

## MCC Convocation Speech

Good afternoon, one and all! I am an engineer, I spend my time talking and teaching technology. As such, I was wondering what to talk about to you who are not engineers. I decided to talk about what I know best, i.e. technology. You are graduating at a time when India has just celebrated 75 years of independence. How has India progressed from 1947 to the present? Consider some statistics on development over these 7½ decades:

- ! Life expectancy – 32 to 70 (1951 – 2019). Had you been graduating in 1947, you would have been close to the end of your life. Today, you have the prospect of over half a century ahead of you.
- ! Rural poverty – 47% to 22% (1951 - 2011)
- ! Female literacy – 9% to 66% (1951-2018). In a graduation ceremony in 1947, the cohort would have been almost 100% male.
- ! Households with bicycles – 1 in 250 to 1 in 2 (1951 - 2011)
- ! Communications – 7 telephones per 10,000 people to 8,500 per 10,000 (1960 – 2020). Postcards at Independence to SMS and Whatsapp today (1951 – 2020).

There has been tremendous improvement in these and many other measures. India has made remarkable progress over 75 years of freedom, thanks to ingenuity and hard work by countless Indians over the past 7½ decades.

Much of this progress is due to technology. A few examples:

- ! Agriculture: Green revolution eliminated hunger and famine through large-scale mechanisation, industrial production of fertilisers, food storage, transport and food processing;
- ! Healthcare: vaccines, affordable drugs, sophisticated medical instruments have eradicated killer diseases such as smallpox, and have improved the lifespan and health of most people. Together the transformations in agriculture and healthcare have contributed to the doubling of life expectancy in independent India.
- ! Telecom has made communications and the Internet near universal. This has brought people closer together, it has brought information and entertainment to every doorstep, it has the potential to greatly enhance equality of people.
- ! Transport: from foot and bullock carts in 1947, today most Indians have easy access to ubiquitous 2-wheelers, 4-wheelers, super-fast trains and planes.

Due to such progress, many think that technology is the solution to all problems. Is this really best for society? Should we give unbridled power over our lives to the engineers who develop technology?

Today, India and the world are faced with serious issues, some that threaten our very existence.

- ! COVID Pandemic that has caused the death of about 15m people and has disrupted lives globally for two years. COVID was spread by global air travel, a necessity for today's globalised technology production system
- ! Climate change that is causing devastating floods and fires, that threatens to inundate low-lying areas: due to galloping use of energy from fossil fuels, and technology-intensive agriculture, deforestation, etc
- ! Surveillance of all aspects of the public and private life of individuals by governments and mega-corporations, using apps that collect all manner of personal in-

formation, using massive databases that tie together personal data from different sources, using spyware such as Pegasus. This is made possible by the pervasive Internet, one of the technological marvels of the modern era.

- ! Division of society based on caste, community, religion, gender: facilitated by Internet-based social media such as Facebook, Twitter, Whatsapp, Instagram, Google. By design these social media foster isolated groups of like-minded people, whereas Indian society is a very diverse collection of people.

All of these major problems involve significant doses of technology. The technologies involved have also been responsible for our remarkable progress. Technology is a double-edged sword and we are in danger of becoming the victims of technology rather than the beneficiaries. We need much more than just technology for society to progress.

One last major challenge that I'd like to mention is not caused by technology. Many of you graduates are women and you have the prospect of bright careers ahead of you. This is not true of the majority of India's women. Despite significant improvement in female education and participation in political life, India is ranked near the bottom of 146 countries in several measures of women's advancement. Female participation in the labour force was 40+% in 1960. Astonishingly, it had declined to 20% by 2019. India is one of the few countries where women have improved in education and political participation, but have declined economically. India cannot progress as long as it treats half of its population as second class citizens.

Technophiles believe that the solutions to technology-created problems is yet more advanced technology. These technologies are developed by engineering graduates from the IITs, NITs, and 1000's of private universities and colleges. So, what is the scope for you arts, commerce and science graduates of MCC?

Experience has shown that for technology to truly benefit society, the involvement of sociology, psychology, history, economics and other disciplines is crucial. Only with such a multi-disciplinary approach can we hope to devise solutions that solve problems without creating new problems.

A good example is the white revolution that transformed dairy farming in India. Starting with Amul in Gujarat, Operation Flood made dairy farming India's largest rural employment sector providing a third of all rural income. It made India the world's largest milk producer, doubled the milk available for each person, and increased milk output four-fold in 30 years.

Amul was started by Tribhuvandas Kishibhai Patel, a Gandhian, and driven by Verghese Kurien, an engineer turned social entrepreneur. It succeeded because of its unique organisation and structure – including no milk from a farmer refused, and 70-80% of the price paid in cash to farmers. Technology played a role – pasteurisation of milk, conversion of excess milk into milk powder and other products. It was backed by farmers, administrators, politicians, engineers and others. Most of the states of India have setup similar cooperatives, such as Aavin in Tamil Nadu and Milma in Kerala. Operation Flood is an example of successful transformation by cooperation between people from diverse backgrounds.

An example that is not unalloyed success is social media, Facebook, Twitter, Instagram, Whatsapp, et al. These networks have an astonishing ability to connect people in different parts of the world. They are useful to find long-lost school mates. They inform and entertain. However, they have their dark side.

These social media networks were created by engineers and they decided on the policies such as who can view what, the ranking of different posts, etc. These decisions were usually based on what technology could do easily. Counting “likes” is easy, it is just a matter of a single click. This count of likes drives social media. This is an engineering solution. However, human psychology tells us that we are attracted to scandals, disasters and horrors. Thanks to the technology-driven design, people “like” these negative posts and they are promoted in a vicious cycle. The design of social media tends to promote closed groups of like-minded people. However, in real life we need to interact with and work with people who are very different from us, people who may or may not share our goals.

The ease of creating anonymous social media accounts is used to create armies of trolls. They undermine electoral processes, divide societies, promote hate speech, propagate pornography, attack the “other”.

It is imperative for people who have a deep understanding of the complexities of Indian culture and society to come together to design a better social media. In order to serve our needs, a social media needs to be designed by a multi-disciplinary team including arts graduates who understand society, working with engineers who understand technology. With such a cooperative, multi-disciplinary approach, social media might well become a largely beneficial technology.

Graduating today, you face a unique problem: several of your college years were spent in isolation at home. Much of the learning during college is actually outside the classroom. Peer learning, social bonding, sports and other activities of the in-person college experience are as important as the formal learning in the curriculum. Unfortunately, you have missed out on these foundations. You will need to make special efforts after graduation to make up for these missing facets in your development.

In your life ahead, you will need to learn how to trust and rely on others because much of your work will be in teams. The teams meet periodically to discuss and take decisions. In August 2016, I was made the Chair of a Committee to increase the female enrolment in BTech in IITs. At that time, a mere 8% of the BTech students in all IITs was female. After 9 months of work, we had conceived of a female supernumerary scheme to increase the 8% to 20%. However, the committee had yet to reach a consensus. There were fears that the scheme would smack of reservation, would dilute IIT standards, would be demeaning to bright girls. In April 2017, I convened what I hoped would be the final meeting ... still with several sceptics. On the evening before the meeting, I met one of the influential sceptics in the lounge of the IIT Delhi Guest House. For an hour, we discussed the pros and cons. By the end of the hour, she was convinced. In the meeting the next day, with her enthusiastic support, the committee quickly adopted the female supernumerary scheme. The rest is history: from admitting 850 girls in 2016, by 2020, we admitted a healthy 3,200 girls, almost a 4-fold increase.

This may surprise you, that critical issues are often decided during informal discussions before the formal meeting. Chance meetings in the corridor, while playing sports, in the restroom, while going for a walk, are an important part of work. The formal meeting serves to seal the pre-meeting understandings.

We have taken a broad look at the progress and the challenges facing India. I propose a goal for you as you go out into the world. Can you apply your learning to tackle the major issues facing India? Can you build an India that is truly a secular democracy with equal respect and opportunity for every Indian regardless of gender, religion, caste, language race and

community, to realise the dreams of our Constitution? Such important tasks cannot be left only to engineers and their technologies. It requires you, working in multi-disciplinary teams that include engineers. It is clear that India will truly progress only when you graduates of the arts, sciences and commerce join hands with engineering graduates to devise technology-based solutions that meet the needs of an aspiring nation without harmful side effects.

Congratulations on your commendable achievement of graduating from MCC, one of India's leading colleges. Congratulations also to your teachers and family who have helped you on this journey. Best wishes for a fulfilling career, during which you will make India a much better place than you find it today!

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