

'Education, Technology and Transformational Change', Nehru Library Lecture by Professor Ian Jacobs, President and Vice-Chancellor UNSW Sydney, New Delhi, India, 16 November 2016.

I am honored to be here today, in this symbolic venue, named after India's great leader of independence, and I would like to begin by acknowledging the presence of Shakti Sinha, the newly appointed Director of the prestigious Nehru Memorial Museum Library. Thank you for hosting us today. I wish you all the very best in your new role.

Nehru who was such an inspiring leader of India and one of the great statesmen of the 20th century said in 1951, "There is no end to the adventures that we can have if only we seek them with our eyes open." That is how I have approached this my second visit to India and my first as Vice Chancellor of UNSW Australia and it is I believe the story of India today. There is an intensity of life and experience here that almost no other country can match. Travelling as a visitor in India, on this occasion to Hyderabad, Mumbai and now Delhi and previously to Bangalore, Velore, Chennai and Rajasthan is to experience a wealth of tradition combined with the rush of newness and the unknown, which makes it doubly exciting.

It's in that spirit too that I want to talk today about a subject that is, like India itself, both as old as human history and very much of the moment: the subject of education and learning, of expanding the boundaries of human knowledge, and, in particular, of the role of higher education – which, I believe, holds the key to a richer life for all, and a richer nation, in every sense.

The overarching theme of my lecture is the university as a servant of society and what that can achieve. I spent most of my career in the UK in Cambridge, London and Manchester, as a doctor, surgeon, researcher and academic leader, before moving to UNSW in Sydney Australia 2 years ago. I have also had the privilege of undertaking work in North America and Africa and of spending time in China, India and many other countries in Asia. I have seen close up what higher education at its best can do to transform lives and I believe that the great universities of the 21st century will be those that act as servants of their society and the global community. I feel passionately about the role universities can play in building a better world and I am proud that UNSW sees itself as a university with that mission.

During the lecture I will touch on six themes. First, I will say a few words about the relationship between India and Australia. Second, I will then turn to the demand for and importance of higher education; in my third theme I will briefly consider what we should expect of the role and nature of universities; and fourth, the efforts of my own university UNSW to be an example. For my fifth theme, I will reflect on the crucial importance of partnership in delivering the potential of universities; and finally, on the exciting partnerships developing between UNSW and organisations here in India and my hope that

these opportunities can improve the lives of many through our UNSW Diya initiative in India.

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So first, a few words about India and Australia. We are bonded through historical links with the UK and we share the great traditions of parliamentary democracy and respect for the rule of law, as well as a mutual love of cricket! As an aside I cannot resist mentioning that Geoff Lawson, an Australian international cricketer, who is an alumnus of UNSW and our cricket Club Captain, coached Kochi Tuskers Kerala in the Indian Premier League in 2010. As an Englishman I was going to steer clear of mentioning cricket in anticipation of England being thoroughly beaten in the current test match series - but I take some comfort from the draw in the 1st test match.

But back to India and Australia. In 1799, the first exports of Australian coal were shipped from Newcastle in Australia to Bengal - today India is Australia's tenth-largest trading partner, realising almost \$18-billion in two-way trade, with plenty of room for expansion on both sides. About 450,000 people of Indian descent live in Australia, 86-thousand of them in Sydney, and - between 2010 and 2015 - 180,000 Indian immigrants arrived in Australia, more than from any other country.

In 2014, an important visit by Prime Minister Modi to Australia injected a transformative shift in India-Australia relations, identifying new areas of strategic cooperation spanning not only political, security and defence cooperation but also extending to sports, trade and investment, energy, research collaborations and education. This heralded an equal shift in our mutual vocabulary - from the 3Cs (cricket, Commonwealth and curry) to the 3Es (economy, energy and education).

Prime Minister Modi described India's relationship with Australia as "a natural partnership arising from our shared values and aspirations". As an example of that partnership, the recently concluded 'Confluence' festival of Indian arts in Australia was a brilliant example of how the complexity, richness and even the mystery of your culture could be integrated with the multiculturalism and energy of Australia - transforming the mind-set between our nations substantially. Just as India itself is transforming, energetically so.

India everywhere projects the rhythm of a country 'on the move'. In a world where many developed economies are struggling to stay on course, India - with the world's second largest population - is recording economic growth rates of more than seven-percent. The World Bank describes India as the "bright spot" in a generally gloomy global outlook for developing countries. Fertility rates are trending down, life expectancy is up. After struggling to keep up with food production, India is now a substantial food exporter. India has a strong communications and cultural sector. And it's rapidly becoming a powerhouse in the fields of computing, medical and space sciences, and other advanced technologies.

This is not to deny India's many challenges. Rural poverty remains a critical issue, and the disproportion between urban and rural incomes is rising. The major cities are becoming far more crowded, the roads more jammed and public services more stressed. In that sense, India is becoming more like the rest of the developed world, experiencing the problems of rapid growth and the benefits, complexities and difficulties of globalisation.

All of this calls for solutions, many of which are to be found in higher education.

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With that as context I turn to my second topic - the importance of and the demand for higher education, which is surging. India is one of the five BRICS nations - Brazil, Russia, India, China and South Africa - which only last week adopted a 'New Delhi Declaration on Education', reaffirming the need for universal equal access to quality education, including secondary and higher education, technical and vocational education and training, and lifelong learning opportunities for all. Within 25-30 years, it's projected that 75% of the world's population will be living in major cities. Demand for higher education will grow as universities are called on to provide the necessary skilled professionals and creators of wealth, drivers of innovation, and solvers of economic and social problems.

As the global economy moves from old-style labour intensive manufacturing to high technology and the provision of services, the Indian economy is embracing the need for more sophisticated workers who can adapt and innovate to be competitive on the global scene. To embrace these developmental challenges, India's Prime Minister Modi has announced a series of initiatives that constitutes a veritable 'future of change': the 'Make in India' programme; 'Digital India'; the 'Smart Cities' initiative; and 'Start-Up India'. As a result, India is emerging as a hub of global research and development, with more than half the world's Fortune 500 companies setting up R&D operations here. By 2020, India is expected to be the world's third largest economy.

All of this requires a major focus on higher education. In the coming decade, India's higher education system will need to undergo radical change, a massive transformation driven by economic and demographic change. Already over 50-percent of the Indian population is under 25 years of age; by 2020 it's estimated that India will replace China as the country with the world's largest tertiary-age population. That's a demographic asset but also a huge challenge. Currently India's higher education gross enrolment ratio stands at 18% in comparison to the OECD average of 27%; the government plans on increasing this to 30% by 2020 requiring 800 new universities and 40,000 new colleges to reach the 30% target and provide 40 million university places, an increase of around two-million places a year. These are dramatic figures and by any standards present a truly extraordinary challenge. So access to higher education is for India a national priority; without it, moving into the first league of developed economies will simply not be possible.

Can international partners help? Well international education is among the world's fastest growing sectors, with demand for expected to grow by 21 million in the current decade to 2020. In countries like India that are still building higher education capacity, students are looking for opportunities to study abroad and India is forecast to have the fastest growing mobile student outflows by 2020. There are more nine-year-olds in India today than the entire population of Australia - that demographic coupled with rising income levels and an ambitious national agenda to drive development, means that India will be a key of demand for international education in the immediate future.

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So the demand and the need are unquestionably there, which brings me to my third topic - in this environment, what sort of universities should India itself be aiming for? Big issues of access and equity arise. The curriculum - what should be taught and for whose needs? The individual, the nation, the economy, the future of humanity? Shaping models for universities in the current climate of global uncertainty is no easy task. I believe there is no 'right' template for building a great university; there are many.

But the fundamental role of universities is clear - the development of human potential. Put simply it is about "people, people, people". That can be economic, training people to for better jobs, unlocking entrepreneurial activity and creating dynamic enterprises, and generating productivity. It can be social, helping people to work to eradicate age-old problems in health, addressing social inequality and prejudice and building community interaction. It can be political, providing the people who demonstrate the leadership needed to build and sustain state institutions and inclusion. It can be cultural, people developing national identity through history, through languages, literature and the arts. And yes, it can be personal qualities, producing proud and talented graduates who become role models for others. These are all forms of transformative human capital that celebrate the power of knowledge, shifting from 'what is' to get to 'what could be', and working out the best ways to translate that into real benefits for humanity. The mantra of "people, people, people" is one hallmark of great, forward-looking universities.

Universities around the world are, and should be, diverse in their offerings, in their approaches to education, in their culture. The universities recognised as the very best should not just be those that are research intensive with the highest global research ratings, although that is important and none of us would reject high ratings, but for the quality and scale of their education and the way in which they work for their communities. They should strive not just to be the best 'in the world', but also the best 'for the world'. They must be – and this is a theme I mentioned earlier and will keep returning to – be servants of the community, their local society, their nation and the global community.

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For my fourth strand of this lecture I would like to illustrate my views about the role of a university by telling you something about my own institution, UNSW Australia based in the great city of Sydney. UNSW aspires to be Australia's global university, improving and transforming lives through excellence in research, outstanding education and a commitment to advancing a just society. Now in its 67th year, UNSW has over 50,000 students and around 6,000 staff. We have 15,000 visiting international students from countries around the world, including India; we are linked through partnerships with over 400 universities in 39 countries, importantly including India. We are a member of the elite Group of Eight universities in Australia and we are recognised as one of the world's leading universities - in the latest QS global rankings, for example, we were 42nd for academic reputation. Our research in quantum computing, solar energy, neuroscience and HIV is cutting edge and world leading.

We began just two years after India gained independence, in 1949, as the New South Wales University of Technology, with the aim of building an institution that would carry forward the profound developments in human knowledge that produced such exemplars as the Massachusetts Institute of Technology - focused on teaching and research in science and technology, but exploring too the humanities, social sciences, economics and politics. We still maintain that mix of sustained innovation, deep scholarship and practical application of results. UNSW's motto is 'Manu et Mente' - knowledge by 'Hand and Mind' – and we have upheld a strong commitment to applied learning and vocational training, in areas such as electrical engineering, water management, transport solutions, built environment and business, and entrepreneur studies. And if it is money students are interested in it is worth noting that UNSW had produced more millionaires among its graduates than any other Australian university and ranks among the top 30 worldwide on that metric of graduate success.

Our stellar academics include several of Indian origin, including Scientia Professor Deo Prasad, CEO of the Cooperative Research Centre on Low Carbon Living and an international authority on sustainable cities; and Scientia Professor Veena Sahajwalla, Director of the SMaRT Centre and a leading materials scientist, who transforms waste and garbage into 'green steel' as a building construction material. Veena is an IIT graduate with extensive ties to Indian industry including Tata Steel, and a recipient of the prestigious Bharatiya Samman Award. We also have early career researchers like Dr Monika Barthwal Datta in the School of Social Sciences, an expert on critical security studies with a focus on South Asia and a Director of the Australia India Youth Dialogue - the main platform for developing linkages and fostering leadership among young people between our two countries.

I should also note that UNSW has a strong commitment to the Indian community in Australia. It hosts the Sydney node of the Australia India Institute, and the Annual Gandhi Jayanti and Gandhi Oration events. The Oration has hosted some of Australia's and the world's preeminent thinkers to make a 21st century contribution to Gandhian principles. Speakers have included Australian writer Thomas Keneally and Gandhi's granddaughter Ela

Gandhi. And last month we again sponsored the India Australia Business and Community Awards which recognise the growing contribution of Indian Australians to the nation's business, cultural and education communities.

Last year we embarked on an ambitious 2025 Strategy, a ten-year plan aimed at securing UNSW's place in the leading 50 of the world's 25,000-plus universities. Our strategy has three top-level themes. One of course is academic excellence with outstanding research and innovation in education as the key strands. We are research intensive and education intensive both at scale. Our new UNSW Scientia Educational experience is about inspired learning, combining cutting edge digital technology with a highly personalised, interactive and flexible approach to education. But outstanding research and education is not enough. Equally important to us are our second theme of social engagement involving social justice, thought leadership and knowledge transfer; and our third theme of global impact with the intention of UNSW, as Australia's global university, having a major, positive global impact through international education and partnership with communities and organisations far beyond Australia's borders.

At UNSW we strive to live up to the aspiration which I mentioned earlier: that great universities should be the servants of their societies and of the global community, and they have a responsibility to play a major role in transforming those societies. Our view is that a truly great university does not stop at the edge of campus, but moves into its surrounding society locally, nationally and globally and is, in turn, influenced and shaped by society and its needs.

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That brings me to my fifth theme of partnership. While it's often said we live in the age of the individual, the truth is that we also live in the age of collaborations, of interdependency. The best partnerships take good ideas and transform them into opportunities, open them to new interpretations and new applications, and generate new, innovative ways to solve the many problems that arise. There's a wise African proverb that says, "If you want to go fast, go alone. If you want to go far, go with others." At UNSW, we do just that. Let me give you a recent example of an exciting new partnership in China.

In April this year in the Great Hall of the People in Beijing I was honoured to join Australian Prime Minister Malcolm Turnbull, Chinese Premier Li Keqiang and other Chinese officials in a grand signing ceremony - to bring to the UNSW campus a major advance in Australia's research and development landscape: the first-ever Torch science and technology park to be established outside China, where Chinese companies and Australian researchers working together will take UNSW invention and knowhow and turn it into products which can be manufactured and commercialised. Contracts have since been signed with eight Chinese companies to deliver more than A\$30 million of direct research funding to UNSW, with an additional A\$50 million of contracts in negotiation.

As another example, UNSW has teamed with two other great universities – Kings College in London, and Arizona State – to form the PLuS Alliance, that’s Phoenix, London and Sydney – crating the tremendous scale you get when three major institutions work together to share knowledge, to combine resources, and expand opportunities. By the end of 2016 we will have 120 PLuS Alliance Fellows collaborating across three universities on three continents. The Alliance is a pioneering effort to see what happens when you alter the concept of the university to match the expansion of knowledge, the explosion of technology and the almost limitless global market for higher education - eventually to the point where it’s available to potentially millions of students. The Alliance aims to deliver an exceptional international learning experience that will build on an established record of both on-campus courses and innovative online course delivery. Already we’re seeing how the critical mass and global reach you get by combining the teaching power of three major universities - using a variety of delivery channels – can pay big rewards. One of our aims through the PLuS Alliance is to create a global learning community of over 50,000 students accessing our new online and blended learning courses. Imagine a student in Delhi having the opportunity to create a personalised degree programme combining options for time in Sydney, Phoenix or London with online learning sessions from home in India. I hope that programmes of study like that will soon be available via UNSW - an exciting prospect for the future.

I mention these examples to illustrate how, increasingly, partnerships and collaborations will drive the very nature of international higher education, both between institutions and between universities and external bodies, be they corporations or governments. I hope that UNSW can contribute in a similar way in a spirit of partnership in India.

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My sixth theme continues the discussion of partnership in the context of the thrilling opportunities for partnership that I see here in India. Like India, Australia is building its capacity for innovation, productivity and growth – and much of that is coming from the higher education sector. Australian universities including UNSW offer outstanding strategic research partnership opportunities, and considerable experience in commercialising outputs. We have a lot to offer, but also a lot to learn. At UNSW, we pride ourselves in operating in two-way spirit of ‘generosity in partnership’.

On Sunday in Hyderabad I began my Indian visit with a programme at the LV Prasad Eye Institute where I met with truly inspirational people who have improved or saved the sight of millions. Prof Nag Rao an extraordinary man who has led the Institute so well for 29 years is a longstanding friend of UNSW and truly lives and breathes the motto of the Institute "So that all may see". As he took me around his Institute, I was delighted and proud to hear that UNSW through our Brian Holden Vision Institute and those we have trained is an important partner for the LV Prasad Eye Institute. I met staff doing great work who had studied at UNSW. Just one example is Nagarajan Konda who grew up in a rural area and began work at the Institute nearly 20 years ago, sponsored by an eye centre in Andhra

Pradesh for a one year Vision Technician optometry program. This opportunity led him to pursue a degree in optometry, specialised in contact lenses and spend time in Singapore as a lecturer. A few years later, he came to UNSW completed a PhD and then returned to India where he now heads the LV Prasad Institute's Srujana Creative Innovation Centre which is delivering high tech ways to make eye care and sight available to many.

I saw first-hand the work Nagarajan and colleagues are doing to use technology to change lives. A wonderful illustration of how having access to international higher education can not only transform the lives of those who receive it, but also benefit millions from the work they then undertake and in turn advance India's development in its dynamic Future of Change program.

UNSW is actively partnering with the Indian government on a series of initiatives Prime Minister Modi has unveiled - such as the India MOOC platform SWAYAM. We anticipate signing an MOU soon with the Indian Ministry of Human Resources Development to become the first foreign university to join the SWAYAM platform which will reach hundreds of millions of learners online. Increasingly, the future will depend on non-traditional forms of education, especially on digital delivery which offers incredible opportunities for providing educational opportunities to millions who would otherwise not have access to the best teachers and resources. Online learning will I'm sure prove transformational in making India competitive with the world.

We are also actively partnering with India on the Smart Cities agenda, working on a major symposium next year to which we'll be bringing our expertise on Low Carbon Living, Built Environment, Materials Science and Computer Science and Engineering. And discussions are currently underway between the Ministry of Electronics and IT and the Australian Centre for Cyber Security at UNSW on a series of programmes related to creating greater awareness on cyber security.

A common thread here is, of course, technology - whether on-line education, cyber security, robotics, virtual learning, 'smart' cities, big data analytics, medical research, transportation – all areas that are transforming India, and in which UNSW has a significant and, in many cases exceptional, global reputation. We are partnering increasingly with Indian industry too. We have just announced a new partnership with Tata Consulting Services focused on staff and student mobility, and joint research, which will see UNSW become a partner across TCS's Global Innovation Network and exploring collaboration on virtual reality, robotics, data analytics, machine learning and other exciting fields. Also in partnership with TCS, we have applied for New Colombo Plan funding to allow 40 of our UNSW undergraduates to take up industry placements in TCS's extensive network across India. This builds on our partnership with Tata Trust focusing on utilising UNSW's expertise in water treatment to develop drinkable water supplies in Gujarat and elsewhere in India.

On the second day of my visit to India I was also thrilled to attend the opening ceremony in Mumbai of the 66th Apollo Hospital, later that day to award an Honorary doctorate to the

wonderful chairman of Apollo Dr Reddy and then to launch - in partnership with Apollo Hospitals and Medvarsity an exciting new online Masters program in public health.

As we look to the future of partnership between UNSW and India it has become clear to me on the basis of discussions over several months and during my exciting visit over the last few days that we need to think big to rise to the opportunities and challenges of India's higher education needs. The needs are far, far more than one university can deliver, but our UNSW team want to contribute and to do so we have conceived what we have called the UNSW Diya Initiative. We have used the word Diya which means light in India to symbolise the illumination that higher education can bring, and that UNSW can bring by working with partners in India to help substantially build its capacity in higher education.

Through the UNSW Diya Initiative we will be able to provide degree education at and through UNSW for as many as 100,000 Indian students across the next decade. We plan to facilitate this with investment in educational technology, including online teaching and learning, through mutually beneficial partnerships across India's higher education system and with India's national and state governments, and through our new India Scholarships, which will bring the transformative power of a UNSW education to outstanding Indian students at undergraduate, postgraduate and research level. The UNSW Diya initiative will demonstrate our commitment to building much-needed capacity in India's higher education system, to expanding the skills needed to drive India's development agenda, to power its economy and contribute to the Make in India, Startup India, Digital India and the Smart Cities initiatives.

Recent global political developments may play a part. While it's perhaps too early to assess the impacts of the Brexit vote in the UK or the Trump vote in America, I believe that the relative stability of Australia in an uncertain world makes it a highly attractive option for Indian students seeking an international education. Many young Indian students will in future see Australia as at least as an attractive option as the USA and UK. We have enormous experience and expertise in looking after foreign students and Australia has more international students per capita than any other nation - we welcome talented international students! Already we are a major destination for Indian students studying abroad, who like the quality of our teaching and our research, and the cost competitiveness of Australian education services. Parents like the fact that our international students can 'live in' on campus, in a safe environment. The Australian government has taken action to ensure the safety of all international students in Australia and I know the Indian government has expressed appreciation for what Australia is doing there. Our Indian alumni regard living and studying in Sydney at UNSW, as a great investment in their personal and professional growth. They are our strongest ambassadors. And it goes without saying that the weather and beaches in Sydney are unbeatable. Having come from the UK, I can certainly vouch for that!

To help make the UNSW Diya Initiative a reality we have taken the important step of appointing the former India Consul-General, career diplomat and educator Amit Dasgupta as our inaugural India Country Director, to work across the highest levels of government and industry to ensure India becomes one of UNSW's flagship partnerships. We see ourselves as Australia's global university and India as a key partner.

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As I come to the end of my lecture I want to restate my belief that education generally, and higher education in particular, is more than anything else the best long-term investment for any nation seeking to have prosperity and security.

Nothing is more likely in this uncertain world to lead to new discoveries and applications which improve quality of life and generate prosperity, or to help us achieve the social tolerance and cohesion which is so badly needed for a successful nation and a safer world. Universities have a key role to play in our future - whether here in India, in Australia or elsewhere. But they cannot deliver that role as ivory towers, cut off from the world they are meant to serve: everything they do must be focused on the wider interests of the community, and be part of an interconnected world - and technology is not peripheral but absolutely central to that.

The great universities of the 21st century will be those that understand they are to be servants of their society and the global community, and act accordingly. That is how I see the role of UNSW. The great nations of the 21st century will be those that invest heavily in education, and they above all are the nations that will reap the greatest benefits for their future generations. India, I have no doubt, will be among them. It has been a great privilege to come here today and talk about these issues that are so important to all of us. And it is my strongest hope that UNSW - through our UNSW Diya Initiative and other partnerships in higher education - will increasingly come to play a constructive, collaborative role in the future of your truly extraordinary nation: this wonderful country, India.

Dosti Zindabad. Long live friendship.

Thank you.