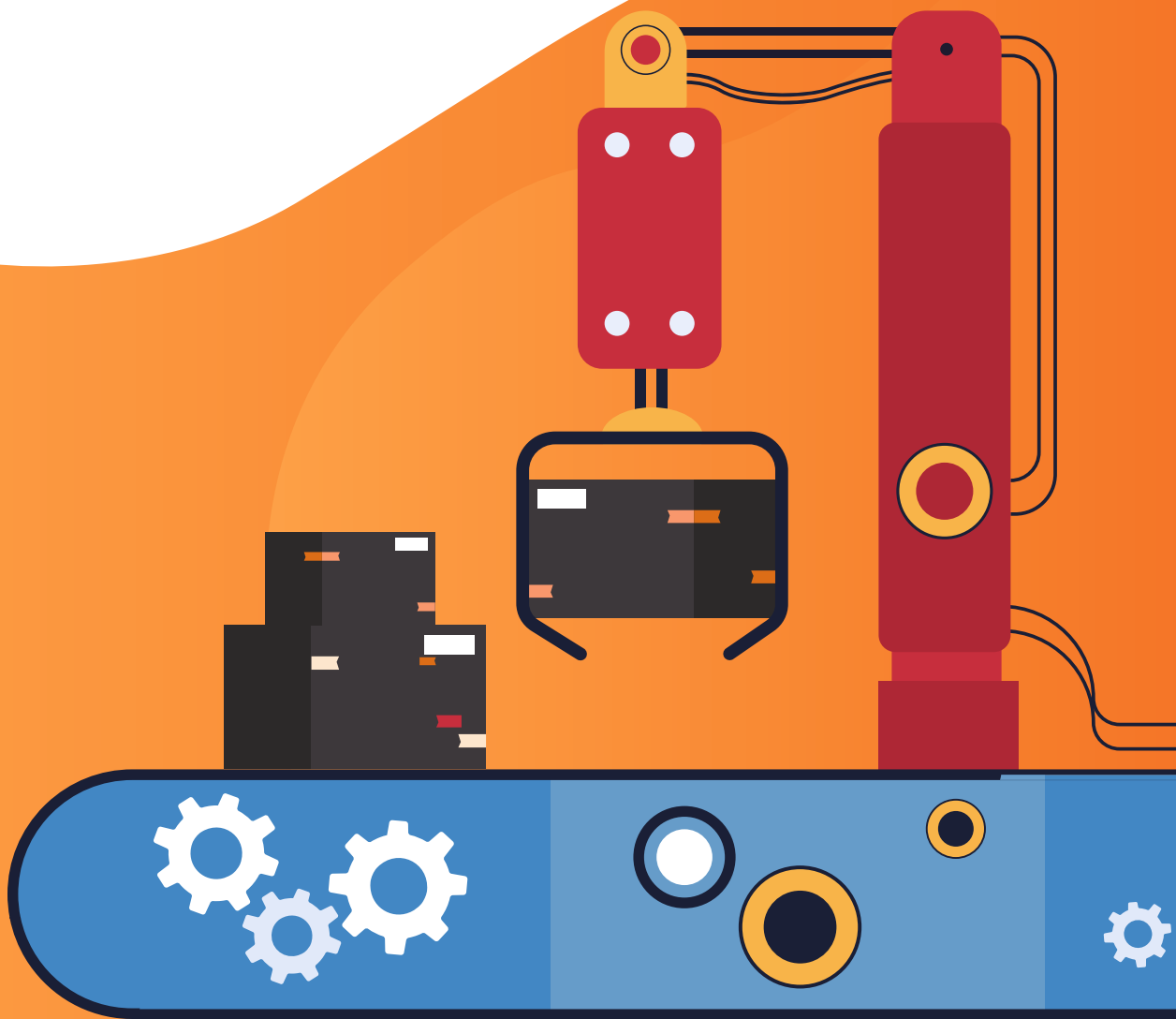# avishkaar

India's Future in Next-generation Tech & STEM

Assessing Aspirations of Indian Parents and Children in
Next-generation Technology & STEM Education
and Careers

Contents

An Avishkaar Report   **June 2021**

Foreword

> **"**
>
> *It doesn't matter if you end up pursuing a major that has to do with computer science. Coding skills, technology skills, programming skills – these are skills that are so, so important to every field of work that you could possibly pursue in the future.*
>
> **Trisha Prabhu, 17, ReThink founder**

ReThink is a non-intrusive, innovative, patented software product that effectively stops cyberbullying before the damage is done.

> **"**
>
> *Many people discouraged me and told me 'this is not possible to do'. So if you want to change the world, take the impossible task first, because it's impossible for the world – not for me, not for you or whoever wants to do something.*
>
> **Harshwardhansinh Zala, 15, Drone Maker**

> **"**
>
> *If the plan doesn't work, change the plan. Not the goal. Learn to adapt to a situation and how to improve your vision from there.*
>
> **Dea Kurti, 16, Novel Girls founder**

After her experience with Girls Who Code, **Dea Kurti** was inspired to start Novel Girls, a program that sends books about STEM and Women Empowerment to women in Albania and Ukraine.

The chutzpah of these young innovators is both shocking and inspiring for us adults who grew up in the last century. These teenagers are raring to make change happen, to address the biases that we have hard coded in our systems, to right the wrongs that they see in their environments and the world today, and they will stop at nothing when it comes to innovating to solve these endemic problems. Thanks to the tools that they have at their disposal, they see the world as their playground and the universe as their circle of influence in no part due to builders and entrepreneurs like Elon Musk and Jeff Bezos who talk about landing humans on Mars and moon as if it is a trip to the neighbourhood supermarket.

If you think that this is limited to only a few precocious youngsters you couldn't be far from the truth. This generation of children are growing up interacting with technology as an extension of the human body and mind. They will inhabit a world where currency notes and coins are antique items and economies run on democratized digital currencies like Bitcoin and Ethereum; where boundaries between humanoid robots and organic humans will be blurred. One cannot help but admire the irreverent drive of thousands of children sitting in remote corners of the world today who are taking advantage of open source systems, online communities and free flowing information to solve real world problems.

What can we as adults do to support them (besides getting out of their way)?

- Let curiosity lead the way and give them the tools to tinker and build and experiment.

- Create microenvironments in homes and schools where there are unafraid to pull apart devices to take a peek under the hood, where they are not berated for thinking outside the box, where they feel safe when they fail.

- Help them become active creators and shapers of technology rather than mere consumers.

We at Avishkaar are on a mission to build an army of young innovators across the globe and we are doing that by supporting parents and educators who believe in the same mission and providing all the necessary tools and environment to the children who love to build and connecting them with like minded innovators and mentors across the globe.
Join us in our mission to support this generation of builders and makers to solve the intractable problems of today.

Please feel free to write to me if you would like to join the movement or if you have any ideas or suggestions to further this cause.

Pooja Goyal
Co-founder, COO, Avishkaar

✉ pooja.goyal@buildingblocks.in

Executive Summary

Avishkaar conducted a survey in the month of June 2021, with an aim to gauge the perception of parents of young children, as well as the children themselves, on their career aspirations in STEM (Science, Technology, Engineering, and Mathematics) and next-generation technology fields.

The survey was split into two parts, one for parents and one for children. Approximately 10,000 responses (5,000 parents and 5,000 children) were obtained from the survey, with participation from Delhi, Mumbai, Bangalore, Chennai, Kolkata, and Pune, among others.

5000
Parents

5000
Children

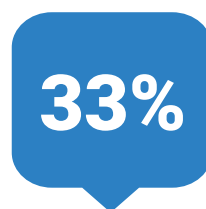**STEM-related subjects continue to be hot favourites**

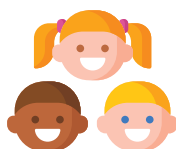56% of all parents are keen for their children to pursue IT/ Technology, more than any other subject. This is followed by Science (46%) and mathematics (43%). In contrast, only 23% of parents wish their child to pursue Arts-related subjects.

56%
Parents

57%
Child
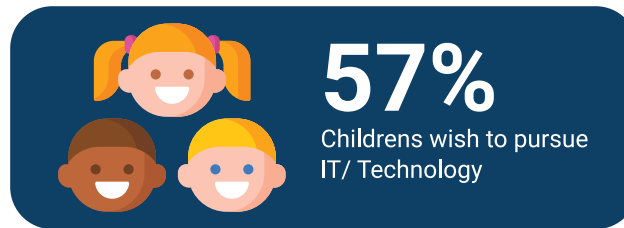
33%
Girl Child

60%
Boy Child

On the other hand, 54% of children wish to pursue Science in future, while roughly 57% wish to pursue IT/ Technology.

Parents want their child to pursue following subjects

Arts
23%

Science
46%

Maths
43%

IT/Technology
56%

57%
Childrens wish to pursue IT/ Technology
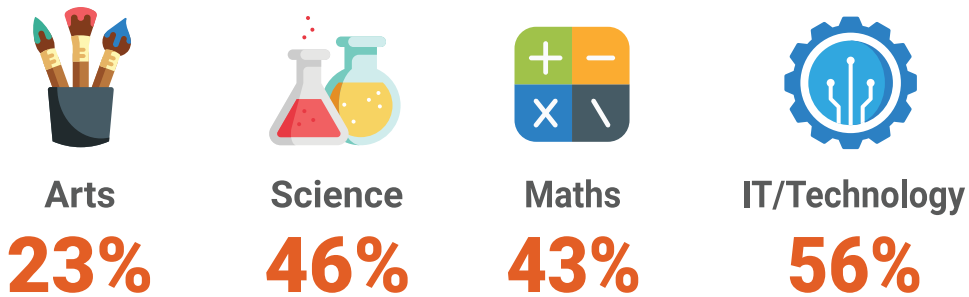
Why STEM?

76% Parents feel that STEM next-gen tech education is critical for their child.

When asked to highlight reasons, of the 76%, 75% feel that this will improve analytical skills within their children, and 69% feel that it is critical as they expect the world to become completely technology-oriented in the near future.

75% Improve analytical skills within their children

69% World to become completely technology-oriented

Not enough emphasis on STEM and next-generation technology education in school.

Only 33% of parents feel that the current school curriculum is enough to help their child prepare for a future in next-gen tech and STEM to some extent. 90% of parents feel that this aspect of the curriculum should be made a priority in school.

On the other hand, when compared to what children feel, a massive 73% feel that their school is doing enough to encourage them to pursue a career in STEM and next-gen tech.

33%

Current School Curriculum is enough to help their child prepare for a future in next-gen tech and STEM to some extent.

73%

School is doing enough to encourage them to pursue a career in STEM and next-gen tech.

SCHOOL

90% of parents feel that this aspect of the curriculum should be made a priority in school.

Parents' influence on children's choices - a boon or bane?

For over 60% of the children, parents remain the largest influencers on career decisions. With regard to their decision to pursue a career in STEM, 45% of children feel that their parents have been extremely influential in their decision. What caught our attention was that girls (74%) seem to be more influenced by their parents when it comes to deciding a career in STEM, as compared to boys (58%).

45%
Parents

45%
Child

74%
Girl Child

58%
Boy Child

60%
Parents remain the largest influencers on career decisions.
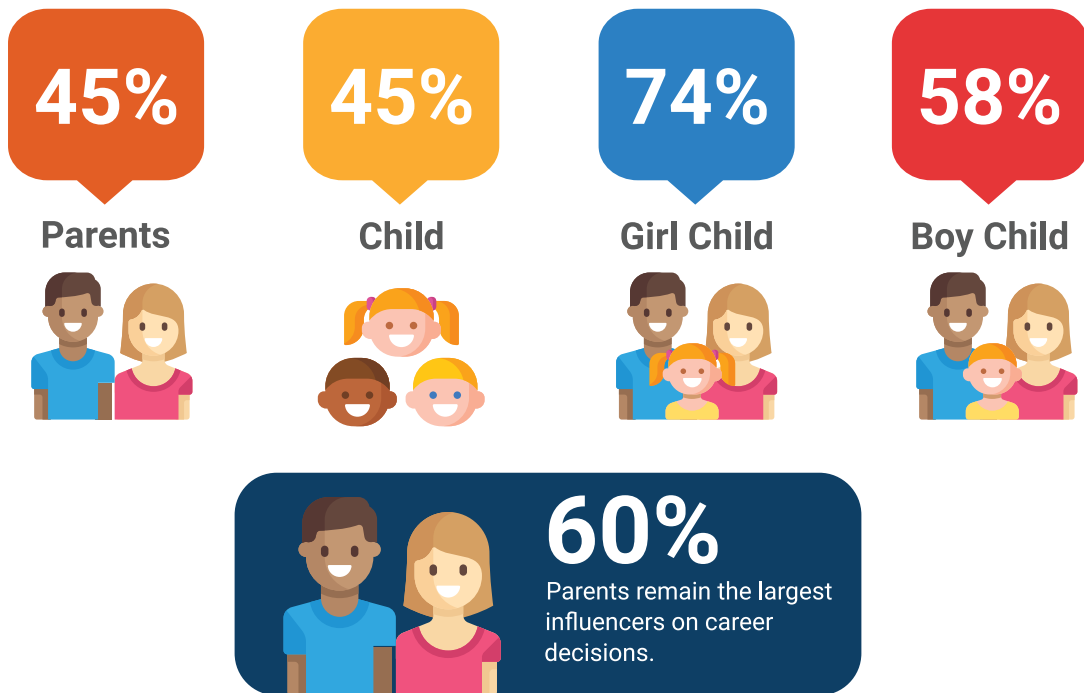
Underrepresentation of girl children choosing to pursue a career in STEM

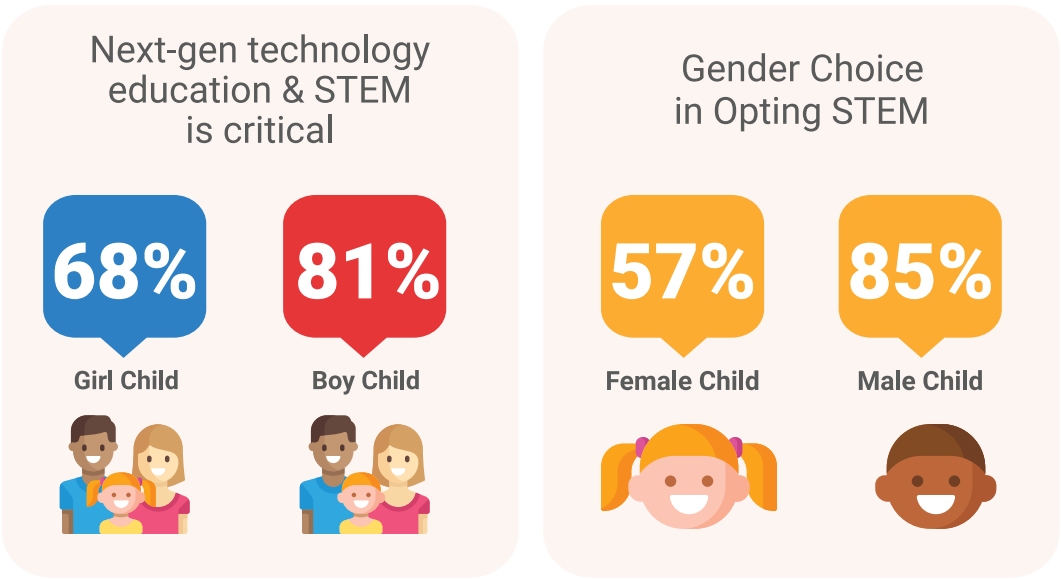**50%** Parents feel that societal pressures are one of the main reasons.

42% Feel Parents' influence plays a role.

30% Work environment in our country in these fields is more suitable for males versus females.

What grabs our attention even more is that many parents (54%) feel that those parents with male children are actually more likely to influence their child to pursue STEM than parents with female children.

On the other hand, when children were asked to express their choice, 85% of male children would choose to pursue a career in STEM, as compared to only 57% of female children.

Lastly, 95% children, including girls, recall male role models as inspiration in STEM fields, highlighting the urgent need to increase the exposure around women role models in STEM fields.

Next-gen technology education & STEM is critical

68%
Girl Child

81%
Boy Child

Gender Choice in Opting STEM

57%
Female Child

85%
Male Child

95% Children

including girls, recall male role models as inspiration in
STEM fields, highlighting the urgent need to increase the exposure around
women role models in STEM fields.

Insights
from Parents

A desire amongst parents for their child to pursue STEM and next-gen tech

We observed that, in general, **56% of all parents are keen for their children to pursue IT/ Technology, more than any other subject.** 46% of parents in total are also keen for their child to pursue Science (46%), while 43% of parents in total are also keen for their child to pursue Mathematics (43%). In contrast, only 23% of parents wish their child to pursue Arts-related subjects.

Parents of male children are more keen for their child to pursue Science, Mathematics, IT, and engineering than parents of female children.
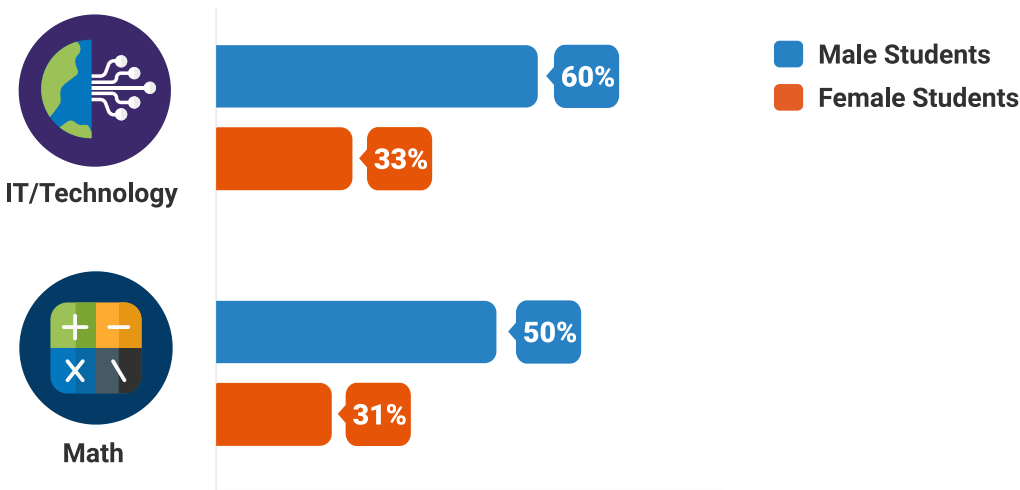
Interestingly, mothers are more keen for their children to pursue Science and Engineering than fathers.

50% of mothers want their children to pursue Science as compared to 40% of fathers, while 36% of mothers want their children to pursue engineering as compared to 25% of fathers. The main reason behind this thinking is that a higher proportion of mothers (84%) feel that STEM improves analytical thinking abilities for their children than fathers (64%), and hence they feel that this prepares them for a better future. Mothers are also more likely to encourage their children to develop an interest in STEM through visual media such as TV and books, as well as through field visits and club activities. Fathers, on the other hand, wish to develop this interest more by encouraging them to participate in science competitions and exhibitions.

Parents feel that STEM and next-gen tech education is critical for their child

75%

Feel that it is critical as they expect the world to become completely technology-oriented in the near future

67%

Parents purchase science related games/ toys/ kits for their children

76%

Parents feel that this will improve analytical skills within their children

69%

Parents encourage their child to participate in science competitions and exhibitions

53%
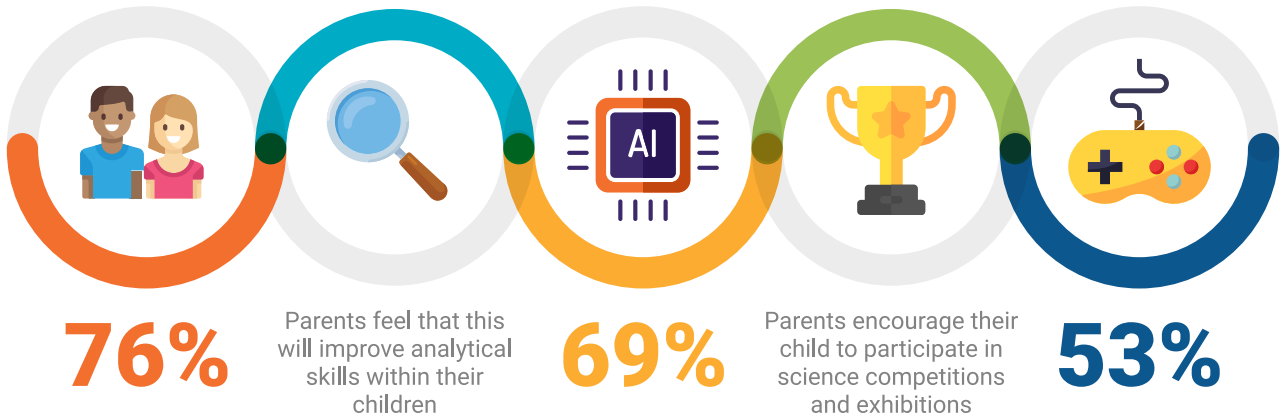
The discrepancy between opinions on the basis of the child's gender shows in the parents' perception of STEM subjects.

Percentage of parents who feel that next gen technology education and STEM is critical for their child.

Parent with Male Child 81%

Parent with Female Child 68%

And while a lesser number of parents with girl children stated that STEM and next-generation technology education is critical for their child, a significant 71% of the respondents out of the ones who would like their daughters to study the subject, believe that

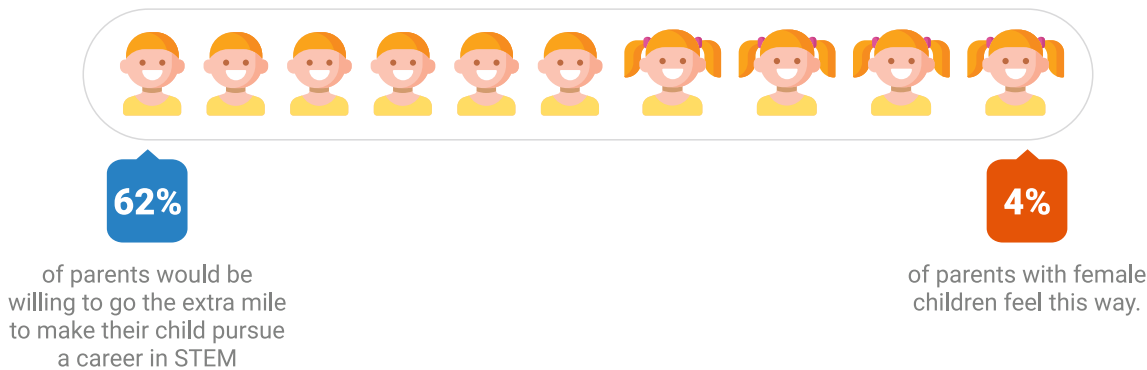*"IT prepares them for a better future, career wise"*

Low faith in the school curriculum, parents appear keen to play an influential role.

When we come to the issue of STEM education within the school ecosystem, o**nly 33% of parents feel that the current school curriculum is enough to help their child prepare for a future in next-gen tech and STEM to some extent**. 90% of parents feel that this aspect of the curriculum should be made a priority in school.

Interestly, a higher ratio of fathers (roughly 48%) feel that currently schools are not doing anything to prepare their children for a future in next-gen tech, as compared to mothers. In addition, parents of older children in particular feel that schools are not doing enough. About 42% of parents with children in the age group of 13-17 years feel that **the current school curriculum is not helping their child at all**, which is a significantly higher ratio than that of parents with kids in younger age categories.

Perhaps the perception of a lack of motivation from the school's side is one reason for the level of influence parents feel they need to have on their children directly. **Roughly 45% of parents feel that they would be extremely influential on their child's career choices,** while another 50% feel that they would be somewhat influential.

62%

of parents would be willing to go the extra mile to make their child pursue a career in STEM
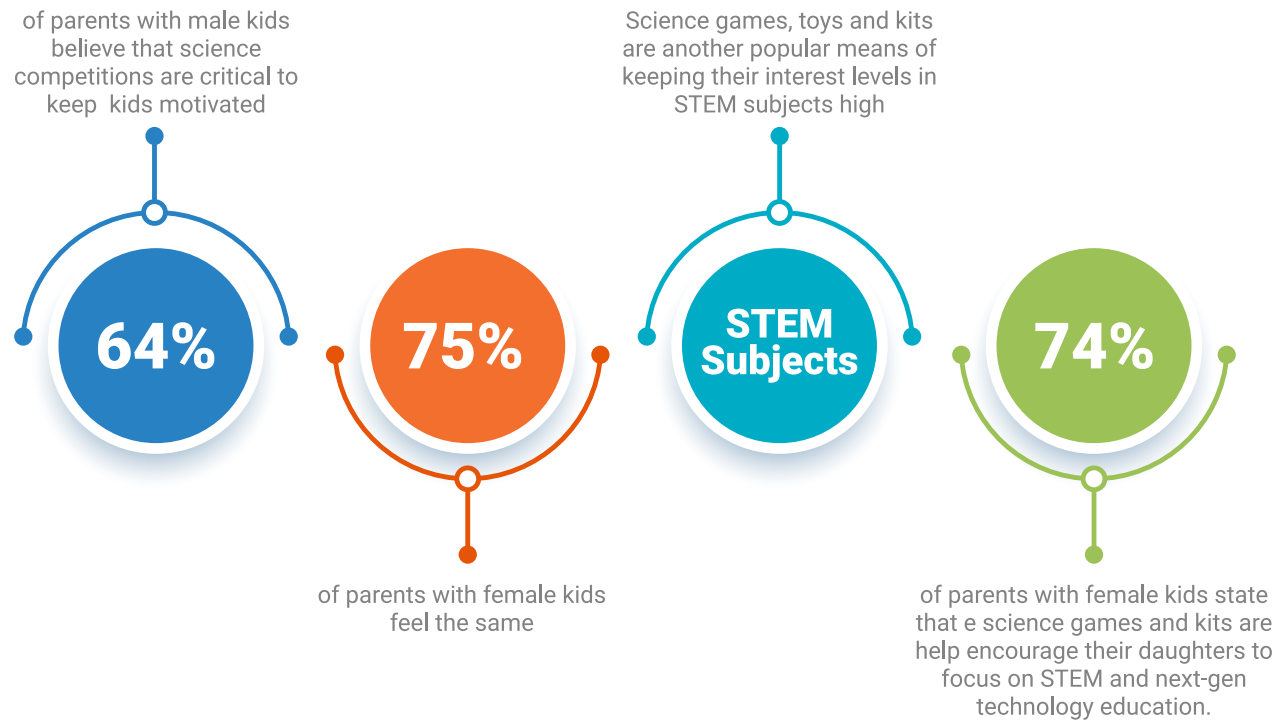
4%

of parents with female children feel this way.

Having said that, a very high proportion of parents are advocates of equal opportunities regardless of gender. Roughly **92% of the parents perceive that next-gen tech education and STEM subjects are equally important for girl children** as it is for boy children in our country.

Another **common understanding which is present amongst both sets of parents is that next-gen tech skills like AI, Robotics, and Coding, will be considered more important than other skills in the near future (77% of parents agree with this sentiment).** An average of 67% of all parents **believe that it is 'very relevant' to incorporate these skills into their child's education for them to become future proof.**

Challenges faced by the girl child in the STEM and next-gen tech space

Sadly, we cannot escape the fact that there is likely to be a gender bias in our country when it comes to studying STEM and next-gen tech related subjects. **50% of parents feel that societal pressures are one of the main reasons behind male children pursuing STEM subjects more than female children, while 42% feel that the parents' influence plays a role. 30% of parents even feel that the work environment in our country in these fields is more suitable for males.** What grabs our attention even more is that many parents (54%) feel that those parents with male children are actually more likely to influence their child to pursue STEM than parents with female children.

Despite the gender bias that exists in our country, our survey shows that there is a rising tide of encouragement from parents to motivate the girl child to participate in STEM related fields as well.

of parents with male kids believe that science competitions are critical to keep kids motivated

Science games, toys and kits are another popular means of keeping their interest levels in STEM subjects high

64%

75%

STEM Subjects

74%

of parents with female kids feel the same

of parents with female kids state that e science games and kits are help encourage their daughters to focus on STEM and next-gen technology education.

For most parents, success is driven by passion

Ultimately, most parents feel that success for their child cannot be achieved by forcing them to take up an interest in a particular subject or field. Rather, it stems from passion. Working towards their passion is defined as the best measure of a child's success by more than 75% of parents. And while most parents are trying their best to encourage their child to find their interest and their passion, many parents (more than 60%) prefer to keep a hands off approach when it comes to performance, and would rather leave their child to define and discover success on their own terms.
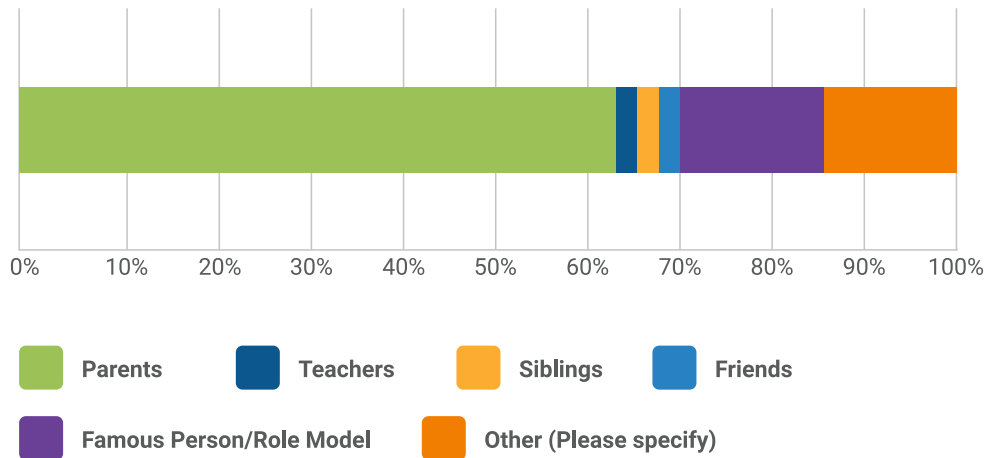
Definition of success for a child

|	
Working towards their passion	1
Define and discover success on their own	2
Extra curricular activities	3
Achievement	4
Money	5

Insights
from Children
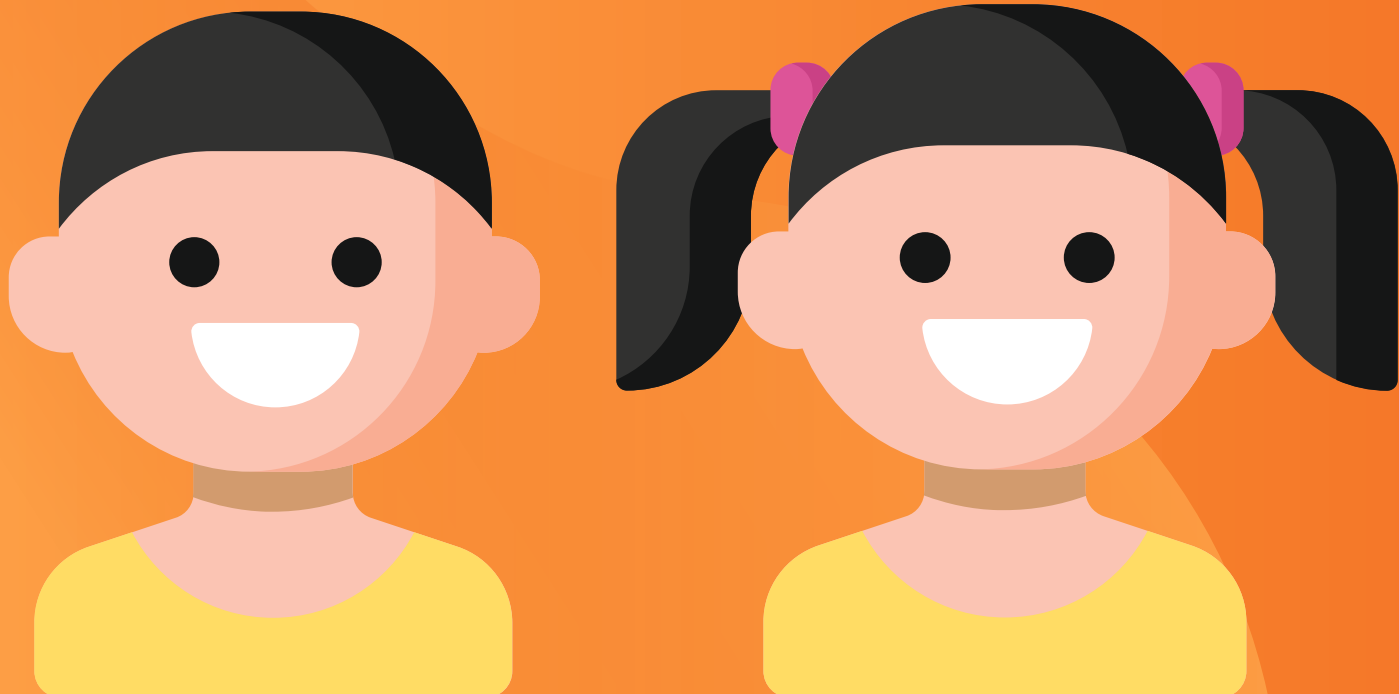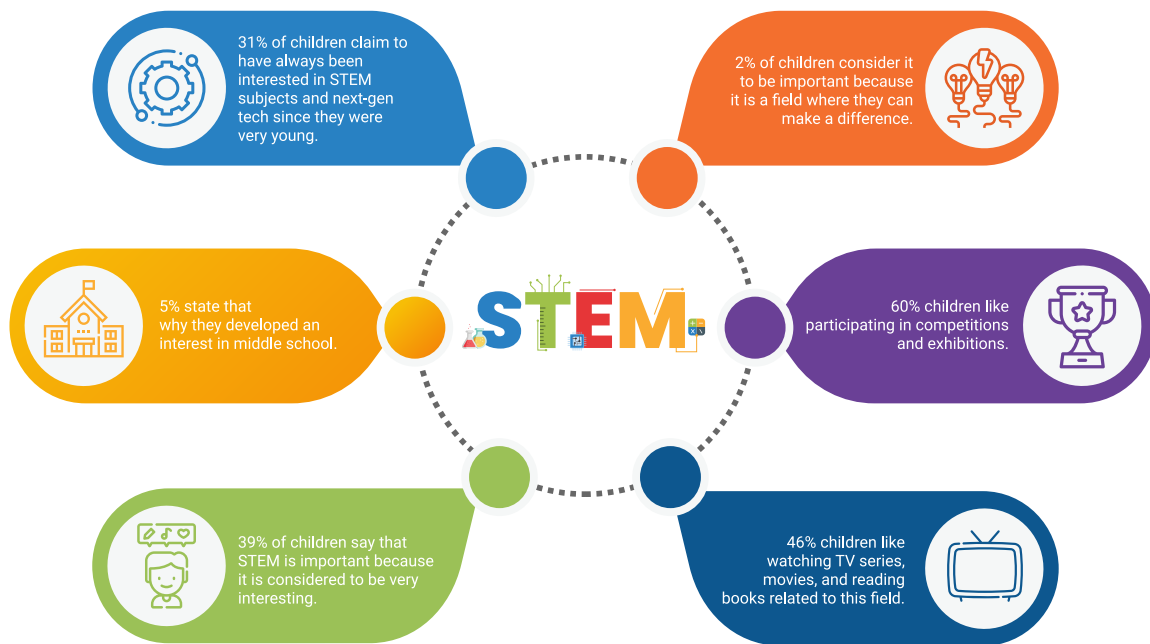
Definition of success for a child

Key Influence on Career Decisions

A majority of all children value working towards a passion as a measurement of success (more than 70%). This is in line with what most parents feel about defining success as well. 60% of female children also value their choice of career significantly and consider it as a key measurement of success. In contrast, 40% of male children value this metric.
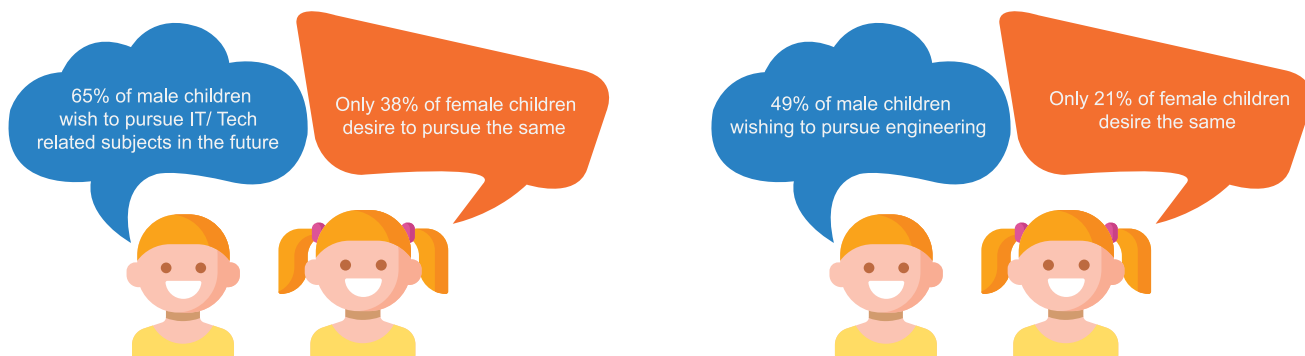
Ranking of subjects by students
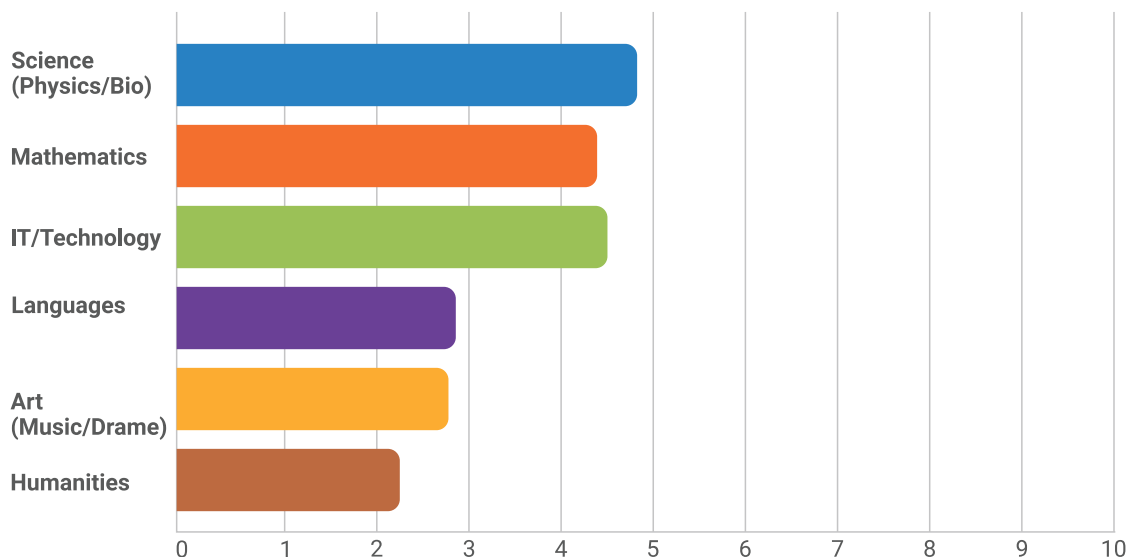
It is also interesting to observe the period in which this interest in STEM developed for the children.

31% of children claim to have always been interested in STEM subjects and next-gen tech since they were very young.

2% of children consider it to be important because it is a field where they can make a difference.

5% state that why they developed an interest in middle school.

60% children like participating in competitions and exhibitions.

39% of children say that STEM is important because it is considered to be very interesting.

46% children like watching TV series, movies, and reading books related to this field.

We also realise that the role of the school in influencing the child to develop an interest in STEM and next-gen tech is absolutely critical. A massive 73% of children feel that their school is doing enough to encourage them to pursue a career in STEM and next-gen tech. When we compare this to the parents' figure of 33%, we can conclude that many **students appear to have more faith in their educational system than their parents, when it comes to being prepared for a career in STEM.**

Gender differences - STEM as a career choice vs STEM as a learning opportunity

A total of 54% of children wish to pursue Science in future, while a total of 57% of children wish to pursue IT/ Technology (these are not mutually exclusive). However, we observe **a gender-based discrepancy here.**

65% of male children wish to pursue IT/ Tech related subjects in the future

Only 38% of female children desire to pursue the same

49% of male children wishing to pursue engineering

Only 21% of female children desire the same

When we approach the concept of STEM, we observe that 85% of male children would choose to pursue a career in STEM fields, as compared to only 57% of female children, indicating that the **discrepancy in opinion on pursuing a career in STEM fields doesn't only exist amongst the parents, but also within the children themselves.**
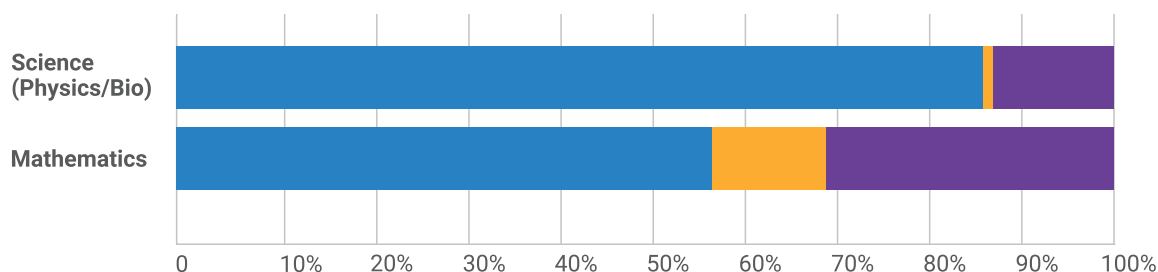
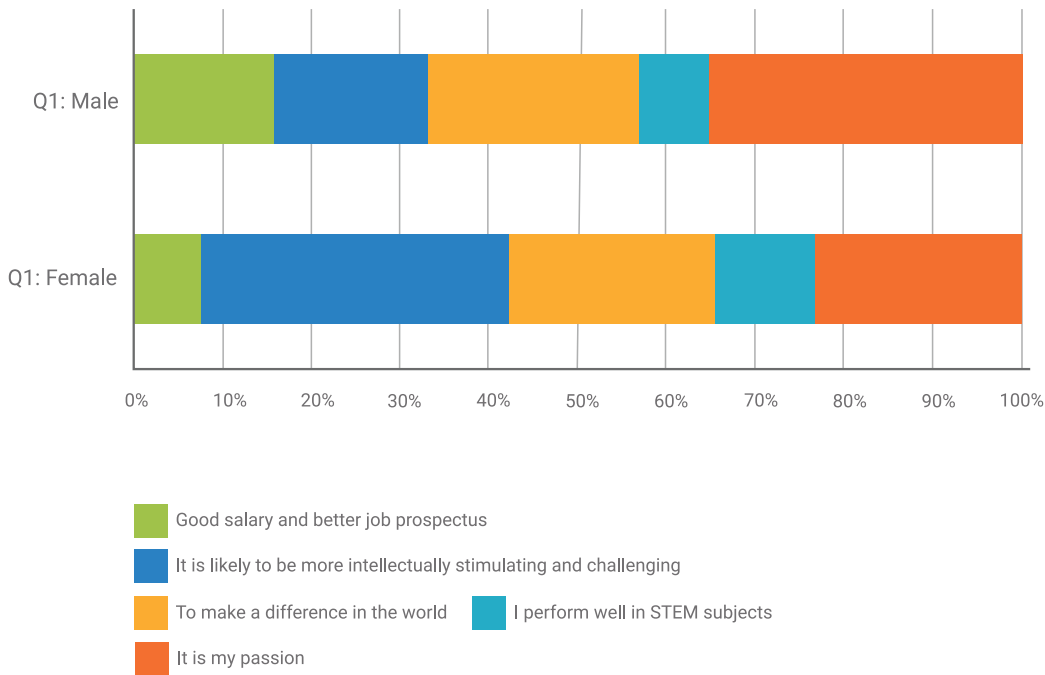

Desire to pursue a career in STEM fields

That being said, learning about Science and next-gen technology **is considered to be highly critical by both male and female children. 92% of males consider these fields to be important, while a whopping 96% of females feel the same way.** The primary reason behind this opinion as stated by these respondents include **'high levels of interest',** followed by the thought that these are fields in which they can make a difference, as they play a more important role in the modern world.

We can hence infer that while pursuing a career in STEM isn't considered as important for the girl child, the space is still thought to be relevant and important from a learning perspective.

This ratio of 96%, in essence, is where we find that the opinion of the girl child differs in some

cases from the opinion of their parents (where only 68% considered learning about STEM to be critical for their female child).

Interestingly, when asked to state their primary reason for choosing to pursue STEM subjects as a career choice.

Legend:
- Good salary and better job prospectus
- It is likely to be more intellectually stimulating and challenging
- To make a difference in the world
- I perform well in STEM subjects
- It is my passion

Parents play an influential role in pursuing STEM, even for the girl child

For most children (more than 60%), parents remain the largest influencers on career decisions. Specifically, kids amongst the younger age group of 5-8 years state that they solely (100%) depend on their parents for any career related choices.

Source influence to pursue STEM

39% Teachers
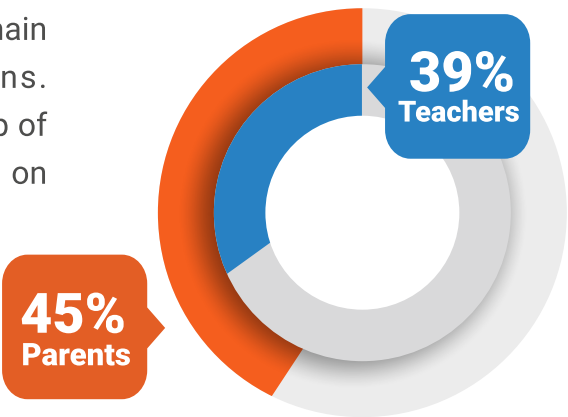
45% Parents

And despite the fact that a higher proportion of parents with male children are willing to go the extra mile to make their child pursue STEM subjects (mentioned earlier in the report), it is in fact the cohort of girls (74%) that seem to be more influenced by their parents when it comes to deciding a career in STEM, as compared to boys (58%).

Children are moving beyond preconceived gender notions

Lastly, we also asked the children to name their role model in the field of science, and amongst the

52%

Children that have a
role model in the field of science

95%

Students have cited a male
role moden in science
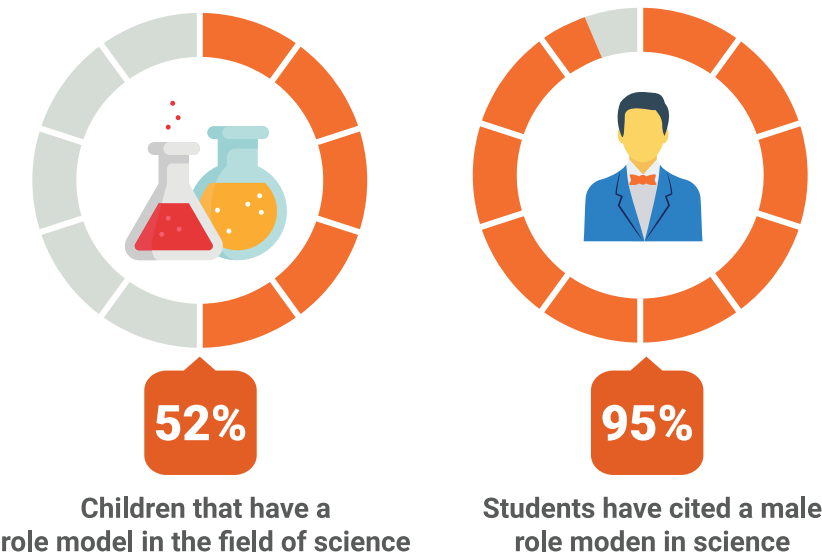
However, we also asked children to describe their ideal image of a scientist, and we found it fascinating that most of the responses provided by children indicate a gender-neutral approach towards their perception of a scientist. This is a clear indication of the progressive thought process of the next generation, where most children are keeping an open mind and not succumbing to any preconceived gender biases that exist within this space.

Survey Mehodology

Survey Methodology

The survey was conducted between June 1 to June 15. An approximate total of **5,000 responses from parents and 5,000 responses from children were obtained through this activity**, captured across demographics, and geographies within India. Most of the respondents belong to SEC A and to that extent the insights therefrom need to be construed and consumed accordingly. Responses were obtained primarily through an online survey tool, reconciled with additional data obtained through Avishkaar's own community of parents and children.

The survey questionnaire was designed to focus on the following key themes:

01

Assessing the interest in STEM-related subjects amongst children and the reason/ motivation behind this, along with the desire amongst parents to help or support their child in developing these interests.

02

Exploring the role of STEM and next-generation technology in the future of the children, along with the impact it could potentially have as they enter the first stages of their careers.
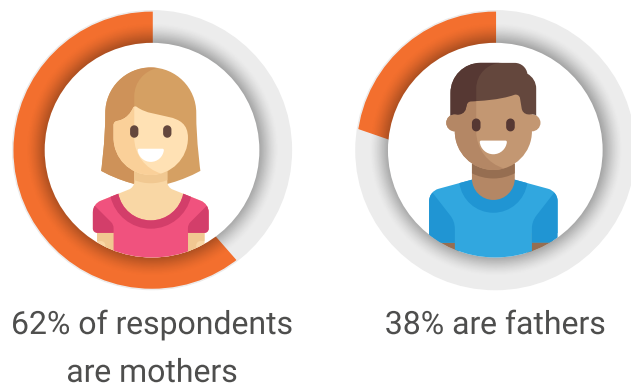
03

Discovering how STEM is perceived by the girl child and their parents, and the emphasis placed on preconceived gender biases, as well as social stigma, concerning STEM education for female children in our country.
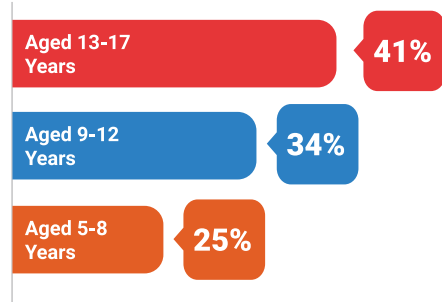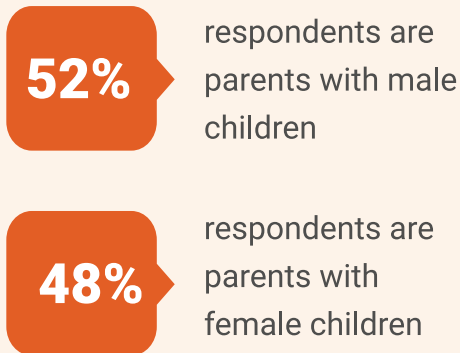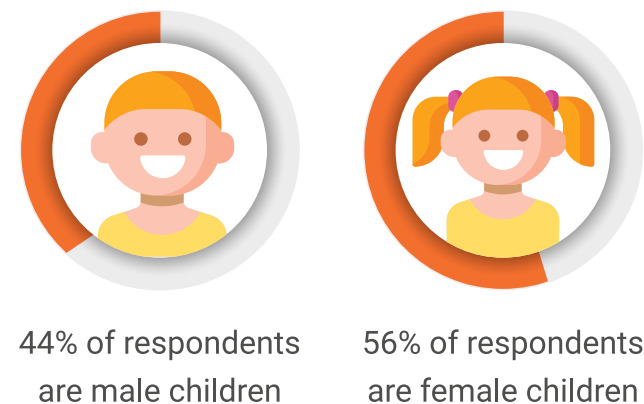
Survey Demographics

Survey for Parents

Gender

62% of respondents are mothers

38% are fathers

Age

Aged 13-17 Years	41%
Aged 9-12 Years	34%
Aged 5-8 Years	25%

Gender of child

52% respondents are parents with male children
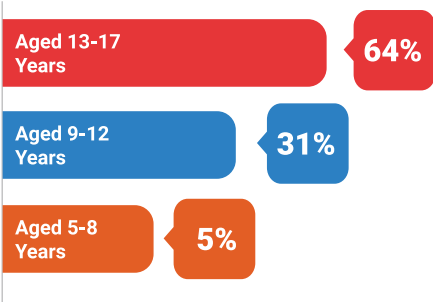
48% respondents are parents with female children

Respondents are from major metros, including Delhi NCR, Bangalore, Mumbai, Chennai, Kolkata, Pune, Hyderabad, and others.

Survey for Children

Gender

44% of respondents are male children

56% of respondents are female children

Age

| Aged 13-17 Years | 64% |
| Aged 9-12 Years | 31% |
| Aged 5-8 Years | 5% |

Respondents are from major metros, including Delhi NCR, Bangalore, Mumbai, Chennai, Kolkata, Hyderabad, and others.

About Avishkaar

Avishkaar is one of India's largest robotics, coding and edtech providers for children between the age group of 5 to 15 years. Avishkaar is at the cutting edge of next-gen technology education providing a comprehensive platform to teach and learn 21st-century skills like Coding, Robotics, AI, IoT, 3D printing and Drones. Avishkar is the only edtech platform that provides microdegrees for Robotics, Coding and App development.
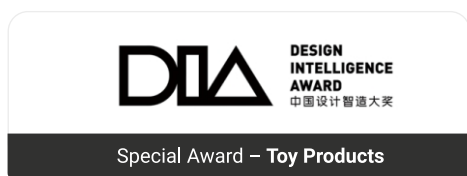

Innovate. Share. Win.

Mechanical Design   Robotics   App Dev

Coding   IoT
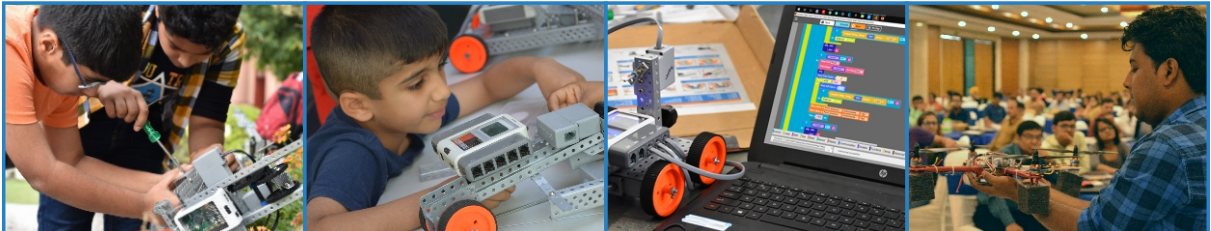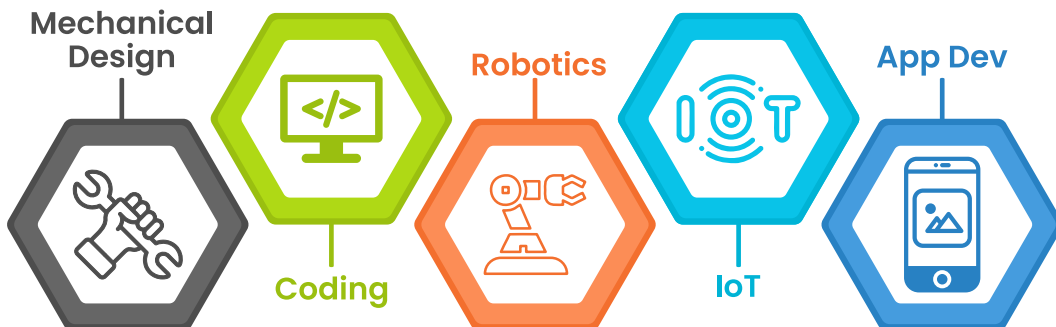
"Learn skills that will be required
for 80% jobs in the future!"

The platform includes Award-Winning Robotics kits like E Series, Tweak, and Maker Board, Personalized Learning with Live Online courses led by expert teachers, an active and engaged online community of children who love to code, build and innovate, an international championship for coding and robotics [Avishkaar League]. In 2017, Avishkaar started working with Atal Tinkering Labs envisioned by NITI Aayog launching Avishkaar Innovation Track held to provide a platform to young makers to make, tinker and innovate.

Avishkaar's efforts have been recognized & awarded

DIIA DESIGN INTELLIGENCE AWARD 中国设计智造大奖
Special Award – **Toy Products**

electronics maker
Best Robotics & Educational Kits Award

AICRA INDIA STEM SUMMIT & AWARDS'18 STEM
India's 1st STEM Contribution Awards and Conference
Best **STEM Products** Supplier

NASSCOM®
Emerge 50 Awards 2016

CII DESIGN EXCELLENCE
Best Industrial Design Product

DESIGN4INDIA A NASSCOM INITIATIVE
Best **Digital Ergonomic Product**

GOOD DESIGN INDIA DESIGN MARK
Crowned with IMARK

1,500+ Schools   **2,00,000+** Innovators