

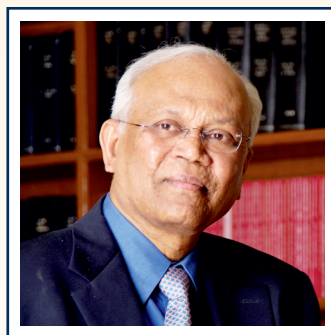


AMITY UNIVERSITY

GURUGRAM

ON BUILDING A WORLD-CLASS FUTURE READY UNIVERSITY

by



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It is a great privilege to deliver this Convocation Address of Amity University Haryana.

I am proud to see the amazing progress that Amity University has made in terms of its outreach, growth as also national impact. I must congratulate the extraordinary Founder President of this University, Dr. Ashok Chauhan, for whom I have enormous respect as a great visionary and an exceptional achiever. No wonder, Amity is considered as one of the most rapidly rising centres of learning in India today.

I feel doubly privileged to give this convocation address because I have received D.Sc. (Hon. Causa) from our university today. I say 'our', because I am its alumnus now. I promise you that I will do my very best to fulfil my duty as an alumnus, and enhance the prestige of our university in every possible way.

My young friends, your graduation marks a milestone in your life as you leave the portals of this wonderful university to enter a world that is full of exciting opportunities. I congratulate you warmly. I must also congratulate your parents and teachers for giving you the best gift of your life, education.

When my generation graduated about fifty years ago, India was struggling as a 'third world country'. When you graduate today, everyone expects India to be the 'third most powerful country' in the world. And my friends, it is you who will be charged with the task of building a great future of our great nation.

I was very happy to read the inspiring mission statement of the University, that the Hon'ble Vice Chancellor was kind enough to send me.

"The University is committed to **integrating education with human values**, in pursuit of interdisciplinary research, nurturing innovations, development of innovative products and innovated systems in an environment of learning by doing."

I believe this is a very profound statement. Why?

Education, research and innovation must be integrated seamlessly. Education disseminates known knowledge. Research creates new knowledge. Innovation converts knowledge into wealth.

The thrust of my convocation address today is going to be on raising the bar on all these three, so that we can create a world class future ready university.

How do we make **education** truly future ready? It must serve the needs of Society 4.0 as also Industry 4.0. It must integrate education with human values.

How do we do research that leads and not follow? How do we open up new research frontiers and not just keep on following the research frontiers that others have opened up?

And finally, how do we assure success in **innovation** that we do by moving successfully from mind to market place. How do we shift from merely incremental to game changing disruptive innovation?

EDUCATION THAT IS FUTURE READY

We must move from right to education to right way of education to right education.

What is the right way of education?

First we had education 1.0. It comprised Gurukuls of India, academies of Greece, etc. Access to knowledge was a privilege of a few.

Then came education 2.0. It had to do with broadcast and an assembly line model. There was mass enrolment. There was 'one to many' information dissemination. Knowledge was limited to books in the library.

Now comes education 3.0 with dramatic paradigm shifts. Information memorisation and brute force recall are being made irrelevant. From 'brain as storage' to 'brain as an intelligent processor' is becoming the norm. Humanity's accumulated knowledge is now be freely available on the Internet. Rich formatted content, flipped classrooms, and research material from the best faculty on a subject is available for free. On demand tutoring, P2P learning, personalised and generative course structure and sequencing to meet the individual needs is the order of the day.

Millennials are already interacting with digital technologies at a very young age. In fact they grow up to be so immersed in this digital world that it is now commonplace for them to interact more digitally with their family and friends than socially.

The current emphasis on STEM models in education will be inadequate in teaching anything beyond technological competence. Empathy and socio-emotional literacy have been left out. By integrating Empathy and Environment into the STEM (Science, Technology, Engineering and Maths) model, we can upgrade it to the model of eSTEeM.

Right education will have two challenges.

First is the challenge of teaching empathy and creating a deeper connect with environment and ecology. Teaching basic emotional literacy will enable the students to have healthier relationships with people and the planet.

Second is the challenge of building digital pedagogies, which means speaking the language of the youth. This means that it is pedagogy that must adapt itself to interactive utilities, social media and purposeful gamification.

Talking about purposeful gamification, I came across an interesting start-up, RealLives. It has a gamified data-driven simulation, which aims at creating and enhancing a sense of empathy towards people as well as planet.

RealLives can be seen as an evidence-based digital pedagogy, which addresses the challenges of the current world. It is a tool and a platform that can be easily adapted to work in and out of the classroom – bringing the reality of the world into the digital immersion of the student.

RealLives provides a virtual simulation of the world, and allows one to lead birth-to-death lifecycles in this world – playing the role of another human being, born in very different conditions. In this journey as another human being, one encounters circumstances, events and challenges that are realistic – because they are created by using authentic factual data – drawn from 193 countries, from almost a 100 reputed sources.

Computer-based life simulation games, such as Real Lives, can indeed be used to deliver factual information in an engaging format and to help students develop self-regulatory skills such as goal-setting, monitoring and self-reflection. RealLives is, of course, a pioneering example digital pedagogy but we require many more such tools, technologies and human initiatives 'to integrate education with human values' which is the motto of our university.

INDIAN RESEARCH THAT WILL LEAD AND NOT FOLLOW

How do we raise the bar on our scientific research? It is time now that our science begins to make a “big difference” to the world of science. They say only two people are remembered in science, those who say the first word and those who say the last word. How many times have we said the first or the last word? We have invariably looked through windows that others have opened up. When are we going to open up new windows ourselves through which others will start looking?'

Indian scientists did open 'new windows' in the past. Jayant Narlikar, in his book, listed what (of course, in his opinion), were the top 10 achievements of Indian STI in the 20th century.

In the pre-1950 era, the first on his list was Srinivasa Ramanujam, who opened so many new doors, some even well after his untimely death in 1920. The second was Meghnad Saha's ionization equation, which opened the door to stellar astrophysics. The third was S. N. Bose's work on particle statistics, which clarified the behaviour of photons and opened the door to new ideas on statistics of microsystems that obey the rules of quantum theory. The fourth was C. V. Raman's discovery that molecules scatter light the Raman Effect, which opened the doors for a new way to study the internal structure of molecules. The fifth was G. N. Ramachandran's pioneering work in structural molecular biology, which created the Ramachandran Map, which, even today, is at the very heart of elucidation of all protein structures; leave alone his breakthrough in collagen triple helix.

Post-1950, Narlikar listed another five. The first was the development of nuclear power and capability (founded in 1950s). The second was the Green Revolution in agriculture (the 1960s and 1970s). The third was the Indian space programme and satellite fabrication with satellite vehicle launching capability (from late 1970s). The fourth was the work in high temperature superconductivity (since the late 1980s). The fifth was the transformation of the chain of 40 laboratories of CSIR towards an industry-oriented, performance-driven and accountable organization (in late 1990s). I am proud to have been involved in this last accomplishment as DG, CSIR.

The worrying fact is that Indian science has not been able to create the magic of 'opening new windows' as it did in the pre-fifties era. Why? For opening new windows, we need entirely new ideas.

NEED FOR CULTURAL SHIFTS

About generating new ideas, Richard Feynman had famously said, “The challenge is not to create new ideas, the challenge is to escape the old ideas. To escape the old ideas, we need irreverence.” So the question is the following. How do we create this culture of irreverence, where our young students will begin to challenge the established? A culture where irreverence will be tolerated and not demolished? Where there will be a tolerance for risk-taking and failure?

To my mind, here are some obvious fundamentals that have to change for making Indian science and technology more original and innovative.

The first is the issue of our cultural inheritance that inhibits questioning. Second, our education system suffocates originality. There is a need for innovation in our education systems – getting rid of the rigid unimaginative curricula, moving from 'learning by rote' to 'learning by doing' to 'learning by creating' and phasing out examination systems based on single correct answer. The third is bureaucracy, where paper becomes more important than people, where 'appearing to be right' takes a precedence over 'being right', where rule book dominates over the objectives and where decision-making time cycles are larger than product life cycles.

ASSURED INNOVATION

Having talked about future ready education and research that leads and not follows, we now come to innovation. Assured success is innovation requires successful exploitation of a new invention in actual practice, in the field, in the market. The journey of mind to market place is a very difficult one. And to achieve this assured success in innovation, I propose an ASSURED Innovation matrix.

A	S	S	U	R	E	D
AFFORDABLE	SCALABLE	SUSTAINABLE	UNIVERSAL	RAPID	EXCELLENT	DISTINCTIVE

Affordability is required to create access for everyone across the economic pyramid, especially at the bottom.

Scalability is required to make real impact by reaching out to every individual in the society, not just a privileged few.

Sustainability is required in three contexts; environmental, economic and societal. Environmental, since 'green' products and processes will only be acceptable to the society. Economic, since there must be a robust business and revenue model. Just depending on government subsidies and props will not work. Societal, since society must find the technology acceptable.

Universal implies user-friendliness, so the innovation can be used irrespective of the skill levels of an individual. Innovation has to be designed around deep appreciation of human needs.

Rapid refers to speed. The speed of our action matching the speed of our innovative thoughts!

Excellence in technology, product quality, and service quality is required, not just for the elite few but for everyone in the society, since the rising aspirations of resource-poor people also must to be fulfilled.

Distinctive innovation is required because there is no use of creating me too' products and services.

In recent times, India has witnessed two **ASSURED** innovations that have been truly game changing.

JAM – **J** (Pradhan Mantri Jan Dhan Yojana), **A** (Aadhar identification and authentication) and **M** (mobile telecommunications) created the fastest and largest financial inclusion in the world, with 360 million plus bank accounts opening up in record time.

Another game-changing innovation is Reliance Jio, which has catapulted India from the 155th rank in mobile data transmission globally to the 1st rank today! But importantly it has moved India from a jugaad 'missed call' innovation to 'free voice call' innovations.

'ASSURED Innovation' can be a 'one word innovation policy statement' for India, helping it achieve accelerated inclusive growth. But the implications of ASSURED can go even farther – it can be used for judging an institution, an enterprise – it doesn't matter whether it is a large corporate or a start-up.

In our recent book 'Leap frogging to pole vaulting: Create the magic of a radical yet sustainable transformation', which was recently published by Penguin, we have demonstrated the power of this ASSURED matrix by analyzing many successes as well as failures.

FIVE MASHELKAR MANTRAS

Finally at the end, you will want to know, what are the lessons that I have learnt.

I will give you **Five Mashelkar Mantras**, which have at least helped me in my personal life. Here they are.

First, your aspirations are your possibilities, so keep your aspirations always high. We often complain about scarcity in India. But remember, the combination of scarcity and aspiration can create disruptive and game changing innovations.

Second, there is no substitute to hard work for becoming successful. Remember, like instant coffee, there is no instant success. I have myself worked 24x7, week after week, month after month, year after year and will do so till I take my last breath. The golden rule is the following. Work hard in silence. Let success make the noise.

Third, it is wrong to wait for the opportunities to knock on your door. If opportunity does not knock, build a door. If you can't find a way, create a new way. Perseverance pays. It is always too early to quit. Winners never quit. And quitters never win.

Fourth, when someone tells you that it can't be done, take it that it is more a reflection of his or her limitation, not yours. Don't be afraid of failure, when you are attempting the impossible. To you, FAIL should not mean failure. It mean First Attempt in Learning.

Fifth, there is no limit to human endurance, no limit to human imagination, no limit to human achievement, excepting the limit you put on your mind. So go limitless.

At the end, my young friends, I wish you all the very best in your journey on this limitless ladder of excellence and achievement, and achievement that will not just be fulfilling for yourself and your family, but for our society, our beloved nation.

Thank you!