



October 2019

EMPOWERING TIMES



THINKING ALOUD

Making Science come Alive
Jay

PODIUM

Lewitt Somarajan
Founder & CEO,
Life-Lab



WE RECOMMEND

The Airbnb Story
Leigh Gallagher

Dear Reader,

According to various surveys, 80% of the jobs created in the next decade will require some form of math and science skills. A robust STEM (Science, Technology, Engineering & Mathematics) education system creates critical thinkers, problem-solvers, and next generation innovators. With India being at the forefront of producing the highest number of scientists and engineers, the growth of STEM has picked up significantly over the last few years. However, one of the biggest challenges involved in the implementation of STEM education is to design infrastructure, curriculum and to equip children with the best guidance and support, while making science and math fun to learn.

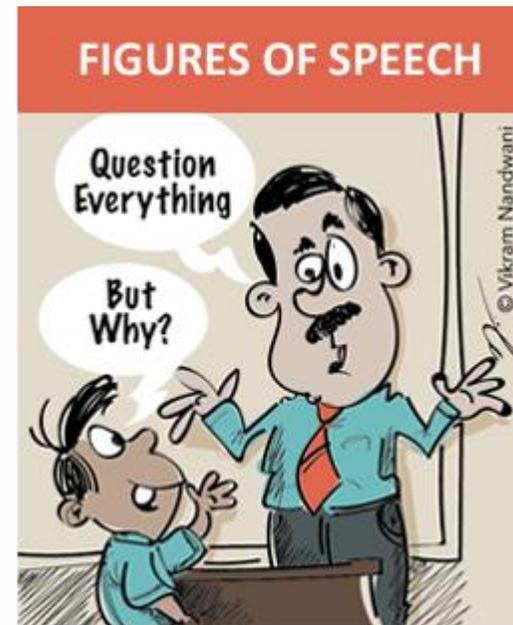
Experiential learning and activity-based education are considered to be effective ways of understanding science. In the **Podium** segment, Founder & CEO of Life-Lab, **Lewitt Somarajan** highlights how poor quality of education and the antiquated methods of teaching drove him to bring about change in science education.

This month in **ET**, we look at the theme: **Making Science Education Fun**.

In the **Thinking Aloud** section, **Jay** shares his thoughts on making science fun through activities and experiments. In the **We Recommend** section, we review author Leigh Gallagher's book about **The Airbnb Story** and the journey of how two cash-strapped designers turned their creative idea into a growing million Dollar company.

In **Figures of Speech**, **Vikram's toon** is already making science fun!

As always, we value your opinion, so do let us know how you liked this issue. To read our previous issues, do visit the Resources section on the website or simply [Click Here](#). You can also follow us on [Facebook](#), [Twitter](#) &



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THINKING ALOUD

Making Science come Alive

Jay

To a child Science is magic - with explanations!

The world of science holds immense fascination for all of us, none more so than to children. Yet we find that in school, for many children, the two most dreaded subjects are Science and Mathematics. The fear is so intense that many students are waiting for the day when they can say goodbye to both these subjects without a second thought.

There are two major reasons for this intense dislike of both subjects. The first is the poor quality of teachers for these subjects, coupled with the poor pedagogy. The second is the intense pressure from parents who weigh down their children with their own dreams of producing Engineers or Doctors. Be that as it may, the net result is a set of youngsters who grow up either afraid of science or 'hating' it.

Coupled with all this is the impression that girls and science are incompatible. This has led to major global initiatives to encourage science education for girl students. STEM for Girls is the new slogan. The focus is to remove the stigma attached to scientific women and redress the unfortunate reality that over the years we only have 19 women who have won Nobel Prize in scientific fields in contrast to over 850 men. Consider the fact that a UNESCO study mentions that the global average is a miserly 28% for women in science, and the average for

India is a dismal 15% according to another study.

The benefit of scientific temperament in society cannot be understated. Not only does this create a rational society that questions shibboleths and slays superstitious behaviour, but it also becomes the fountainhead of innovation. Arguably, science provides the answer to most of the societal issues, be it physical, infrastructural or medical and emotional. A passionate advocate of science might even stress that we need less emotion and more scientific reasoning for a peaceful world. An interesting but less known fact is that under Section 51A, sub-section H, the Indian Constitution enjoins us as a Fundamental duty to 'to develop the scientific temper, humanism and the spirit of inquiry and reform'. Contrast this with the behaviour of vast number of our populace (including politicians) who are obsessed with mindless ritualistic fervour in daily life, totally irrational and regressive in nature. Science has been given the go-by in every which way, one concludes.

The question to be addressed is how do we make science come alive to school children? The question in essence is a criticism of the age-old methods employed in our school system that converts the mystery associated with science into an inchoate question and answer routine. Can the pedagogy be constructed in a manner where young minds begin to explore with enthusiasm and find awe in the discovery of new answers to old questions? What an exciting challenge this is, isn't it?

An inquiry-based approach to learning in science envisages children to ask questions, challenge each other with fun-filled tasks, apply critical thinking skills and learn by experimentation. The intent is not just to answer questions that arise in the curious minds of young children but also make them adept to find the under-lying cause of a situation or problem that are bound to happen in daily life. We are living in a world where most of us seek easy and quick answers through Google rather than challenge ourselves to discover the cause and effect relationship that comes from analysing root causes. This is a skill that can be taught at an early age by encouraging the curious mind to probe deeper rather than baulk at challenges.

An experiential learning classroom is also a healthy way of engaging children to acquire a growth mindset, which is so vital for success in life. Conceptual understanding gathered through rote learning severely impairs a child's development as the magic of science is better appreciated when activity brings to life ideas gathered from books. The 'aha' experience imprints learning firmly into a young learner's mind much more than bland reproduction of

a framework learned through memorising. Besides, learning by doing enhances confidence in a child and prepares him or her to tackle the physical challenges that one encounters in everyday life. When one encounters real life challenges and has to use their faculties to flexibly find answers, then concepts come to life. Only this way will theories of chemistry, physics or biology become of practical use in our daily life. A probing mind will examine a difficult situation and seek logical solutions as against a sterile mind which tends to seek answers from outside. Teachers need to be alive to this aspect as much as their focus on enabling students to secure 'good marks' in examinations.

For a start, it would be wonderful to extend the spirit behind the celebration of National Science Day (February 28th) to everyday classroom teaching. After all the Raman Effect, discovered on this day in 1928, came from the years of curious and restless enquiry by a scientific mind who was fascinated by the deep blue colours of the Mediterranean Sea during C V Raman's long return voyage from England. Scientific questions lie hidden in plain sight and when brought alive to an inquisitive intellect by a caring and innovative teacher, a new world of magic and secrets unfold triggering new pathways of scientific discovery and invention.

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Podium

Lewitt Somarajan

Founder & CEO, Life-Lab



Lewitt is an Ashoka Fellow, Acumen Fellow and Teach for India Fellow and earned his Bachelors in Chemical Engineering.

Started in 2013, Life-Lab makes science education fun and engaging for children and builds the capacities of teachers to create experience-based learning environments. Life-Lab, having an Avengers team of over 38 is currently working with more than 1,300 schools, impacting 4.5 lakh children across 6 states.

ET: In your opinion, what is the current status of imparting science education in India? Can you also throw some light on experiential learning in this regard?

LS: The question of instituting quality and moving away from the detrimental practice of rote learning has plagued the Indian education sector for over two decades now. Evidently, a need for practices to improve the fractured process of imparting education in classrooms has been felt. Research confirms that students who practice what they are learning in a hands-on environment can often retain three and half times as much as opposed to just sitting in a lecture room and listening intently. Activity-Based Learning (ABL) or Inquiry-Based Learning (IBL) has for long been a proven pedagogy to improve quality of education and has been endorsed by several leading national and international institutions like the UNICEF and the Government of India.

Unfortunately, despite the pedagogy existing for several decades now, it has faced significant limitations in scaling and being practiced in schools across India. Most successful initiatives have stayed limited to private/alternative schools. Efforts by large institutions have also met limited success. For example, UNICEF's

initiative in India has stayed limited to 270 schools over 12 years and the Indian government's efforts have failed to scale beyond the first segment of primary education (grade 2). As a result, classrooms rooted in enquiry-based learning remain far from a reality. Efforts by Chief Strategy Officers (CSO) through training of teachers on toolkits have also failed to integrate the method into the learning process. Activities are conducted as a practical extension of the theory and not as a means of arriving at the theory.

A critical gap that all efforts have failed in scaling is in enabling teachers to transition to this new pedagogy. Practicing ABL or IBL requires a deeper conceptual clarity and competency on part of the teachers.

However, teachers, especially those in low-income schools, are products of traditional methods of education and the Central Teacher Eligibility Test is increasingly revealing how ill-equipped teachers are; only 5.6% of the teachers passed the test in 2014. A growing number of teachers share that they feel threatened because they do not understand how to create an enquiry-based classroom. Unless the teachers are taught, there is no way for the children to experience this way of learning. The teachers have traditionally only been trained in demonstrating the tool and managing behaviour - the aspect that is left out is the skill to facilitate a conversation that draws questions out of the kids. There is a need for solutions that empathetically support the shift in mind-sets of teachers and enhance their skills and knowledge to function as facilitators to the child's learning process at scale.

While the market has been flooded with models that can be used as tools for ABL, they are not mapped to the course content. The toolkits contain experiments that help learn concepts (such as force and pressure) but do not tailor them to fit the curricula of various grades, putting further demands on an already stretched teacher to map these new tools to his lesson plans. Models are also often built only for the teachers as a demonstration tool. The teacher fears damage to material and the children are unable to have the opportunity to work with experiments. The expectation on the children is to create their own working models; however, there is no information supplied that can help either students or teachers to identify materials from their surroundings that may be used to do so.

ET: How can various stakeholders (teachers, government, etc.) help in making science education accessible and fun?

LS: For children, joyful learning environment in classrooms deepens conceptual understanding, enhances science

learning outcomes, reduces stress, makes child curious, and inspires child to be creative-problem solvers and critical thinkers.

Taking a system level approach, key stakeholders that play an important role to create the above experience for children are parents, school system, government, corporate and philanthropic foundations.

Parent's needs are fulfilled when children demonstrate enthusiasm towards learning, effectively articulate his/her learning experiences, future aspirations and dreams, come up with new innovations, get recognition from external stakeholders. All these aspects enhance the perceived face value for parents that their child is getting good quality science education.

Thus, it becomes the fundamental responsibility of the school system, government, corporate and philanthropic foundations, NGOs and social enterprises in education to collaborate, invest in the pedagogical research, and learning environments required to make children future ready. Currently, 80% of the education budget goes for teachers' salaries and 90% of the corporate and philanthropic grants in school education is allocated for replication of the model that innovates majorly in delivery mechanism. That is a major paradox, since the need of the hour is research backed models that completely flips the way teaching-learning is conceived, strategized, executed and implemented.

ET: Technology is reaching classrooms at a pace like never before. What are your views on digital learning aids and the impact on students?

LS: Technology as a tool is catalysing the process of knowledge acquisition for teachers, parents and children. We are living in a time where technology has literally made the accessibility of knowledge free, which could not have been imagined few decades back. Imaginative and mesmerizing visual content, adaptive tests, curated and customized content delivery and data backed pedagogical techniques provided to teachers and parents are some of the positives of technology-based interventions in classrooms and at homes. It makes technology a powerful, and addictive tool. However, children like flowers, need a gardener which, in a school system space, is a teacher and at home, parents. Unfortunately, and increasingly though, strengthening and empowering teachers and parents is taking a back seat and technology is perceived as a co-driver to bridge the teachers' knowledge and skill gap. And in parents' case, technology is becoming a filler for lack of time that parents can constructively

provide to their child. Thus, focus needs to be on equipping the teachers and parents to intelligently and responsibly use technology as one of the tools, than the only tool! At max, technology can serve as an antibiotic; however, it is not a solution or a curative process for the problem. There cannot be a substitute for time, care, gentleness and humane touch that a child needs for holistic development to be a responsible, participative citizen having the compassionate heart and an acumen to solve problems for the welfare and creation of a progressive society.

ET: What is Life-Labs' approach to science and how has it been making science fun for all?

LS: When the majority population is scientifically illiterate, it not only aggravates inequity but also excludes this majority from making decisions and create the meaningful impact on their environment. Thus, science learning must be seen as necessary for the full realization of human beings. To address the increasing needs for universal access to quality science learning in schools, numerous pedagogical experiments were conducted. These experiments, based on the foundations of fun, engagement, conceptual understanding, creativity, and problem-solving, became Life-Lab. The team's acumen for design thinking, and panache for storytelling, led Life-Lab to take the approach of Activity-Based Science Learning (ABSL). To immerse 440 million Indian school going children with ABSL approach, hundreds of Life-Lab models are required. Thus, Life-Lab has adopted a cyclic three-fold strategy to achieve Science Education for All. For creating proof-points, invest CSR and philanthropic foundations, to develop cutting-edge pedagogical research that integrates Science with Social-Emotional learning and pilot these innovations in government schools. For growth, validating the proof-points across diverse contexts, and regions by collaborating and co-working with NGOs, and like-minded entrepreneurs. For scale and to institutionalize sustainable behavioural changes in science teaching-learning practices, Life-Lab works with state governments as a knowledge partner to strengthen the education machinery across the delivery chain.

In FY 2019-20, Life-Lab is impacting 4.5 lakh children in collaboration with the Delhi Government (Department of Education), and Government Institutions like FSSAI, Kerala Development and Innovation Strategic Council; and in collaboration by working with more than 15 NGOs and 12 Corporates. In the next 5 years, Life-Lab will impact close to a million children by strengthening the three-fold approach and provide consulting solutions for state governments to enhance the quality of science education with special focus on rural India.

ET: What inspired you to start Life-Labs? What strides has the company accomplished so far?

LS: From the time I became conscious, my dream and end goal in life was getting an American Job, a German car and a beautiful Indian wife. An engineering degree would have done the trick and made it quick. So be it. Naivety at its best, and finally at 17, boom - college happened. Best things (and even bad things) happen when unchained and free in life. Life increasingly became another '5 Point Someone'. Realization struck. It was liberating. My naive dream was never mine! It was my parents'. And, thus I became a wanderer and a traveler. Not doing touristy stuff but experimenting. Romantic threshold came at the age of 20 when I became part of Jagriti Yatra. Life became sweeter ever since.

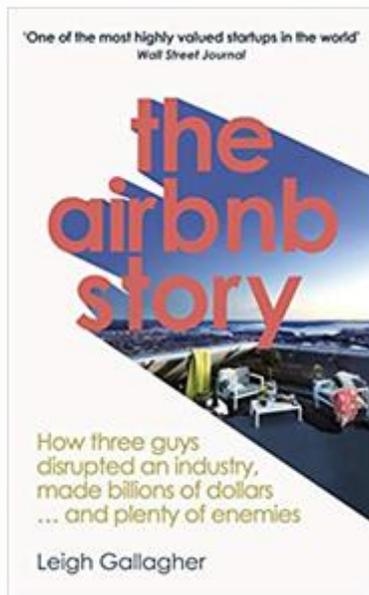
Seeds of attraction towards the development sector were born during Jagriti Yatra. And, it became a sapling with my decision to join the Teach for India fellowship at the age of 23. For the kind of notorious and rebellious student I was, my teachers and professors used to quip jokingly that one day I would become a teacher! Their blessings turned real. However, those two years of classroom explorations with my 30 kids led me to believe that learning need not be a torture, the teacher need not be a ring master and the classroom need not be a circus stage. Thus, Life-Lab was born.

Today I am an educator, friend, trainer, innovator, manager, entrepreneur and at times an office-boy donning different hats at Life-Lab which started in 2013 with a vision to create inclusive classrooms that would make learning fun and experience-based for children.

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We Recommend

The Airbnb Story Leigh Gallagher



Think travel and one would say Airbnb! Such is the impact of this start-up firm, which was valued at US\$ 30 billion in 2017 and is growing!

In 2007, graduates from the Rhode Island School of Design, Brian Chesky and Joe Gebbia were trying to make ends meet to pay off their rent in San Francisco. With an upcoming conference in the city, they knew there would be a shortage of hotel rooms. The duo decided to rent out air mattresses in their apartment to attendees of the conference for US\$ 80 a night and called it “Air Bed and Breakfast.” Thanks to their creative thinking, a simple thought landed up in to a million Dollar business idea.

With the idea of offering a bed and breakfast service in place, the founders went on to serve Obama O's and Cap'n McCain cereals which were basically re-boxed cheap cereal that earned them nearly US\$ 30,000! The team's drive attracted the attention of Paul Graham, a tech billionaire and founder of Y Combinator, a launchpad for Silicon Valley start-ups. While Graham disliked the Air Bed and Breakfast concept, he did appreciate the team's tenacity and mentored them.

There was no looking back after this. The novel Airbnb idea had disrupted the hotels and travel space. The firm tapped into something greater than low prices and an abundance of available inventory. Airbnb had already re-defined how one looked at space and how we viewed strangers. It opened up a new market for "alternate

accommodations" that drew interest from many upstarts as well the biggest hotel companies. With a third co-founder Nathan Blecharczyk on board, the firm currently lists more than three million lodgings in nearly 200 countries.

The book is inspiring especially for entrepreneurs who can relate to the struggles faced while starting a business. Airbnb's growth hadn't come without its own set of complications. In many cities, the fundamental activity enabled by Airbnb - individual's renting out some or all of their homes - was illegal. The laws varied from city to city and from country to country which were some of the challenges, among others, that the founders had to overcome. To combat Airbnb, New York even changed laws and created a one home-one rental policy in the city! The author also elaborates on the smooth booking and payment system created by the founders to enhance user experience.

One of the inspiring and unique aspects of the company's growth is that despite the lack of management experience of the founders, the company was able to scale-up. Airbnb is growing and has a long way to go with plenty legal battles to tackle. The firm is also expanding and readying itself for an IPO.

A graduate of Cornell University, Leigh Gallagher is an assistant managing editor at Fortune. She is also the host of Fortune Live and is a co-chair of the Fortune Most Powerful Women Summit. The author has beautifully summarised Airbnb's journey which promises to inspire and ignite a spirit of entrepreneurship within the reader.

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THROUGH THE LENS



Avid bird photographer, **Rupesh Balsara** takes a snapshot of the Rufous-bellied Niltava (*Niltava Sundara*), largely found in Bangladesh, Bhutan, China, India, Laos, Myanmar, Nepal, Pakistan, Thailand, and Vietnam. During the winters, these birds migrate to lower elevations as far south as central Thailand.

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