

THE FOUNDATION POST

Q1, 2018

SCIENCE

TECHNOLOGY

ENGINEERING

MATHEMATICS

STEM

Why STEM?

Importance of STEM in the future of Indian education system

Implementation and Success Stories

A few stories about the whiz kids of VidyaGyan using technology for social change



EDITORIAL

“If a child can’t learn the way we teach, maybe we should teach the way they can learn.”

In a world where success is measured not just by what you know, but more by what you can do with that knowledge, it’s crucial that our youth be equipped with the skills and acumen to solve tough problems, gather and evaluate evidence, and make sense of information.

These are precisely the types of skills that students learn by studying the academic disciplines of science, technology, engineering and mathematics in an interdisciplinary and applied manner. Collectively known as STEM, this curriculum integrates the four disciplines into a hands-on learning experience based on real-world applications.

What separates STEM from other traditional curriculums of education is the blended learning environment it provides. Students aren’t just taught; they are shown how scientific methods and mathematical principles can be applied to everyday life. STEM education teaches students computational thinking and real world applications of problem solving.

Yet today, very few students pursue expertise in STEM fields - and there is an acute inadequacy of teachers skilled in those subjects as well. As a result, the demand for STEM professionals is slated to rise exponentially in coming years, and that in itself is more of an opportunity than a threat.

To bring about a change, schools and other institutes need to train their teachers and address their education policies and curriculum choices to inculcate a STEM approach. They play a central role not only in whetting their students’ interest in STEM subjects, but also in providing every student equal opportunities to access and benefit from quality education. At the Shiv Nadar Foundation we do our best to follow a STEM approach in the modus operandi of our institutes. We encourage the spirit of scientific curiosity in our students, and implore them to develop a technological bent of mind. Our tutoring methods rely on simple experiments, DIY assignments and activity-based learning.

In our first newsletter of 2018, we shed light on the importance of STEM education, discuss the future of the Indian education system, and take you through the many steps and measures that we have taken to ensure the prevalence of STEM in our schools and institutes.



COVER STORY

The Roadmap: Why STEM is the Future of Indian Education

India has one of the highest* number of students in the world. To build a skilled workforce comprising of these students, we must encourage the spirit of scientific curiosity in them, and implore them to develop a technological bent of mind. Our schools and other academic institutions, however, still rely on textbook learning formats, which help in securing good grades but don't promote critical thinking and hands-on learning.

To that end, educational institutions in India will have to embrace STEM education wholeheartedly.

A curriculum built around the disciplines of science, technology, engineering and mathematics, STEM integrates all four subjects in an applied manner. In the words of renowned curriculum specialist Nancy Tsupros, "STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy."

Through the STEM way of learning, students can develop a well-rounded, future-ready version of themselves. Here's how:

- Students develop an enquiry-based outlook for learning that encourages them to gain knowledge, rather than pushing them towards it.
- STEM education moulds the mind while it's still young, curious and impressionable. Giving them a peek at an early age into the world of STEM helps them be better prepared for the future.
- Students learn quicker and better through team building and community learning, hastening the growth of their social abilities.



Instilling in these students the desire to pursue a career in any of the STEM fields could spark a lasting dream. Likewise, a shortage of STEM skills in students could dampen the growth of business and industry in the near future. To ensure the former, education in India has to cater to the growing need of our nascent industries for scientific and technical manpower.

Lest we forget, inclusivity is another key factor here. Since occupations in STEM-related careers are some of the fastest-growing and highest-paying of the 21st century, the need for skilled manpower is inexhaustible to say the least. Such careers often have the greatest potential for job growth. To ensure that everyone has access to these opportunities, STEM education should reach all corners of the society, including the minorities, the underprivileged and the economically backward classes.

In India, various organisations promote STEM in schools and private coaching centres. VidyaGyan, an initiative of the Shiv Nadar Foundation, is one such school that encourages young minds from economically underprivileged and rural backgrounds to use STEM education as a tool to leave a lasting impact on the society. Not only does VidyaGyan help students understand the significance of science and technology, it also applauds their products and imagination.

It is only fair to conclude that presently one of India's biggest challenges is the education of its sizeable young population. In order to successfully create a task force of problem solvers and innovators, we need to use education as a tool for mass transformation. Lessons in school will have to be based on engineering design processes that make learning real and tangible, leaving no scope for ambiguity. Only then, only through the zeal and hard work of our future scientists, engineers, mathematicians, and technicians can our nation truly develop as a global leader.

*Source: At 315 million, India has the most students in the world, Census 2011 data, The Times of India: Jul 3, 2014.





SUCCESS STORY

The whiz kids who grew plants without soil, made organic manure from human hair!

If provided with the right guidance at the right time, each one of us has the potential to achieve greatness and create history. Childhood years are the most formative in a person's life. But often, potentially brilliant children are unable to realize their full potential because there's no one to guide them on the right path.

While most schools focus on learning but the way the curriculum is structured, a lot of it happens in theory. Which is why great schools need to focus on hands-on and practical learning rather than rote learning. Perceiving this, some schools have started focusing more on practical learning and less on mechanical rote learning. One such school, VidyaGyan, aims to drive transformation in the country by investing in the youth and catalyzing them into future leaders.

VidyaGyan has two campuses – one in Sitapur and the other in Bulandshahr. The school first identifies meritorious, rural students from economically underprivileged backgrounds. Thereon, they spend seven years – from class VI to XII – at the school's residential campus while following a carefully crafted leadership curriculum that allows them to explore their full potential. The school ensures that children take learning as an approach, not as a subject.

HERE ARE A FEW STORIES ABOUT THE WHIZ KIDS OF VIDYAGYAN:

Using technology for social change

Improper disposal of human hair is a source of pollution and can result in health hazards like pulmonary disorders, Alveolar edema, Bronchitis, TB, cancer and more. Burning it produces toxic gases like Ammonia, Hydrogen sulphide, and sulphur dioxide. A single strand of hair takes about 3 – 4 years to fully decompose. Keeping this in mind, 4 students of VidyaGyan, Sitapur campus, decided to produce organic manure from human hair.

They collected waste hair from their surroundings, mixed it with cow dung, put the mixture in a pit, and covered it. In 50 days, it turned into potential manure, suitable for plant growth.



Growing plants without soil!

Hydroponics, a subset of hydroculture, is the method of growing plants using minerals present in a water solvent, without requiring soil. This experiment was successfully conducted by students of class 6th when they grew 'methi' plants through this method.

Empowering the visually challenged through science

'Raja the great' – a project started by four students of class 7th and their science teacher aims to empower the visually impaired and act as a service provider in the field of rehabilitation, education, training, and assistive technology. Under this project, they created a prototype of a walking stick with IR sensors, Vibrators, and PVC pipes. Powered by Arduino software, the stick can assist any visually challenged person in moving from one place to other by avoiding obstacles.

In addition to this, the students (largely on their own) have developed a science activity center in the school where they have developed working models like a three-pitcher water filter, a smokeless chulha, a paper recycling unit, and a software to enhance the record keeping system of the Indian Premier League

You might have heard about Doon school and the Mayo College. The two are excellent schools beyond a doubt and have created a space for nurturing high potential students from India's urban elite, but the very fact that rural students of grade 7 from VidyaGyan were successful in preparing organic manure with help of human hair shows that talent doesn't discriminate. No matter the background, every child has the capability of becoming a future genius. Tomorrow's Nobel laureates may not only come from the urban centers of excellence but from the rural heartland also.



SNAPSHOTS

FORBES 100 MOST POWERFUL WOMEN: ROSHNI NADAR MALHOTRA



Roshni Nadar Malhotra, Executive Director & CEO, HCL Corporation and Trustee, Shiv Nadar Foundation. She was featured in The World's 100 Most Powerful Women list compiled and released by Forbes. She ranked at 57 and was present with the likes of ICICI Bank's MD & CEO Chanda Kochhar, Kiran Mazumdar-Shaw (ranked 64), Chairman and MD of Biocon and Bollywood actress Priyanka Chopra (97).

SSN INSTITUTIONS



Bio Medical Students of SSN College of Engineering developed a prosthetic limb using 3D printing technology and have secured an international patent for the consultancy work.

The Team headed by Dr. S Kavitha HOD and students R. Rathi Adarshi, A. Santhana Lakshmi, R. Shuruthi Sree and Vaishalini Venkatraman involved in the research work which will cut down the cost of prosthetic limb from 100,000 \$ to 1000 \$. The prosthesis has been made using recycled plastic and seven mini motors have been installed in the palm region allowing greater freedom of movement of the fingers. It weighs around 800 gm and is customised for international use.

SHIV NADAR SCHOOL

MISSION DISCOVERY

Shiv Nadar School Gurgaon

3rd to 7th October, 2017



Shiv Nadar School played host to a unique, experiential, STEM based programme called Mission Discovery – in which students learn from NASA scientists, astronauts and astronaut trainers. The first edition of the same programme in India and Asia was hosted in Shiv Nadar School Noida in 2016. This programme encourages inquiry and critical thinking, along with teamwork and presentation skills. Students are guided to design an experiment which has potential to benefit the Human Race. The highlight of this programme is that the winning experiment designed by school students is actually launched into Space!

SHIV NADAR UNIVERSITY

12 November 2017

TEDxShivNadarUniversity 2017



The TEDx Club at Shiv Nadar University organized the second edition of TEDxShivNadarUniversity that brought together engaging speakers, performers and exhibitors from across disciplines to collaborate, discuss and champion great ideas. The event witnessed speakers from diverse walks of life including Sriram Raghavan, Director of IBM Research; Garima Avtar, Rally Racing Driver; Amitabh Mall, Partner & Director, BCG; and Bianca Ghosh, Corporate Storyteller.

KIRAN NADAR MUSEUM OF ART

EARTH AS HAVEN: UNDER THE CANOPY OF LOVE:



At Musée National Des Arts Asiatiques, Guimet, Paris, France in collaboration with the Kiran Nadar Museum of Art, New Delhi, supported by Akar Prakar, Embassy of France in India & Embassy of India in France.

Indian artist Jayashree Chakravarty - "Carte blanche à" (Earth as Haven: under the canopy of love) curated by Roobina Karode.

Show is now open for public viewing at Musée National Des Arts Asiatiques, Guimet, 6 Place d'Iéna, 75116 Paris, France in collaboration with the Kiran Nadar Museum of Art, New Delhi, -supported by Akar Prakar, Embassy of France in India & Embassy of India in France.

This project is one of the most enterprising undertakings by Jayashree Chakravarty, responding to the specificity of the site, setting and scale as well as to the circular plan of the rotunda. In the transformed ambience of the Carte Blanche space, one encounters a large, suspended paper structure, an imaginary form inspired by the tiny wasp-house/cocoon but built in massive proportions, making it possible for viewers to enter into and experience her insect-world.

THE EUPHORIA OF BEING HIMMAT SHAH A CONTINUING JOURNEY ACROSS SIX DECADES

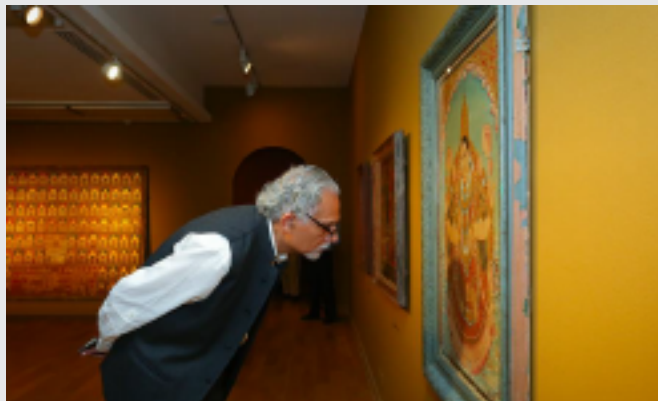


JKK-Jaipur, Jawahar Kala Kendra and Kiran Nadar Museum of Art present
**THE EUPHORIA OF BEING HIMMAT SHAH
A CONTINUING JOURNEY ACROSS SIX DECADES**
Curated by Roobina Karode.

This exhibition is a celebration of Himmat Shah's solitary pursuit and inspiring nomadic life lived under an open sky that transformed into a recurrent poetic metaphor of the vastness and infinity of space in his work.

Thank you to all the art enthusiasts for making it a packed house opening.

AMRUTA KALASHA THANJAVUR AND OTHER SOUTH INDIAN PAINTINGS



This time, as the winter sets in and the art season begins to blossom, KNMA is bringing to Delhi, to viewers in North India, a month- long special exhibition of South Indian paintings focused on Thanjavur, Mysore and Andhra, presenting 200 works from the extraordinary collection of renowned Delhi-based architect Kuldeep Singh.

'Amruta Kalasha - An exhibition of Thanjavur and other South Indian Paintings' was inaugurated by Mr. Shiv Nadar during a preview evening event at KNMA Delhi on 13th November 2017.

On the occasion of show opening Kiran Nadar, Founder and Chairperson, KNMA says, "A introvert man, Kuldeep Singh's Collection is being shown for the first time at KNMA, India, and as a museum we are delighted to bring into public viewing his persistent and quiet efforts of putting together an array of Thanjavur and other south Indian paintings of India." Image

SHIKSHA

SHIKSHA+ 1ST BATCH OF MALE LEARNERS IN SITAPUR



First male batch with 8 SHIKSHA+ learners has been formed in village Maheshpur of Gram Panchayat Kaima. It was an achievement for the field team to convince male members to attend the classes as it involved numerous challenges. The foremost challenge for them was to overcome the apprehension of being stigmatised.

The other noteworthy challenge for them, was to manage time to be engaged in the programme since they are primarily engaged in agricultural activities.

ABOUT SHIV NADAR FOUNDATION

- ▶ Shiv Nadar Foundation was established in 1994 by Shiv Nadar, Founder, HCL - a US \$ 8 billion leading global enterprise
- ▶ The Foundation is committed to the creation of a more equitable, merit-based society by empowering individuals through transformational education
- ▶ The Foundation pursues the philosophy of 'Creative Philanthropy', which envisages creation of institutions that continue to impact future generations for many centuries to come
- ▶ Total number of students and alumni – 25,000
- ▶ Total investment – INR 51,550 Million (USD 800 Million)

K-12 EDUCATION



2009

Leadership Academy for meritorious rural underprivileged children



2012

Chain of urban K-12 schools to create lifelong learners

HIGHER EDUCATION



1996

Ranked amongst India's top engineering colleges



2011

Student-centric, multi-disciplinary & research-oriented university

MASS INTERVENTION



2012

Technology-based educational intervention envisioning the eradication of illiteracy



2010

Building awareness and propagating modern and contemporary Indian art

SHIV NADAR FOUNDATION

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