

Mind Vs Mind Set : The Grand Indian Challenge

By Dr. RA Mashelkar

May I say first of all what a great honour, what a great privilege it is to be standing before you this morning. I want to thank All India Management Association and Lucknow Management Association for doing me this honour. As one gets older, the company of the young makes you feel young and you start adding just not years to your life but life to your years. So thank you for giving me this opportunity.

What I have been asked to do is to be a little anecdotal and take you through the journey that I have myself gone through – share with you the lessons and the inspirations one can have from that journey of my life.

Mind and Mindset

While I am going to do precisely that, let me begin by saying that the idea of having this Shaping Young Minds Programme is a great idea. And why do I say it's a great idea? When we look at the 21st century, many people say that it is going to be the century of knowledge, but people who think more deeply about it say it is going to be the century of mind.

Just think about it. Can you imagine that with the demographic advantage that India has, with 55% of its population being less than 25 years old, you are talking actually in terms of something like 600 million odd young minds shaping the destiny of this country. So, Mr. Handa, what a powerful theme you have selected for designing and defining the future of this great nation. For this, I will really like to congratulate you.

There was never any doubt about the quality of the Indian mind. Today, we talk about the digital economy. Digital economy would not be there, if binary digits were not there. And what are binary digits? It is zero and one. And who discovered the zero? It was an Indian mind. So, I think India and Indian mind can rightfully take the credit for laying the foundation of the digital economy.

Yesterday, we saw this great spectacular opening of the Olympics. We have sent a huge contingent for, hopefully, getting us some Olympic medals. You also saw today's headlines in the morning papers. Not very inspiring! And the record shows that very rarely have we won a bronze medal, a silver medal, let alone a gold medal yes, we won the gold medals at a time when we were world champions in hockey for a number of years but no more so. That is the state of affairs from this 1.2 billion population as far as the Olympic is concerned.

But you know, there is something else called Olympics of mind. Do you know what is Olympics of mind? These are competitions among young scientists -science Olympiads, where we send the contingent of young students. Year before last, I remember the statistics exactly, we sent 19 young people to represent us in science Olympiads. Can you guess as to how many came back with medals? 19 out of 19 came back with a medal ! That shows the power of Indian mind.

I think we should re-look at this theme of "Shaping Young Minds Programme" and what I am going to propose is something very fundamentally difficult. There is a fundamental difference between the mind and the mind set. Mind represents the intellect, mind allows you to do smart observations, smart analysis, smart synthesis etc. but it is the mind set, which determines your attitude and your approach to life. In India, there is this huge battle between the Indian mind and the Indian mind set. The Indian mind is taking us into the 21st century, and there is no question about that, it is the Indian mind set which is drawing us back into the 14th, 15th, 16th century you name it!

Mind Vs Mindset

Let me illustrate this battle of Indian mind Vs Indian mind set. Today, everybody talks about global village as a great idea but who talked about global village first ? Who said Vasudhaiv Kutumakam? It was an Indian mind. In Maharashtra, Dnyaneshwar is held very highly as a great saint philosopher. He said 'He Vishwachi Maz Ghar' i.e this entire world is my home. So, our great minds talked about a global village long time ago. They were actually 21st century minds but what is our mind set today?

We say that we are all one family. But do you know that when one Japanese and one Japanese come together, how many Japanese do they become? You would say two. No! They become eleven. They form such a great team. Somebody was joking the other day when he asked, 'you know when one Indian and one Indian come together, do you know how many Indians they become?' Not two but zero! They neutralize each other! They do not form a team. That is because of the Indian mind set.

So, my basic premise is that it is not so much shaping the Indian minds, it is shaping the Indian mind set and we should start looking at the issue of both mind as well as mind set. Not only how will we have clever minds, more intelligent minds, more observant minds, more analytical minds, better minds who synthesize in a clever way but also mind sets that are positive mind sets, constructive, forward looking, mutually reinforcing mindsets that will make it possible for us to shape the 21st century India.

Let me give you another example. We say Gurur Devo Bhawa Gurur Sakshaat Parabhrama Tasmay Shri Gurave Namah about our teachers. So we taught to look at our teachers as Gods and so on. Isn't it? I had presented a little story about my own *Guru* in my school, Principal Bhave, in the Presidential address at the Science Congress in the year 2000. Mr. Atal Bihari Vajpayee was the then Prime Minister. He inaugurated the congress. During lunch, where some Nobel Laureates were also present, a question was raised as to why such great teachers don't exist today. And I still remember Atalji saying Mashelkarji aapko pata hai aisa kyon nahin hota? Is ka kaaran yeh hai ki samaj mein aaj unko pratishtha nahin hai. He said, the research we do not produce Bhaves any more is because the society does not respect and value them. So, here the Indian mind says Gurur Sakshaat Parabhrama and the Indian mind set does exactly what our erstwhile Prime Minister is saying no respect and value for the teacher in the society, so how do we reconcile with this great battle of Indian mind vs Indian mindset? That is going to be the big challenge. I just gave two examples. I could give many more.

My young friends, while we are building those great minds of the 21st century, we also need to build the mind sets of the 21st century. So, I would simply propose that we don't have the symposium theme on shaping young minds but we have the symposium theme — ***“Shaping Young Mind and Mind Sets”*** just to emphasize this challenge..

My Gurus in my life

Let me start with my journey of my life. Journey of my life has been challenging- to put it simply. So many great people have influenced my life and given me interesting lessons in my life and I would like to remember and recognise them. May be some you must have also met such individuals in your life, who inspired you.

I start with my greatest guru - my mother. I was born in a very poor family and my father died when I was six. We moved to Mumbai and my mother did menial work to bring me up. Two meals a day was a tough challenge. I studied under street lights and I walked barefoot until, I think, I was 12. I remember when I passed the 7th standard and I wanted to go into the 8th standard, our poverty was such that even to secure 21 rupees for secondary school admission became a big challenge. We had to borrow from a lady, who was a housemaid in Chaupati in Mumbai. That was the tough life I had.

In fact, I remember, my passing the SSC Examination – i.e. 11th Standard. Those days it used to be not 10th standard or 12th standard but 11th standard. I stood 11th among one 1,35,000 but I was about to leave higher education and find a job. What helped me was the scholarship by Sir Dorab Tata Trust. It was just 60 rupees per month and would you believe that 60 rupees per month from Tatas added so much value to my life that I have been able to stand here today before you to speak to you.

I am on the Board of Tatas now and it is very interesting that the same Bombay House where one used to go to collect that 60 Rupees per month now one goes and sits there as a Director on the Board of Tata Motors. The turn that these 40 years has taken is very interesting. It has all been possible because of the chance I got to do higher studies at the insistence of my mother. She gave me values of my life. She was one of the noblest parents I have met in my life.

So, my greatest guru was my mother. My second great guru was Principal Bhave, about whom I made a mention earlier. He taught us Physics. Because it was a poor school, I remember, it had to innovate to convey to the young students the message of Science.

I still remember one of the interesting experiences when, on a Friday afternoon, Principal Bhave took us out into the sun to demonstrate to us as to how to find the focal length of a convex lens. He had a piece of paper here, a convex lens here and he moved it up and down and there was a point when there was a sharp focus and a bright spot on the paper. He showed the distance between paper and the lens and said that this distance was the focal length. But then the paper started burning. For some reason, he then turned to me, and said, “Mashelkar, if you focus your energies like this, you can burn anything in the world.

My young friends, from this I got two lessons- first the philosophy of my life that if we focus, we can achieve anything. And the second about the power of science. It was so powerful. I thought to myself why don't I become a scientist. It left an indelible mark in my mind.

By the way, if you think carefully about that story, it also tells you about the new model for the society and for the nation. What is the experiment? You have the lens. And what does the lens do? It takes the parallel rays of the sun and then lets them converge. And what is the property of parallel lines? Parallel lines never meet. Parallel rays never meet but the lens actually makes them meet. I call it “convex lens” leadership by the way – leadership that brings people together.

In fact I was a visiting Professor at the Harvard MIT HST School last year and there I gave a talk. And I talked about how to bring the world together – we need a convex lens leadership.

Unfortunately, in our country, rather than finding a ‘convex lens leadership’, we find a ‘concave lens leadership’! And what does a concave lens do? The parallel lines go even further apart. Rather than societies coming together, they try to divide them further – on the basis of caste, on the basis of religion, and so on. Our elections have been reduced to caste based voting my many places in India. Sounds familiar- isn't it? So there are deep lessons in that afternoon's experiment. We all must strive for and insist on ‘convex lens leadership’, where we become one society – one India.

The third teacher who made a huge difference for me was Professor M.M. Sharma. He had returned from Cambridge at the young age of 28. He took up the position of a Professor in University Department of Chemical Technology. He was incredible. I was among the top rankers in Chemical Engineering. I had a number of offers of scholarships from the United States of America and Canada for doing research for my doctorate degree. I had always done things which were different, by the way. I thought where could I get a better Guru for me and decided not to go abroad and worked in University and did my Ph.D under young Prof. Sharma, a man with enormous value systems. All his research was ‘idea based’. With barely Rs.10,000 per year as contingency grant, i.e. less than 1000 rupees per month, we

did research that was published in top international journals. He has remained a teacher. Just now, it was mentioned that I am the third Engineer to have got the fellowship of Royal Society in the 20th century. Prof. Sharma was the first by the way. Ours is a rather unique combination of *Guru* and *Shishya* both getting Fellowships of Royal Society!

And the fourth one, and I want to mention about him in order to set the mood and tone for what I am going to say subsequently, was Professor CNR Rao, who came in my life little late. Prof. Rao is the most celebrated scientist in the country. The interesting thing is that he is approaching the age of 75 now and he still works 25 hours a day! Not 24 but 25. And that too day after day, week after week, month after month, and year after year. He is really my role model and an icon. Except the Nobel Prize, he has received all the major awards. I am sure he will get that too, and sooner rather than later.

What he did for me was very interesting and there is a lesson for you to take home. Anytime I got any honour and I went to him expecting him to appreciate and applaud. You know the only word he would use would be- *Not Bad!* I became a Fellow of Royal Society FRS, It's a big honour. In fact, I remember receiving a letter from another FRS, who said 'only two greater things can happen to you in life now, One is Nobel prize and other is death. One is certain and the other is uncertain'.

When I went to Professor CNR Rao and told him that I received FRS, he said Not Bad! Then I became Foreign Associate of U.S. National Academy of Science. It was established in 1868. In 140 years or so, only seven Indians have got this honour. Sometimes you get a Nobel Prize first and that honour later, like Sir Harry Kroto, who got the Nobel Prize first and five years after that he got this honour.

I thought surely now Professor CNR Rao would be impressed. So, I went and told him look, I got this honour. He said, 'Not bad'. I was really frustrated. So I asked him directly what will make him satisfied. Then he defined for me what is called a *limitless ladder of excellence*. He said, "there are no limits to the ladder of excellence". You should continue to climb on this ladder of excellence for ever and ever. Your best is yet to come.

Looking forward to exceed one's potential

The vision statement of the Lucknow Management Association spoke of actualizing the potential and it ended with achieving the potential. What I want to emphasize is that it is not the question of reaching the potential, it is the question of exceeding the potential, going beyond it. The word *limitless* has a meaning. Therefore, I think that there are no limits for each one of you, on what you can change, where you can reach. So let us now talk about "limitless ladder of excellence" and how the proper mindset can actually make you reach that limitless ladder of excellence.

About this issue of not only reaching your potential but going beyond it, I would like to share with you what I have actually seen in my life and which could be inspirational to you. I would say it is not only the "individual mindset"; there is what is called an "institutional mindset". IIT has the mindset, All India Management Association has the mindset, National Chemical Laboratory had a mindset, and India has a mindset. And that also needs to be also addressed. Let me go back to the National Chemical Laboratory.

Changing Institutional Mindset

I was the Director of National Chemical Laboratory from 1989 to 1995. It is a great Laboratory and is one of the finest in chemistry. We were supposed to do research and development, develop technologies and transfer them to industry, partner with them, make commercial production happen in Indian industry based on new indigenously developed technology and so on.

There are so many great achievements that National Chemical Laboratory has had in catalysis, in polymers and whole range of other areas. I had a very interesting challenge, when I took over the Directorship of National Chemical Laboratory in 1989. Any time we at NCL had done something ahead of the rest of the world and I went to Indian Industry, they would always ask me, “but have *they* done it” That was the Indian Industry’s mindset. Have they done it means- has Japan done it? Has U.S. done it? Has Europe done it? If they have not done it, how can we do it?

So, I had a very interesting challenge. I asked myself a simple question. What was I selling? The answer was that I was selling knowledge. Then I asked myself what is my market? My market is global. So, in 1989 I made a statement that National Chemical Laboratory would be “International Chemical Laboratory”. What did it mean? It meant that my market would not be limited to India. It would be U.S., Europe, all over the globe.

This was audacious. I was almost saying that I would develop something and sell it to Pfizer in U.S., sell it to General Electric in US and so on. There were many doubting Thomases, who told me that the size of the budgets of Pfizer and General Electric, were bigger than India’s R&D budget. I remember telling them that it was not the size of the budget but the size of the idea that mattered.

Size of the idea- thinking big is what matters. The beauty of the flight of imagination is that it has no limit to the height you can reach, there is no limit on the fuel that you can load, and there is no limit to the distance that you can land, excepting the limit that you set for yourself. *Limitless* –that is the key word. And we said we would pick on some challenges and we picked on General Electric. They were leaders in polycarbonate plastics and had 40% world market share. I said let us create something, which they had not thought of. Their budgets were bigger than India’s R&D Budgets, by the way. But I was trying to prove a theory that it was not the size of the budget but the size of the idea that mattered.

We got a breakthrough on what is called as solid state poly-condensation of polycarbonates. I am not going into the technical details, the important thing was that we had changed the paradigm by doing a reaction that was conventionally done in the molten phase to a solid phase, with lot of attendant advantages on the quality, cost, etc. Normally, if it had a breakthrough like this, we could have published – and then it would have been common knowledge. In the new paradigm, we didn’t say *publish or perish* but *patent, publish and prosper*. Why patent? Because if I am selling something to General Electric, I cannot go to them and say I have copied it from you. They will kick me out. I have to be ahead of them. Not only that, it has to be protected by the patent in their country, otherwise they will not buy it for the fear of infringement.

At that time it was a paradigm shift because we did not have a single U.S. patent in National Chemical Laboratory in 39 years after its establishment in 1950. We went in for aggressive patenting because it became a compulsion and without patenting we could not be able to sell knowledge to multinationals.

When we got a breakthrough in solid-state polycondensation of polycarbonate, we filed a US patent. And we were all delighted, when it was granted. That breakthrough was actually like putting a stake on General Electric’s territory. Impressed by this, the General Electric shook hands with us – became our knowledge partners. It was an incredible journey afterwards.

One day Jack Welch the CEO of General Electric said, “If they are so good then why are we not there?” And they set up the Jack Welch R&D centre in Bangalore and once they set it up, there were several others who came. And today we talk about India as a Global R&D hub with more than 300 companies having set up their R&D centres, and not small, by the way, but with 2000, 3000, 4000 scientists working in them making India a knowledge production hub.

But it all began with that little spark at the National Chemical Laboratory. What did it prove? The same young Indians who were only doing copying-and glorious word for that was “reverse engineering”, by the way, started doing “forward engineering”. And the same set of people were able to actually deliver something which was ahead of the rest of the world. What is the central point I am trying to make? It is that by changing your mindset, you can do it. The basic mind is the same, the intellect is the same. It's the positive mindset that has changed. This mindset now says “I can do it – I will do it” - and that makes a difference.

Changing National Mindset

I can give more examples about “institutional mind set” but I will now move from institutional mindset to national mind set, which we make collectively. What is a national mindset? We got our political freedom in 1947. I call it our first freedom. We got our second freedom in 1991, the freedom to compete, when Dr. Manmohan Singh liberalized and opened up Indian economy and that made a huge difference. When you see a lot of these things that are happening today, they are happening because of the second freedom in 1991, when the mindset of the country was changed, though the same minds were there at that time.

Look at Tata's Nano that you are very proud of. Nano, the one lakh rupee car, the people's car, is a paradigm shift. If you go anywhere in the world, there is a buzz of excitement about how we could do it. It's a great car.

I remember I sat in before it was launched in January 2008. I am a six footer and there was space for me in the front and space at the back, mileage of 25 kilometer per liter and EuroIV environmental standards . Incredible achievement!

It is going to make a paradigm shift, but Tata's Nano would not have been there, if Tata's Indica was not there. And how did Indica come about? It was only in 1993 and not before that, that Ratan Tata was allowed to make a car. Before 1991, India did not allow competition. There was a frustration for those, who wanted to compete, who wanted to fly, who wanted to be ahead of the world. In March 1978, JRD Tata made a very interesting cryptic comment. He said that if he was allowed to make a car, he would have been as good in it as in trucks (made by Telco) but he was not allowed to do in the pre-liberalised India, that was before 1991.

The national mindset then changed in 1991 and it made a difference. Now who made Indica – 700 engineers, who were with Ratan Tata. They were the same engineers, with the same quality of minds by the way, except that they were not given that challenge of making an Indian car – an Indica - till India changed its mind set. I am giving you these two examples just to illustrate the point that how institutional mindset, national mindset actually make a big difference. And 1991 made such a huge difference.

We had turned a full circle when Indica came. 50 years ago, it was the British Morris Oxford which was being sold as Ambassador on Indian roads. Exactly 50 years later, it was an Indian Indica which was being sold as City Rover on London roads. Today, Tata Motors have even done something audacious – they have acquired Land Rover and Jaguar. What a change, what a transformation! And all that has been possible because there was a change in “national mindset” in 1991.

When Jamshedji Tata wanted to put up the steel plant, one British gentleman had said, “if you are able to produce steel, I will eat every pound of it” I am sure this British gentleman would have got indigestion because of the way then TISCO and now Tata Steel has moved. And it's not only that. Today Tatas have acquired Corus, a British steel company. So we are producing steel right in the backyard of Britain now! All possible due to the change in the “national mind set”.

Let me talk about this mindset further. Lots of people call me a dangerous optimist. Many a times, I have said things, which people did not believe at that time. For example, in 1995 I gave Thapar Memorial Lecture in Delhi and the title of my lecture was *India's Emergence as a Global R&D Platform - Opportunities and Challenges*. Dr. Manmohan Singh, the then Finance Minister presided over the lecture. What I had said at that time, 13 years ago, was that India would become a major Global R&D hub. I said there will not be product based competition. Because product would be just be an intermediary in the market place, which would draw value for the enterprise from the market. It was going to be the skill based competition, what skills you bring together, how quickly you bring together, how you assemble them, how you use them to synthesise something entirely new, smarter, faster, cheaper than your competitor. And that is beginning to be true now and you can see skill based competition coming all around.

People don't talk about history of science, they talk about geography of science, geography of science shifting to Asia Pacific. All these changes are beginning to happen. I have an undying optimism in life, which manifests in many different ways. If you show me a glass that is half empty I would look at the half full part of it. If I go into darkness, instead of cursing the darkness, I will be the first person to run to find a candle. How would you develop such a mindset? It is extremely important that we do that because with positive mind set what you can achieve is unbelievable, they can be truly transformational.

On Creating Positive Mindsets

I remember about eight or nine years ago, there was a big turmoil going on in Delhi University and the Teachers' Association had invited me for a keynote presentation at some symposia. I remember some distinguished individual introduced me and after the introduction he said "---- and as we know, we are all in coma and Dr. Mashelkar will address us and tell us what to do"

Now, I had to think fast about my response in the time it took in walking up to the mike. I said, "Gentlemen, I have so far never addressed an assembly of people in coma. But maybe, the gentlemen didn't mean coma. He meant comma. And what is a comma? You write a sentence, you come to the middle of the sentence and you put a comma. That's a pause. That's a time for you to reflect. You have not written the rest of the sentence. You write the rest of the sentence in a way that the next sentence follows, the paras follows, the pages follows, and the chapter gets completed. And may be it becomes a golden chapter, if you just interpret the coma and comma differently.

Do you know that the entire conference that was going to be a wash-out for the next two days, people being so negative, because of the negative environment they themselves had created, became a very positive conference! People still talk about it.

So, I would say that positivism and looking at things positively, doesn't take much. There is no need to be dangerously optimistic but if you don't look at the positive aspects of life in particular way, things wouldn't happen that will take you upward and forward.

I learnt many things from many people and one of the aspects of positivism came in a very different form from Sunil Gavaskar. Nandu Natekar, who is a great badminton player had invited me and Sunil Gavaskar to his home for dinner. Nandu had achieved something in Badminton, Sunil something in Cricket and I had something, a little bit though, in Science. We were talking about our own experiences, sharing our views on how do you reach the top and stay there and so on. Sunil told us something very important. I asked him, "you are an opening batsman, you get on to a pitch whose condition you don't know, you don't know the bounce of the ball, nothing much but then how do you manage to bat. Sunil said" Many a times I missed the ball completely. When a batsman misses the ball he looks like a fool on the television camera with millions of people watching. At that time he is a defeated person." Sunil then said what I used to do then, was this. "When I took stance for the next ball, I used

my unbelievable ability to completely wipe out the memory of the previous ball and take the next ball as the first ball of my innings”

Someone has said “I only think of the future because that is where one is going to spend the rest of my life” It is that philosophy that makes it possible. Because in life there are successes and there are failures. When there are failures, you don’t go into the dumps and when there are successes, you don’t fly sky high. You have to learn to take them all in your stride. This also is the part of the positivism. I spoke about positivism in my convocation address at Delhi University a few years back. Those of you, who were interested in this convocation address, may go to Google, put my name and word “positivism” and that convocation address will appear. In fact, Mr. Arun Shourie told me that he liked that lecture so much that he personally gave a copy to many senior ministers.

What I want to do now is to give you what I like to call as bold print messages about India, Indians and the future where we go from here. The first is the future of India and the challenge.

China Vs India : Advantage India

Yesterday somebody was asking me about China Vs India. It’s a favourite question, by the way. Any where I speak around the world, this is the first thing they ask. I have standardized the answer now. And that answer is yes - India will finally win for the simple reason that India is not a sprinter but a long distance runner.

India has three things which will stand for it in good stead. They all have to do with innovation and creativity because only those nations will survive and succeed in the 21st century which are great in innovation and creativity. So, what are those three things?

These are three Ds: Democracy, Demography and Diversity. Democracy gives us the ability to think free, act free. And we have a great democracy in the country, somewhat chaotic, but still we are democratic and that is going to make a huge difference. The second is “Demography”. I just mentioned that almost half of our population is less than 25 years. In Shanghai, within the next five years, one third of the population will be more than 60 years because of the one child policy that they followed at some point in time. Innovation is the business of the young. Therefore being a nation of the young is going to make a lot of difference. And the third is “Diversity”. Look at the diversity in this room, for example. Look at the diversity from Kashmir to Kanyakumari, in our culture, in our language and so on. And when there is diversity, innovation thrives.

So these three factors, believe me, that are going to stand us in good stead but what is very important is that the democracy we have, has to be an enlightened democracy and not “chaotic”. Our demography has to be one where these young people have to be given an opportunity to grow, opportunity to reach their potential otherwise it will become a liability. And the diversity that we have, we have to always make sure that we manage the “unity in diversity” as we have managed over a period of time without factions. So Democracy, Demography and Diversity are India’s three great advantages over China.

Talent, Technology & Tolerance

Then what are the three things on the basis of which we can carve out our future for us in the 21st century? You will always find me quoting three things by the way. It’s like *Satyam*, Shivam, Sundaram! In my judgment, they are three Ts– Talent, Technology and Tolerance. Talent – this is in evidence here. What India is going to leverage is this talent -Indian talent. If you know you look at different countries, they grew because of different things at different points of time in their history. For example, the United States of America – it was roads and railways, Britain – it was textiles, Denmark – milk and milk products, Sweden – it was timber

and timber products, Middle East – it was oil. And if you ask me what is the “oil” for India in the 21st century, I will say IT and when you would say Oh! IT means Information Technology. No, I am sorry, IT means “Indian Talent”- all of you. That’s what is going to make the 21st century India’s century.

Then, of course, Technology is absolutely transformational. I am not just talking about what we did in space, defense, atomic energy, etc. but technology which can make a difference in the lives of the people, technology that is inclusive, technology that cares for the under privileged.

How do we smartly use that technology? Look at Tata Consultancy Services (TCS), for example. On one hand, if you go to Hinjewadi in Pune, you will find there, very proudly, the fourth fastest super computer in the world. It is developed by 80 young kids. I visited them recently.

This achievement has taken place at the top of the ladder. For the bottom of the ladder, that means for those millions of poor and illiterate Indians, TCS has developed computer based functional literacy (CBFL), which can make illiterate women read a newspaper within 6 to 8 weeks at a cost of just 100 rupees. Entire Medak district in Adhra Pradesh has become literate by this. More than one lac people have become literate in six different states – in six different languages. It has been used in South Africa – with the same astonishing results.

If we all launch a National Mission by using computer based functional literacy, this entire country can become literate less than five years, not 20 years. And can you imagine what difference it will make to create that “enlightened democracy” that I was talking about. So, when I talked about the talent first and then technology, this technology is not for making those super computers, which can simulate nuclear explosions, or which can do the most complex fluid dynamic calculations. But I am talking about a technology that makes a difference at the bottom of the pyramid- inclusive technology.

And the last is “tolerance”. What is tolerance? Tolerance for failure, tolerance for risk taking, tolerance for ambiguity Today we talk about Silicon Valleys success with great admiration, but this success is not just because of the talent and technology that they have but because of the tolerance that they have. Venture capital flourished there, risk taking comes naturally there. Venture capital has assumed the meaning of “adventure” capital there.

Somehow, we have become an intolerant society as far as risk taking and as far as the failure is concerned. Is there a success without failure? Have you a seen a small child walking without falling? No. But somehow or the other, we are not tolerant to failure.

I keep on going back to cricket. When Ajit Wadekar won the test series in early seventies against England, the streets in Bombay had lined up but just a few years later, when he came back after losing the series, there was stone throwing! Is it fair? Tolerance, I think is going to be an essential part, -tolerance for all the religions, castes, creeds, socially deprived, economically deprived. So, I believe that the new India that you have to build is on this solid fulcrum of talent, technology and tolerance.

Tolerance for ambiguity is very critical by the way. If you see the real story behind Microsoft, somewhere there is a romantic story about the tolerance for ambiguity. Bill Gates recently got an honorary doctorate from Harvard and he narrated an experience. He declared himself as the most successful dropout from Harvard University. Then he said, in his early days, when the hardware manufacturing was started by a company in Albuquerque, he phoned them up and offered to supply them the software, half expecting that they would keep the phone down because he was just a student, who was calling. But they did not. They asked him to come after a month. Bill Gates says. ‘Thank God! They said come back after a month because I had not actually developed the software’, when I had called them. So, you see plenty of ambiguity here. It is in terms of what Bill Gates did because he offered the software which he was yet to develop. And ambiguity in terms of the company in

Albuquerane in accepting the offer by an undergraduate student - they did not keep the phone down because he was a student. The rest is history, the rest is Microsoft, the greatest software company, which made Bill Gates the richest man in the world. So, I believe that talent, technology and tolerance are the key to success.

Innovation, Compassion & Passion

And finally, what are the three qualities I would like to see you imbibe because that is something that has stood me in good stead. And it is again *Satyam, Shivam, Sundaram*-three things which are connected to your body. One is innovation, the mind, the brain. The second is passion; passion in the belly and third is compassion.-compassion in the heart.

Many nations, many societies, many individuals may be very passionate, they may very innovative but if they have no compassion, they are missing something. I think that the future citizens of India have to imbibe these three qualities. And particularly compassion is very important for this country for the simple reason that we have to create an 'inclusive' society, not an 'exclusive' society. We talk about 8%, 9% growth. It has to be "inclusive growth"; it has to be innovation led inclusive growth, which 'includes' all those unfortunate 'excluded' – all those poor, those deprived, those have nots.

When I look at all of you, I see unbelievable potential. I think the big challenge that we have is how do we unleash the potential of a billion plus in India. I like to look at not national laboratories but nation as a laboratory, India as a laboratory.

I will tell you an interesting experiment that we have done. Do you think research and technology and innovation can happen only in CDRI, in ITRC, in NBRI, in CIMAP, University of Lucknow and Sanjay Gandhi Research Institute etc. etc. only? No! Each one of us can be innovative.

Therefore, in the year 2000 we created, what is called a National Innovation Foundation- for whom? For grass root innovators which include artisans, farmers, school dropouts and so on. The movement is led by an exceptional leader and a human being, Anil Gupta from Indian Institute of Management, Ahmedabad whom I call a modern Gandhi. He does Shodha Yatras in villages, walking 15-20-25 kilometers in a day, seeing what villagers have innovated. National Innovation Foundation holds national competition for grass root innovators. In the first year when we had the competition, we just had five thousand entries across the country. Year before last, one lac entries came, out of which we picked up the top 30 and gave them awards. Dr. APJ Abdul Kalam, while he was the President, gave the last two national awards. We are hoping that this year our current President will give the awards.

And believe me, out of these awardees, there were so many illiterates. We have seen one 8th standard drop out schoolboy create a robot, one of the most complex robots. In fact Dr. Kalam himself was surprised at what he saw.

So, that is a tremendous potential each one of us has got. It's only a question of discovering it. It is like Hanuman, who did not know what powers he had until Jambawant pointed out those powers to him. So, can you imagine if 1.2 billion *Hanumans* express themselves what a great nation this will be, what a great India we will create? Many young friends, that is our challenge. Let us rise and create that great India where 1.2 billion people will rise to their potential, then exceed their potential, and then give India the rightful place in the comity of nations, which is right up there.