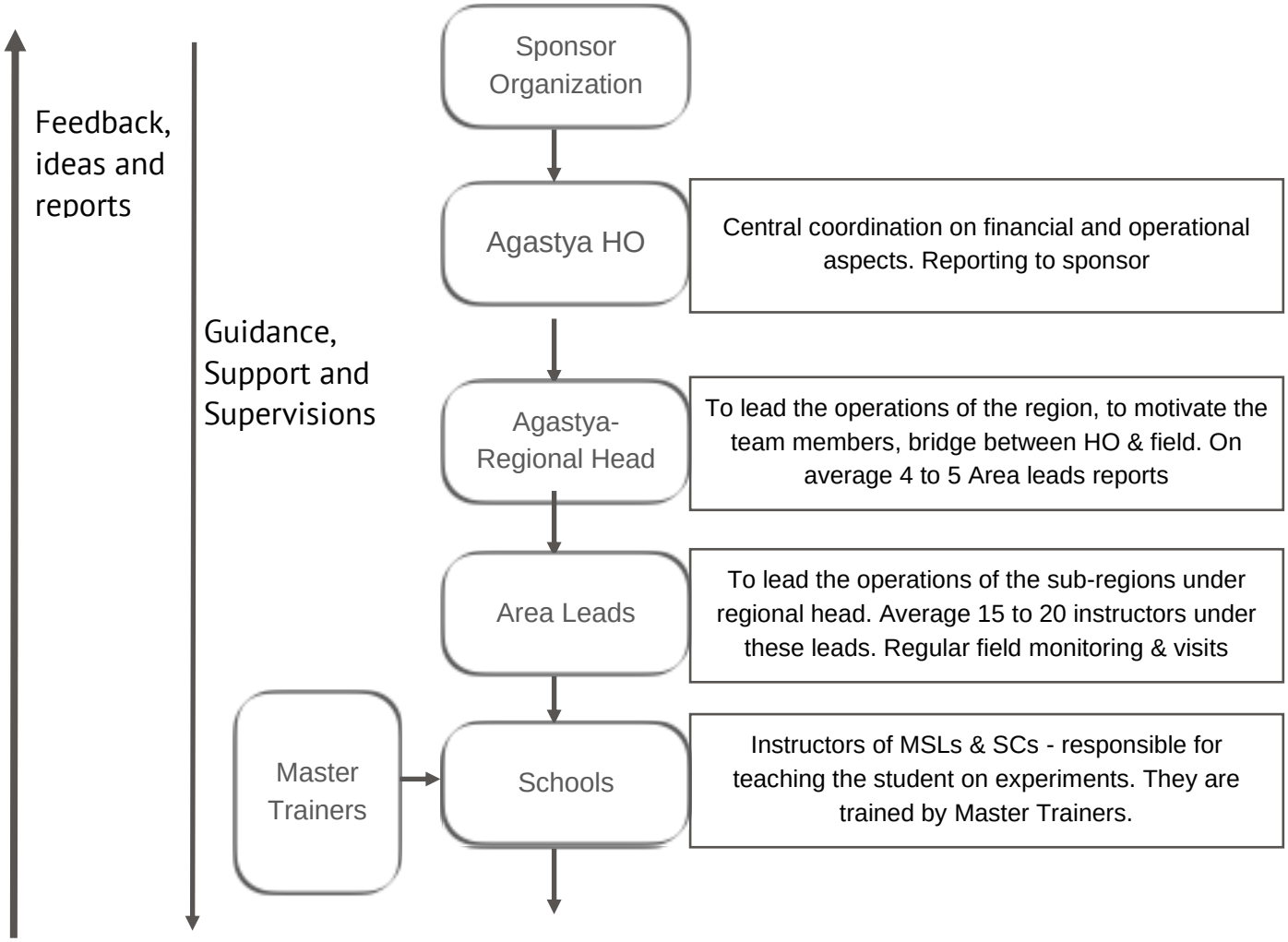
SUGGESTIONS FOR IMPROVEMENT

- The virtual program is good although not everyone has access to digital devices or has limited access. It would be helpful if the program can support creating the access to digital devices such as smartphones or laptops where appropriate and needed.

"We are happy to be part of such a unique program. As Government schools, we have many limitations due to which we had to compromise on the learning experience for students. Through Honeywell Science Experience our students are getting quality education on science and we have observed tremendous improvement among our students on their level of confidence, curiosity and knowledge" - a school headmaster's testimonial about the program.

AGASTYA PROGRAM TEAM

Five Agastya program implementation team members were interviewed as part of the survey to understand the challenges and experiences in the implementation pathway of the program. The five included both regional and area managers. **The Agastya team structure of operation and reporting is as given below**



PROFILE OF RESPONDENTS

Particular	Details
Designation	Regional Heads & Area Leads
Areas in charge	Delhi, Faridabad, Telangana & AP, South Karnataka, Mysore, Madurai & Chennai

From the interviews with the regional and area leads, different insights and aspects about the program are captured, as given below:

- **Program idea:** The goal is nation building. The idea is to use science as a medium or tool to spark the curiosity. Bringing changes in students through hands on materials. To bring in curiosity, creativity, confidence, caring and leadership
- **School Identification:** Schools are identified on need-based approach. For feasibility check minimum student requirement are checked.
- **Program Selection:** Between SC & MSL, the selection made based on the number students. If there are good number of students Science Centres are feasible
- **Behavioural shifts –** Yes —-> Why, Looking —-> Observing, Passive —> Explore, Textbooks—-> Hands-on, Fear —> Confidence
- **Science labs:** If there are 1000 unique students in school SC are feasible. Although in cases where there are less number of students, the neighboring school students are brought to give exposure to the program on a regular basis.
- **MSL:** Are used when schools are spread around. One MSL can take up to 4 sessions per day. Each session will cover 30 to 35 students approx. 140 students per day. In a month an MSL can cover around 2500 to 3000 unique students ensuring each student one exposure per month. The same unique students will be usually repeated throughout the months giving 6 to 8 exposures per student in a year (excluding holidays, exams etc.). A tentative year plan is made ready in the beginning of the program, which is shared with all the schools, although if required slight changes are made later.

> ***"Schools are very receptive toward the program. Given that many of them don't have proper and functional labs on their premises, the program was the only resource for the students to get some hands-on experience in science experiments. Our experiments are designed to align with the school curriculum and hence they found it very beneficial. Schools also give their feedback and suggestions on new models, which we take very seriously and work upon. Overall it's a positive experience for us"*** Mr Shiv Kumar, Regional Head (Delhi, Faridabad & Noida)

The program team were asked to share the success factors of the program and the challenges they faced, which are tabulated below:

Success Factors	Challenges
• Teachers adapting to the experimental based teaching strategy	• Space Allocation for the program. In many schools they don't have space for conducting the program
• Well-equipped instructors - well-structured hiring, training and mentorship for the instructors	• In some rare cases teachers don't show interest in the program - this creates conflict of interest
• Cooperation by Government departments	• After training, not many teachers are implementing the methods in the classrooms
• Proper planning sessions with each school in the beginning of the academic year	• For science fairs getting the permissions can be sometimes challenging
• Content created by well-equipped team comprising experts and scientists - feedback system to develop and modify the content	• Challenges of virtual classes- in COVID induced digital academic year

RATINGS

- Effectiveness of intervention across schools: **4.4**
- **I**nteractions and support provided by Honeywell team in the
- implementation of program: **5**
- Effectiveness of volunteering sessions conducted by Honeywell staff: **4.6**

OPERATION VASANTHA - CHILDREN AS CHANGE AGENTS

This is a new intervention running in the villages through the program. This is a peer-to-peer learning program where students who got exposed to the program go back to their community and teach the children there on those topics. This is a scalable model where students act as the change agents for their community. This caters to the dropouts, slow learners and those who are denied formal educational opportunities.

"It is important to develop systems and to equip our team to reach students who are now left out in this pandemic stage without any proper access towards online or digital education.
Already we have come up with new programs like Ha book - a self-learning experiment books, which are distributed to the students who can do experiments by seeing the instructions within their home with the resources usually available in a household. This is a scalable activity which needs more support from sponsors" - Mr Topaz, Regional Head (Tamil Nadu)

INTERVENTIONS IN THE COVID TIMES

Multiple interventions were tried and practiced in the field by the program during the COVID lockdown and the subsequent times where schools were closed. A few of the interventions are:

- Operation Vasantha – Peer-to-peer learning
- Ha book – Self-learning experiment books
- WhatsApp based resource sharing and discussion groups
- Smart TV programs - In Remote Village
- Home lab kits
- Virtual classes

Honeywell Program team

One member from the Honeywell program team was interviewed to understand the challenges and experiences in the implementation pathway of the program.

RATINGS

- Implementation by Agastya: **5**
- Reporting by the program: **4**
- Financial Utilization: **5**
- Overall effectiveness: **5**
- Volunteering sessions: **5**

The major points about the program are as given below:

Honeywell is carrying out this program as part of its **overall strategy to promote STEM education**	Trying to bring **more interest among students towards science**	Continuously **tracked by Honeywell team** both on terms of programmatic and financial achievements
Conducts **spot audits and third-party audits** to ensure transparency	Honeywell **team and volunteers have interacted with students** frequently	The major success factor of the program happens **due to the integration of learning methodology with the regular school curriculum**
Created a good **rapport with the government officials** bringing in smooth implementation	Focus on **optimum utilisation of school resources** including time, space, teachers, and labs	Continuously evolving - it came up with **new programs like iMobile, innovation hubs**

"The program has adopted an innovative approach of inducing curiosity among the students. For e.g., rather than simply teaching the properties of the prism, the students will be asked to pick a yellow straw, from the multi-color straws present in front of them while looking through a prism, but due to the properties they may reach out to a green one, and the curiosity is sparked there, **said Ms. Sangeeta who was the senior manager working in Honeywell with the project.**

Honeywell volunteering teams have done an amazing job with the program. In one instance, the Agastya team was looking for developing robotics into their pedagogy, but they didn't have the technical expertise. When informed of this to our volunteers from engineering section, they wholeheartedly took this as a challenge and developed a cheap and reliable robotics model that can be used in the labs. It was a logo-based model that works with simple instructions, but the impact it created among the students was tremendous. Now it is part of the curriculum in Agastya's science programs" - **she remarked when asked about the volunteering program.**

GOVERNMENT DEPARTMENT

Three government officials were interviewed as part of the study to understand the government cooperation and synergies in the program. Two of them were District science officers while one was a retired state syllabus education advisor. The major insights from the discussions are listed below:

- The officials showed **high regard for the program** and the program implementation on field
- Program is **imperative to the children studying in government schools** without good facilities for quality education.
- Officials appreciated to the program for being **adaptive and agile** when the Covid crisis hit.

Key success factors and improvement areas shared by the respondents are as below:

SUCCESS FACTORS	IMPROVEMENT AREAS
• The feedback program is helpful for rectifying any mistakes, adapt and innovate	• The program should be scaled up into more areas with special focus on remote villages
• High level of participation from schools and students across the regions	• More partnership with government
• Multi-level team structure with proper planning and execution	• To explore the possibilities of Corporate-Government- NGO partnerships to scale up the program

• Good synergy and cooperation with government officials and vice-versa	

"It is a wonderful program. Something that government was not able to give to the students of the state yet. The program has motivated students and teachers tremendously. I have seen the projects and models that these students created, showcased and explained in the science fairs. It was inspiring" - Mr Prabhakar, Retd District Science officer, Member of Children science congress & Telangana science fair academy

VOLUNTEERS

Four volunteers have participated in the survey conducted by the study. All of them had attended the volunteering sessions only once. All of them had majorly focused on mentoring the students about career opportunities and shared their stories to inspire them.

An average rating of 4.75 was given by the volunteers when asked about their satisfaction with the volunteering program.

"***Inspiring everyone to be their highest self and a better human being is a cause very close to my heart. It would be more impactful if we could help guide the children and the student community so that they also develop a sense of giving back to the society in their early stages." -*** said Mr Deepankar Patnaik, a volunteer of the program

7.12 SWOT Analysis

A SWOT analysis is done to understand the strengths, weaknesses, opportunities and threats to the program. SWOT was conducted largely from the responses received from the program team and other implementation-level stakeholders, same time considering the beneficiary feedbacks.

STRENGTHS	WEAKNESSES
• Trained and skilled instructors • Teachers training as a sustainability approach • Good rapport with government departments • Interest among students towards attending sessions • Quality of experiments and equipment • Strong and dedicated implementation and program team • Guidance and support from Honeywell program team and volunteers	• MoU and proposal do not capture the Key Performance Indicators (KPIs) for the project • No sustainability plan - how to run the existing labs/centres without financial aid • Focus on Young Leadership Program was found minimum • Outcome of teachers' training as adoption of learnings into classroom sessions was found minimal • Student -level data collection was not structured, accurate and complete • Financial Reporting formats not consistent and unavailability of signed utilization certificates • Virtual sessions not universally accessible for the stakeholder profile
OPPORTUNITIES	**THREATS**
• Having such a large cohort of student beneficiaries across the country should be leveraged in multiple ways • The program can start Alumni-networks and other similar groups to bring in more resources and knowledge • Scaling up of the project into more schools and regions • The program can adapt and accommodate more science related topics • In virtual mode to identify students who don't have a learning environment in home and give them alternative options for the same	• Program relying on only donor/ sponsorship model • The program needs to keep on evolving, if not can go redundant and obsolete • In virtual learning mode a good proportion of students not having proper access to smartphones/devices • Lack of a conducive environment for studies in home can be troublesome in digital academic years.

8. CONCLUSION

The study has attempted to assess the impact and outcomes of the Science Experience Program through various analysis approaches. It has also observed the various factors that have helped and hindered the program to achieve the desired outcomes. The study was not able to conduct a long-term impact of the program on how the student beneficiaries have fared in their higher education or professional life, although it had tried to understand their perception and plans going forward. Regarding the virtual classes, it may be still early to say how students and teachers will cope with online learning as they figure out the constraints, reorient to address them but the perception and readiness of students is an important consideration that the study has tried to address.

Based on these analyses and findings, the following conclusions were drawn:

- The science experience program had given the beneficiary students a **chance to develop their interest and learn science**, which they couldn't have accessed otherwise. In that sense, the program has successfully addressed a vital need of the students.
- The program has successfully **instilled confidence and curiosity among a significant number of students**, although the study cannot confidently say what proportion, given the selection bias and limitation of virtual conduct of the study. It was, however, found that
- The project is dependent on HHSIF funding for operational sustainability and has a very high admin cost (57% compared to industry average of 15-20%). 41% of HHSIF contribution is towards the salary of 156 resources on this project which has increased to 60% by end of the project
- YILs were not aware of roles and responsibilities and the Teacher training on practical methodology was reportedly not resulting in actual practice
- The **virtual learning classes have given students an opportunity to continue their studies despite the disruptions due to the pandemic**. Although the program was rolled out as an immediate response to the school shutdown happened, it was meticulously planned and briskly implemented. The other interventions planned as a response to COVID emergency are also commendable.

- The program has constructively used feedback mechanisms and consultations with key stakeholders to effectively adapt, innovate and reinvent the program activities. During the pandemic the project activities were shifted to virtual mode to not disrupt the progress.
- The program has **lacked proper student-level data capture**. Most of the data were captured on school level, hence individual beneficiary identification became a difficult.
- The program **lacks robust sustainability plans** to run the centers or mobile labs, rather teacher training and peer to peer trainings are considered as sustainability plans. On a macro-level, they may be seen as sustainability plans although on an operational level, they cannot be.
- The program had created a good **rapport with government departments for its smooth functioning,** although partnerships or leveraging of different government schemes and funds to enhance the program did not happen.
- The program had plenty of opportunities for volunteering activity, which was effectively leveraged to modify and upgrade the program itself, along with usual activities of interactions and workshops.
- HHSIF to device clear exit plan and ways to enhance operational sustainability in mutual discussion with implementation partner
- Implementation partner to explore partnership with schools, Corporate donors and/or government entities to ensure operational sustainability

9. RECOMMENDATIONS BASED ON CHALLENGES

In the light of the foregoing findings, challenges and conclusions, the following are recommended:

Challenges/Observations	Recommendations
STUDENT BENEFICIARY	
• **Self-learning and replication of science models among the students was found to be low**. Over 50% reported not having tried to replicate any science model on their own	• Scientific models and experiments that student can easily understand and replicate with **limited and easily accessible resources at home** should be encouraged through **practice sessions, assignments, or virtual student demonstrations**
• Close to 25% of students surveyed mentioned that they had **difficulty in understanding the instructors** as well as in clearing doubts	• A clear mechanism should be in place to address students with challenges in comprehending the sessions in terms of **extra classes / mentoring sessions** by trainers or YILs
• Over 50% of the students surveyed mentioned that they **do not have access to the virtual sessions** from the program and the school • 34% of the parents interacted corroborated that their children do not have **limited or no access to virtual learning devices** such as smartphone/laptop	• Every student needs to be provided access to the virtual sessions **through digital devices such as smartphones and laptops**. Remote outreach sessions through mobile labs are a good option to bridge the gap where students have no access to digital resources
• **Lack of awareness of the project sponsor** - Only 18% of the student respondents were aware of the project sponsor.	• Undertake awareness **sessions with company employees / provide material and supplies with subtle branding at each school/location**
• 66.7% of YIL students were **not aware about their role as YILs**	• YILs need to be **frequently and regularly made aware of their role and responsibility**

• Only 1/7 YIL students interviewed was able to **explain the leadership skills** they have acquired through the project	towards the project impact and should have an outline of their tasks, roles, and responsibilities.
• **Self-learning and replication of science models among the students was found to be low.** Over 50% reported not having tried to replicate any science model on their own	• Scientific models and experiments that student can replicate on their own should be encouraged through practice sessions, assignments, or virtual student demonstrations
TEACHERS/TRAINERS	
• **Low adoption of teacher training** - Adoption of learnings into classroom sessions was found minimal	• Efforts to ensure the adoption of learnings into classroom teaching through **frequent monitoring and performance linked rewards.**
INFRASTRUCTURE AND PARTNERSHIPS	
• Low partnerships with government initiatives • **Space allocation for conducting the program is inadequate** in many schools	• Partnership with Government initiatives such as: – **Laboratory setup and upgrade** - Rashtriya Avishkar Abhiyan (RAA) and Atal Tinkering Laboratories (ATLs) – **Teacher Training and infrastructure support** - Sarv Shiksha Abhiyan and Rashtriya Madhyamik Shiksha Abhiyan – **National Exhibitions -** NCERTs National Science Exhibition
• Lack of monitoring and support initiatives **to sustain project outcomes** specially to aid students in further academic development in science and to pursue higher studies	• The program should try to address the **support and guidance that students require for pursuing their higher studies**, at least for the identified students from the entire cohort. This could be through **scholarships** to pursue higher education in science, guidance and counselling sessions, **mentorship** programs or fellowship programs

	• Cohorts of Science experience program can be created. **Cross-state interactions, networking, alumni system** etc. can be implemented through this. This will also motivate the students to come back later (once they have achieved things in life) and give back to the communities in any form.
• Merely instilling interest, knowledge and confidence alone may not result in a long-**term impact given that many students are not from such a conducive environment** that supports higher studies in science	• A parallel and focused intervention to ensure that students are having a conducive learning environment in their homes can be a part of the program, that can be executed along with the school authorities. This includes ensuring that children are not used for any form of child labour or are not abused in their homes in any form. This is in the light of the widely reported news of such incidences happening in the country, especially after the pandemic and lockdowns started. Awareness generation among parents, continuous follow up and monitoring has to be conducted to curb these issues which in turn can complement the program with better results.
PROJECT DATA	
• **Inaccurate beneficiary data** – Multiple contact numbers (27.75%) of the sample size were incorrect • **Low response rate to impact assessment survey (18.06%)** compared to industry average (80%) • Considerable percentage (21.51%) of students called were **not interested in**	• The program needs to have a **more accurate and easily accessible database** about the details of the beneficiary students - this is to ensure proper impact assessment and understand long term outcomes of the program. The program needs to have a strengthened monitoring system in place to

answering the survey and refrained from giving any reason for the same • Multiple reporting formats were observed over the period of 2016-21 as well as inconsistency in the data points being shared through the project reports which led to difficulty in consolidation of key outcomes.	ensure data accuracy and beneficiary validation • The reporting format should be kept consistent especially for all the quantitative data and should include a column for cumulative figures for all data points being captured.
Financials	
• High **dependency on donor fund** for ongoing operations of mobile labs and science centers post-exit	• The program needs to focus on the sustainability of the Mobile Labs & Science Centers, i.e., it should be able to operate even once the donor is withdrawn from the program. A five year or three years sustainability plan can be explored between Agastya and Honeywell. Alternatively a small fee can be charged from students who can afford the same. The project should continue to look for partnerships with corporates or other donor agencies to cover the operational costs. Honeywell can consider creating a corpus to support the project further until a suitable alternative for funding operational costs is found.
• **Multiple entries in the Financial Utilization Reports were without proper categorization under budget heads and/or identifiers** • **High amount of unspent grant (over 2Cr) was observed**	• Organization is recommended to define clear budget heads as well as assign identifiers such as CAPEX/OPEX and Direct/Indirect expenses to aid in better analysis and insights • Unspent fund to be utilized through mutual consultation between HHSIF and Agastya. This could be utilized on activities to enhance

• **High operational costs and dependency on Donor agencies for sustainability of operations** • **The project is dependent on HHSIF funding for operational sustainability and has a very high admin cost (57% compared to industry average of 15-20%)** • **41% of HHSIF contribution is towards the salary of 156 resources on this project which has increased to 60% by end of the project**	the access to digital devices for needy students • Since the project costs are heavier on the operations side and involves personnel salaries that are incremental over the years, the project sustenance would be dependent on donor agencies or grants. The project should explore an income generating source such as charging fees from the students that can pay or should seek collaborations with government schemes and programs to raise funds on operational costs.

OVERALL RECOMMENDATION:

- HHSIF to device clear exit plan and ways to enhance operational sustainability in mutual discussion with implementation partner
- Implementation partner to explore partnership with schools, Corporate donors and/or government entities to ensure operational sustainability

10. ANNEXURE

10.1 Student's Survey

1.1 General Information

1. Age
2. Standard
3. Gender: Boy / Girl
4. City name:
5. School Name:
6. Medium:

1.2 Program Reach

7. Which among the classes did you attend?
a) Mobile Science Lab b) Science Centre c) Virtual classes d) Others
8. How many times have you attended the classes together?
9. When did it happen (year)? 2016, 2017, 2018, 2019, 2020
11. Which subject were you taught through the program? A) Physics b) Chemistry c) Biology d) Math e) Other
12. For how much time each classes happened (in hours) ?

1.3 Program Perception

13. Was the Mobile Science Lab program interesting for you? Yes/No
14. What interested you the most in these classes? A) doing experiments b) the mobile van c) the science center d) group learning e) engagement and interactions f) Fun way of learning g) It was not interesting h) others
15. On a scale of 1-5 (1-very poor, 2-poor, 3-average, 4-good, 5-excellent), how would you rate your experience with MSL/Science Centre?
16. What were the benefits of the program?
a) Ease of understanding science concepts b) Helped in understanding school curriculum c) Helped in scoring in exams d) increased interest in science e) imbibed better confidence f) peer to peer learning g) other
17. Which among from the two will you choose to learn Science?
a) normal classroom sessions b) Mobile Science Labs/ Science Centre c) Both are good d) don't like both
18. What are the benefits of learning science? a) It helps me to understand the world better
b) It helps in scoring better marks in exams c) It will help in my higher education d) It will help me in getting good jobs in future e) others

1.4 Program effectiveness

19. Did the MSL/SC sessions helped you in understanding science concepts? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all

20. Did the MSL/SC sessions helped you in scoring better marks in your exams? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
21. Did the MSL/SC sessions created curiosity in you to learn science? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
22. Did the MSL/SC sessions created confidence in you? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
23. Which science topics you enjoyed and understood the most through MSL/SC? Can you explain the concept?
24. Do you like doing science experiment? Yes/No
25. Which were your favorite topics or experiments? (open ended)
26. Have you replicated any science model own your own, that you learned through MSL? Yes/No
27. If yes, what were the models?
28. Do you like to work and study in groups or individually? groups/ individually
29. How do you like to learn new concepts and experiments? a) self-learning b) from friends & classmates c) from teachers d) other
30. Will you (are you) pursue science related subjects for your higher education? Yes/ No/ Don't know
31. Will you pursue a job in the future related to science? Yes/ No/ Don't Know/ Can't say

1.5 Before - After

32. On a scale of 1 to 5 how much you like to learn science now? (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
33. On a scale of 1 to 5 how much you used to like science **before the MSL program** (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
34. On a scale of 1 to 5 how much you like to do science experiments now? (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
35. On a scale of 1 to 5 how much you liked to do science experiments **before the MSL program** (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)

1.6 Other

36. How many science fairs have you attended? Yes/No
37. Have you explained any models in these Science fairs? Yes/ No
38. If yes, can you explain your experience (open)

1.7 Experience with instructor

39. Did you face any difficulty in understating the MSL instructors? Yes/ No
40. Did you ask any doubts to the instructor? Yes/No

1.8 Virtual Classes

41. Are you getting any virtual sessions from the program for the last one year (to make sure not to confuse between online classes conducted, by school if any)? Yes/No
42. How are these classes conducted?
43. frequency of classes? Daily/ Weekly twice/ Weekly once/ irregular/ other
44. How long does each session lasts?
45. What are the topics taught in the session
46. Are you also attending the online classes conducted by your school? Yes/No

47. If yes, how is this program different from school's online class? (open)
48. Do you have access to smartphone/ laptop whenever you want to study? Yes, whenever/ Yes most of the time/ No, rarely/ Not at all
49. Does your parents engage with you in studies yes/ No/ Sometimes
50. Does your parents encourage to attend virtual classes and study? Yes/ No/ Sometimes
51. Do you know who is the sponsor of the program? Yes/ No (if replied Honeywell, tick yes)
52. Do you have any other comments / remarks about the program? (open)

10.2 Young Instructor Leaders (YIL) Interviews

2.1 General Information

1. Age
2. Standard
3. Gender: Boy / Girl
4. City name:
5. School Name:
6. Medium:

2.2 Program Reach

7. Are you a Young Instructor Leader? a) Yes b) No c) Used to be, but not now
8. How were you exposed to the program? a) Mobile Science Labs b) Science Centre c) Virtual Classes d) other
9. How many times have you attended the YIL classes (together)?
10. When did it happen (year)? 2016, 2017, 2018, 2019, 2020
11. In which standard you were then when you became a YIL?
12. What all were you taught through the YIL classes? a) Science experiments b) personality development classes c) other
13. How were you selected for the YIL program (open)?

2.3 Program Perception

14. Was the MSL/SC program interesting for you? Yes/No
15. What interested you the most in these classes? A) experiments b) mobile van/science center c) group learning d) engagement and interactions e) Fun way of teaching f) It was not interesting g) others
16. Which were your favorite topics or experiments? (open ended)
17. On a scale of 1-5 (1-very poor, 2-poor, 3-average, 4-good, 5-excellent), how would you rate your experience with the program?
18. What are the benefits YIL program to you?
a) Ease of understanding concepts b) Helped in understanding school curriculum c) Helped in exams d) increased interest in science e) imbibed better confidence f) improved communication skills g) peer to peer learning h) personality development i) other
17. Which among from the two will you choose to learn Science?
a) normal classroom sessions b) Mobile Science Labs/ Science Centre c) Both are good d) don't like both
18. What are the benefits of learning science? a) It helps me to understand the world better
b) It helps in scoring better marks c) It will help in my higher education d) It will help me in getting good jobs in future e) others

2.4 Program effectiveness

19. Did the MSL/SC sessions helped you in understanding science concepts? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all

20. Did the MSL/SC sessions helped you in scoring better marks in your exams? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
21. Did the MSL/SC sessions created curiosity in you to learn science? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
22. Did the MSL/SC sessions created confidence in you? 1) Yes, very much 2) yes, Somewhat 3) Just a little 4) Not at all
23. Which science topics you enjoyed and understood the most through MSL/SC? Can you explain the concept?
24. Do you like doing science experiment? Yes/No
25. Which were your favorite topics or experiments? (open ended)
26. Have you replicated any science model own your own, that you learned through MSL? Yes/No
27. If yes, what were the models?
28. Do you like to work and study in groups or individually? groups/ individually
29. How do you like to learn new concepts and experiments? a) self-learning b) from friends & classmates c) from teachers d) other
30. Will you (are you) pursue science related subjects for your higher education? Yes/ No/ Don't know
31. Will you pursue a job in the future related to science? Yes/ No/ Don't Know/ Can't say

2.5 Before - After

32. On a scale of 1 to 5 how much you like to learn science now? (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
33. On a scale of 1 to 5 how much you used to like science **before the MSL program** (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
34. On a scale of 1 to 5 how much you like to do science experiments now? (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)
35. On a scale of 1 to 5 how much you liked to do science experiments **before the MSL program** (1-not at all 2-not much, 3-average, 4- like to learn 5- like very much)

2.6 Other

36. How many science fairs have you attended? Yes/No
37. Have you explained any models in these Science fairs? Yes/ No
38. If yes, can you explain your experience (open)

2.7 Experience with instructor

39. Did you face any difficulty in understating the MSL instructors? Yes/ No
40. Did you ask any doubts to the instructor? Yes/No

2.8 Virtual Classes

41. Are you getting any virtual sessions from the program for the last one year (to make sure not to confuse between online classes conducted, by school if any)? Yes/No
42. How are these classes conducted?
43. frequency of classes? Daily/ Weekly twice/ Weekly once/ irregular/ other
44. How long does each session lasts?
45. What are the topics taught in the session
46. Are you also attending the online classes conducted by your school? Yes/No
47. If yes, how is this program different from school's online class? (open)

48. Do you have access to smartphone/ laptop whenever you want to study ? Yes, whenever/ Yes most of the time/ No, rarely/ Not at all
49. Does your parents engage with you in studies yes/ No/ Sometimes
50. Does your parents encourage to attend virtual classes and study? Yes/ No/ Sometimes

2.9 YIL Specific questions

48. As a YIL, do you used to help other students in your class in understanding science concepts? Yes, a lot of time/ Yes, Sometimes/ Rarely/ No
49. Did the YIL program helped in improving your communication skills? Yes/No
50. Did it help you in improving your personality development? Yes/No
51. If Yes, can you explain what kind of personality development traits you have improved? (open)
52. Have you taken any initiatives in your community to teach science or conduct science experiments? Yes/ No
53. If yes, can you explain
54. Have you won any science competitions? Yes/No
55. If yes, explain.
56. Do you know who is the sponsor of the program? Yes/ No (if replied Honeywell, tick yes)
57. Do you have any other comments / remarks about the program? (open)

10.3 Parents' Interviews

General Information

1. Mother/Father
2. Which class your child is studying?
3. Are you aware of the Mobile Science Lab/ Science Centre classes your child was exposed to? Yes/No/ No, they are not exposed

If Yes, (if No, go to 4)

3.1 How many MSL/SC classes your child has attended?
3.2 Is your child a Young instructor leader? Yes/ No/ Don't know
3.3 Have you noticed any improvement in the below aspects of your child after attending these classes? (tick the ones)
a) confidence b) curiosity to learn c) comprehension d) knowledge e) communication
3.4 Does your child speak to you about the science experiments? Yes/No
3.5 Have you noticed any improvement in your child's interest to learn science? Yes/ No/ Don't know
3.6 Does your child conduct science experiments in home? Yes/No
3.7 Do you believe these experiment based science classes will help your child better in learning? Yes/No/ Don't know
3.8 if yes, how? a) Ease of understanding concepts b) Help in understanding school curriculum c) Helped in exams d) increased interest in science e) imbibe better confidence f) improve communication skills g) peer to peer learning h) others
3.9 Do you like to see your child working in the areas of science in future? yes/ No
3.10 Do you have any other comments about this science classes?
4. Is your child getting virtual classes from school? Yes/No

5. Are you aware of the virtual classes your child is doing through Agastya Foundation? Yes/ No/ No virtual classes from Agastya
If Yes, (if No end)

5.1 Do you know what your child is taught through this class? Yes/No
5.2 Do you find it beneficial to your child? Yes/No
5.3 Does your child have access to smartphone/laptop whenever they want to learn? Yes, whenever/ Yes most of the time/ No, rarely/ Not at all
5.4 Do you encourage your child to study? Yes/ no/Sometimes
5.5 Do you sit with your child sometimes while he/she is studying? yes/ no
5.6 If no, why? (open)
5.7 Do you have any other comments about these virtual classes?

10.4 Teachers' Interviews

General Information
1. School Name
1.1 City Name
2. To which grades you are teaching?
3. Which subjects you are teaching?

Training workshops

4. Have you attended the training workshops? Yes/ No
5. How many times have you attended these workshops?
6. On a scale of 1-5 (1-Very poor, 2-poor, 3-average, 4-good, 5-excellent), what would you rate the training provided to you?
7. What was the most useful topics covered in training?
8. Did this program help you improve your Science concepts & understanding? Yes/No
9. Did the program help you in teaching the students in a more effective way? a) Yes, very much b) Yes c) a little d) not at all
10. What are the changes you've brought into your classrooms after attending the training sessions?
11. Have you seen any issues/drawbacks in these training sessions? yes/No
12. If yes, can you share any few

Student development

13. Do you think experiment-based learning is better that classroom sessions for students? Yes/ No/ both are necessary
14. Have you also attended the below programs with students. A) Mobile Science lab b) Science Centres c) Not attended
15. If yes, how would you rate the way of teaching in these MSL/SCs to students? (1-very poor, 2-poor, 3-average, 4-good, 5-excellent)
16. How often did the MSL visited the school? or how often school students visited science Centers?
17. Did all the students between 6^{th} and 10^{th} grade get exposure to the program? Yes/No
17.1 If No, Explain.
18. Have you noticed any improvement in your students in any of the below areas after them attending the program? a) Ease of understanding concepts b) understanding school curriculum better c) Scoring

better in exams d) increased interest in science e) better confidence to ask questions f) improved communication skills g) more peer to peer learning h) None of the above i) others
19. Can you give any three success factors of the program? (open)
20. Do you have any success story to share, on how the program has impacted either any individual student or a group of students? If yes, please explain (open)
20. Have you seen any issues/drawbacks/challenges in these sessions or overall program? Yes/No
20.1. If yes, can you share
21. Do you know who is the sponsor of the program?
22. Have you attended any volunteering sessions? Yes/No
22.1. If yes, can you share the experience (open)
22.2 In a scale of 1 to 5 how effective were these volunteering sessions?
23. How did your work changed in the last 1+ year after COVID ?
24. Do you have any other comments about the program, please feel free to share

10.5 Headmasters' Interviews

1. Name/ School Name/ Medium/ Grades/ Total No of students
2. City
3. How did you know about the Agastya Science Experience Program? Who approached you?
4. Did Mobile Science Labs visited to school did you took the students to the science centers?
5. How often did the MSL visited the school? or how often school students visited science Centers? How long were each visits?
6. Did they give exposure to all the students in one visit, or was it in turns? or was it given only to any particular students?
6. Were you able to accommodate enough time for these MSL/SC seamlessly? How did you accommodate this into your school timetables?
7. How would you rate the MSL/SC program and its effectiveness? (1-very poor, 2-poor, 3-average, 4-good, 5-excellent)
8. What has been the major change/improvement that the Science Experience program has brought to your school? Have you witnessed any impact? Can you share any instances?
9. Have you noticed an improvement in students in any of the below traits?
a) Ease of understanding concepts b) understanding school curriculum better c) Scoring better in exams d) increased interest in science e) better confidence to ask questions f) improved communication skills g) more peer to peer learning h) None of the above i) others
9.1 Any explanations?
10. Are you aware about the virtual classes and programs Agastya are doing with the children? If yes, how do you think it is beneficial?
11. Did the teachers in your school got training sessions from the program? If yes, what kind of training?
12. Did you find any improvement/change in teachers 'approach to their classrooms after attending these trainings? Explain
13. Do you have any suggestions for improving the intervention or the learning experience of the students?
14. Did your students attended any science fair organized by the program? If yes, can you share the experience
15. Is there Young Instructor leaders selected by the program in your school? If yes, can you describe about their works and activities

16. Do you know who is the sponsor of the program?
17. Were there any volunteering sessions conducted by the program? If yes, can you share your experience
18. How did your work changed in the last 1+ year after COVID?
19. Do you have any other remarks about the program, please feel free to share.

10.6 Agastya Program Team's Interview

(questions to be asked as per the role of the team member in the organization & program)

1. Name
2. Designation in Agastya
3. Can you briefly explain your role in Agastya
4. Can you briefly explain your role in the Science Experience program
5. Are you in-charge of any specific city or specific number of MSLs/SCs?
6. Can you share the idea of the program, what you were looking for through implementing such a program
7. What is the change you were envisaging within through your program?
8. How are the experiments designed, who all were the stakeholders involved in designing the experiments? their background
8. Can you explain the operational aspects of the program, how schools are identified, how they are approached, how the visits are planned, how the trainings are planned etc.
9. How receptive were schools towards the program initially. Have that changed in the course of time?
10. Can you explain how the reporting works from the field level? Do you follow any MIS?
11. Do you have an internal monitoring system within Agastya to monitor the physical and financial aspects of the program? Please explain
12. How does your reporting to other stakeholders including the sponsors work?
13. Have you taken any course corrections to make any improvements in the program from the feedback you receive from various stakeholders? Explain
14. From the 2 impact assessment conducted with students, what were your major take-away. What were the action plans you prepared from those learnings?

15. Do you visit the MSLs/SCs? how frequently?
16. What kind of engagement you keep with the operators in the field?
17. On a scale of 1-5 (1-very poor, 2-poor, 3-average, 4-good, 5-excellent), can you rate the effectiveness of the intervention across all schools?

18. Can you explain your procurement process?
19. Can you explain your accounting process? (how expenses are recorded/ payments are made/ books that are kept)
19. Are the SC/MSL operators pay roll employees of Agastya/ contract/ self-employees?
20. In whose ownership does all the physical assets / CAPEX purchased come under.
21. What are your sustainability plans to run the centers/ MSLs?

22. How will you rate the interactions and support provided by Honeywell team in the implementation of program (1-Very poor, 2-poor, 3-average, 4-good, 5-excellent)
22.1. Do you have any comments on this.

23. How will you rate the effectiveness of the volunteering sessions conducted by the Honeywell staff? (1-Very poor, 2-poor, 3-average, 4-good, 5-excellent)
23.1. Do you have any comments on this. Did you receive any feedbacks from the volunteers about the program? Describe

24. What are the major challenges you've faced while implementing the program? Can you list 3 to 4.
25. What do you thinks are the major success factors of your program? List 3 to 4
26. What are the improvement areas you are working on.
27. What are the plans/ vision you are having for the program for the coming years.

28. How did your operation changed in the last 1+ year after COVID. Please elaborate.
29. Please elaborate the issues, challenges, achievements, success factors, improvement areas etc. in your virtual mode of delivering services to students.

10.7 Honeywell Program Team's Interview

1. Name:
2. Designation in Honeywell:
3. Can you briefly explain your role in Honeywell
4. Can you briefly explain your role specific to the Science Experience program (if any) – Heading CSR
5. Can you share the idea of the program, what you were looking for through implementing such a program-
6. Can you share the outcomes and long-term impact you were envisaging through the program –
7. What are the monitoring mechanism you have adopted to oversee the program.
8. How often did you interact with the Agastya team to understand the progresses, challenges and improvement areas
9. How often does your team visited the MSLs/SCs? Have your team attended the science fairs? Have your team interacted with the YILs /students?
10. Did you and your team gave feedback to the program? If yes, how receptive was Agastya towards these feedbacks? Please explain –
11. Do you think there are ways in which the scope of the project could be widened? If yes, please explain.

12. Are you satisfied with the implementation of the program by Agastya? Please rate.
(1-Very poor, 2-poor, 3-average, 4-good, 5-excellent)
13. Are you satisfied with the reporting done by Agastya team? Please rate.
(1-Very poor, 2-poor, 3-average, 4-good, 5-excellent)
14. Are you satisfied with the financial utilisations of the program. Please rate
15. On a scale of 1-5 (1-very poor, 2-poor, 3-average, 4-good, 5-excellent), can you rate the overall effectiveness of the intervention? Can you share any instance where you witnessed the impact?
16. What are the major challenges you've faced while rolling out the program? Can you list 3 to 4.
17. What do you thinks are the major success factors of the program? List 3 to 4 – 18. What are the improvement areas you have observed -
19. What are the plans/ vision you are having for the program for the coming years.
Sustainability
20. How did the project focus changed in the last 1+ year after COVID. Please elaborate.
How satisfied are you with the strategies Agastya has adapted?

21. Please elaborate the issues, challenges, achievements, success factors, improvement areas etc. in the virtual mode of delivering services to students.
22. How will you rate the effectiveness of the volunteering sessions conducted by the Honeywell staff? (1-Very poor, 2-poor, 3-average, 4-good, 5-excellent) :
23. Can you explain a bit on this.
24. Did you receive any feedbacks from the volunteers about the program? Describe

10.8 Volunteers (Honeywell) Interviews

1. Name
2. Designation
3. How many times have you volunteered with the Science Experience program?
4. Can you explain your experience? What kind of volunteering activities you were a part of?
5. How satisfied were you with your volunteering experience? (1-very poor, 2-poor, 3-average, 4-good, 5-excellent).
6. Are you aware of the Science Experience program Honeywell is implementing through Agastya? If yes, do you have any feedback from your involvement as a volunteer
7. Have you noticed any impact or success stories you would like to share about the program.
8. Any other observations/ suggestions

10.9 Pending approval or not-budgeted line items in financial report

Activity	Type of Cost	Description	Quantity	Budget	Comment
Covid-19 - Safety Measures Cost	OPEX	Sanitizing the place		7,20,000	Sent for approval, waiting for the confirmation
Covid-19 - Safety Measures Cost	CAPEX	Thermal Thermometer	120	5,09,760	
Covid-19 - Safety Measures Cost	CAPEX	Laptop (refurbished)	120	36,00,000	
Covid-19 - Safety Measures Cost	CAPEX	Projector with screen - new	60	18,00,000	
Innovation Hub (3 New for Bangalore SC)	CAPEX	Innovation Hub (3 New for Bangalore SC)		9,90,000	Sent for Approval, but not approved
Capex & incremental opex for Converting old MSL to	OPEX	Math MSL -Bangalore	1	3,00,000	Sent for Approval, but not approved
Electronics MSL- Bangalore	OPEX	Cretile Kits -	15	3,50,000	Sent for Approval, but not received confirmation

Adding additional math module to MSL (addign one more instructor)	OPEX	Math Kits		17,34,000	Sent for Approval, but not received confirmation
Mobile Makers Space (Banao Bus) - (includes capex+incremental opex)	OPEX	Refurbishing, Painting, Stickering		20,000	Sent for Approval, but not received confirmation
Mobile Makers Space (Banao Bus) - (includes capex+incremental opex)	OPEX	Instructors Training for 15 days-Induction trg		37,000	
Mobile Makers Space (Banao Bus) - (includes capex+incremental opex)	CAPEX	Power tools/Digi Fabrication, Electronic hardwares, Programmbale electronic kits, Electronic Parts kit, (kit for curious) Hardware & Hand tools		5,00,000	
Mobile Makers Space (Banao Bus) - (includes capex+incremental opex)	OPEX	Incremental Opex		1,75,000	
Technology for iMobile Lab	CAPEX	Laptops	10		
Technology for iMobile Lab	CAPEX	Wi-fi Dongle	2		
Technology for iMobile Lab	CAPEX	Projector	1		
Technology for iMobile Lab	CAPEX	Multimedia Speakers and Portable Screen	1		
Coding Program (BNG) Laptops, Wi-fi Dongle, Projector ,Multimedia Speakers and Portable Screen	CAPEX	Technology for iMobile Lab		4,00,000	Sent for Approval, but not received confirmation
Coding Program (BNG)	OPEX	Volunteers/Interns		-	
Coding Program (BNG) Communication & Stationary, Consumables, Food for Children	OPEX	Program Cost		2,60,000	
Coding Program (BNG)	OPEX	Governance and administration		26,000	
PR agency and Event cost	OPEX	PR agency and Event cost		5,00,000	Sent for Approval, but not received confirmation