Re-imagining Indian Universities: **Learning from the glorius past for building new India**

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REIMAGINING INDIAN UNIVERSITIES

LEARNING FROM THE GLORIOUS PAST FOR BUILDING A NEW INDIA

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New Delhi (India)

Vijnana Bharati, New Delhi

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PUBLISHER'S NOTE

Namaskar

Vijnana Bharati takes immense pleasure in presenting a booklet 'Re-imagining Indian Universities: Learning from the Glorious Past for Building New India' to our esteemed readers. Prof. Bhushan Patwardhan, an eminent academician and Vice Chairman of UGC, GoI, is the author of this book.

Prof. Bhushan Patwardhan is one of the rare academicians of repute rooted in the past and yet modern in his approach. So it is just rightful that he can re-imagine Indian Universities in modern context taking inspiration from the glorious past. Based on the popular guideline 'Think Global Act Local' he has presented an important road-map for building New India. We are confident that his vision will kindle the imagination of academicians, policy makers and all others who are engaged in educational activities. Moreover, these thoughts will give push to work vigorously to regain the glory of Bharat as a 'Vishaguru'.

Padmabhushan Dr. Vijay Bhatkar, our national president and a Chancellor of prestigious Nalanda International University, has blessed all of us through his inspiring foreword. His words of wisdom have added grace to this booklet.

Vijnana Bharati being a science movement with swadeshi spirit aims at re-visioning and revitalizing Indian education to achieve overall development of our country and well-being of humanity. Publication of booklet presenting a vision corresponding to our ideals gives us satisfaction of fulfilling our duties towards the country.

Dhanyawad.

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Reimagining Indian Universities

FOREWORD

As is being popularly discussed, the current pandemic of COVID 19 has become a sort of marker in the history of humanity. It has brought the world to a grinding halt. It has questioned the paradigms world over, be it in the way we live, the way we work and even the way we learn. Professor Bhushan Patwardhan aptly quotes Darwin in his opening remarks that "it is the most adaptable and resilient of the species that survive and prevail in the long run." This would also apply to the knowledge system world over that have clearly emerged as the ultimate force.

This very lucidly written article brings the spot light on the Indian Knowledge System and the Indian University System. He draws attention to the aspect that while there could be some common thread that could run through the education system globally, it would be a folly to insist upon the entire system to be exactly the same. He calls in the stranglehold of a single cultural and intellectual tradition.

He harps upon capitalizing on the diverse knowledge system's legacy of science-botany, animal science, metallurgy, agriculture, astronomy; health science - pharmacology, medical sciences, surgery; mathematics - arithmetic, geometry, algebra, trigonometry; social science - philosophy, economics, logic; linguistics, final visual and performing art and architecture etc. He highlights the strengths of the University system where the personalized interaction between Guru and Shishya became instrumental in creating skilled professionals, artisans, thought leaders, warriors, nation builders, responsible citizens and humble human beings. The article crisply spots at the differences in the Gurukul and Kulguru system of education.

It is high time that we stop using the invasions and the colonial rule as an excuse for being 'subjected to' prevalent system. We now need to be the master of our own. It is time to use our legacy as our wind beneath the wings rather than shackles around the ankles.

The article spots out the similarities in the recommendations of two NEPs, first one in 1966 chaired by Prof. Kothari, and other one in 2019 chaired by Padma Vibhushan Dr. K. Kasturirangan that highlight introduction of work experience and social service as integral part, moral education and sense of social responsibility, vocationaliation of secondary education, strengthening of centers of advanced studies research and innovation and calls these out as long awaited points on agenda for effective implementation.

While being aspirational about the role that universities should play in Nation building in order to capitalizing on the demographic dividend, Dr. Patwardhan says, "University education is also expected to produce employable graduates by focusing on social, academic, cultural, professional and intellectual development to enable students to earn respectable livelihood and emerge as responsible global citizens."

The article rightly questions the validity of 'monotonous, monologues, and monopolized', 'information providers' . He cautions their redundancy in the light of information being available to learners in abundant quantity at the tip of their fingers through information technology. He reflects on the various roles teachers can play in lives of a student and how they can provide profoundness and roundedness to their character. He accentuates that the teacher needs to be the one to role model way of life and encourage inquisitiveness, nurture human values, inculcate tolerance, environmental sensitivity and passion for peace and channelize their energies, rather than letting students become puppets in the hands of politicians and causing disruption to the social fiber of the nation. Reflecting on trends in sophistication of robotics and machine learning the article predicts that purely, 'information imparting' roles could be hijacked by robots and teachers need to find more meaning in their being.

In this article Prof. Bhushan Patwardhan envisions a technology enabled, flexible, modular, collaborative, cross, institutional, cross cultural University system where learns can play key role as knowledge creators. The article evangelize a more self-directed and self-paced learning based on competency based, demand driven, adaptive to disruptive technologies, flexible, modular lifelong education stressing more on EQ rather than IQ. He talks about collaborative convergence of man and machine to explore new pedagogies.

Dr. Patwardhan foresees the future of education as a blended method that uses the best elements from campus-based, correspondence, external, distance, learning, online, etc. He refers to Adidhi, Bodha, Acharna, Pracharana the four stages of learning for holistic, participative, proactive model of teaching-learning. He is hopeful that this, blended with technology, will have a positive impact on the ease, reach, affordability and quality of education while reducing the burden of rather compulsive demands 'of' as well as 'on' the University infrastructure in the post COVID era.

He points out the mismatch in the pace of changing aspirations of a young India and response of academics to keep up. The article suggests much needed inclusiveness from all the privileged elements in the society and governance in making this happens but also cautions that education should not become elitist. Rather it should become instrumental in erasing the digital and economic divide.

To quote Dr. Patwardhan, 'global leadership may not happen merely by achieving place in top 100 in global ranking India must-rediscover, re-visit, re-purpose the basic tenets, philosophy, value, purpose and pedagogy to re-imagine the Indian university system." He also cautions about risks involved in current race to increase GER without sufficient attention to quality. He presents nine pointers on basic considerations while architecting the 'New Future-ready University System for India'. He iterates the grandeur of our heritage and says that along with it come great challenges as well as responsibility.

I feel it is high time now to create a time bound action plan for disruptive reforms to re-construct New Universities for New India as envisioned by Prime Minister Narendra Modi. I congratulate Professor Bhushan Patwardhan for this very well-articulated article during the challenging times when COVID situation is turning out to be a great equalizer disruptor and new direction finder for new universities of new India.

Vijay Bhatkar
Chancellor
Nalanda University

Re-imagining Indian Universities: Learning from the Glorious Past for Building New India

SUMMARY

The University system after COVID-19 will be very different. Future education will be blended and technology enabled. The Indian education system in the 21st century requires a new model of a forward-looking University system rooted in Indian culture. The new model of the University needs to be based on a transdisciplinary approach bringing academic excellence, flexibility, professionalism, and self-reliance in the system and integrating traditional and modern knowledge to make it locally relevant and globally competitive to serve not only national development but the larger cause of humanity as well. The Indian knowledge systems comprising Darshana-s (philosophical world-views), Vidya-s (knowledge sources), and Kala-s (specialized skills) can be integrated with the present-day mainstream university education system. Insights from our cultural past can help us to re-imagine and re-model "New Universities" to meet the vision of "New India".

PRELUDE

The 21st century isessentially dominated by the information-knowledge-drivenglobal society. India is well equipped witha critical outlook to discover its contemporary relevance in the global milieu from its own intellectual and cultural traditions. Those, who are well-read and can perceive and understand the vast magnificent backdrop of India's past,have for long rejected the colonial myth that inspiration for modernity can only be imported from the West. History is a continuum, not an isolated event or related to anyparticular era;the true nature of modernity in all societies has to be derived from the evolving traditions. Today, in disciplines such as philosophy, history, archaeology, linguistics and fine arts, the mono-culture dominance in knowledge systems is already being replaced by transdisciplinary or cross-

cultural perspectives, which widen intellectual frameworks for comprehension of nature and society. Knowledge leaders are becoming increasingly aware that the monopoly of any particular knowledge tradition to comprehend reality is limited and is a politically-conditioned assumption about the past.

Although India became independent in 1947, its history, culture, and science extend back thousands of years in antiquity. The Indian knowledge systems are a rich source of evolving knowledge. They comprise diverse schools of philosophy that offer mature propositions and sophisticated logic for understanding and experiencing the relationship between the observer and observed. They embody fourteen knowledge categories or Vidya-s which classify differently multiple dimensions of knowledge about nature and society. They include sixty-four Kala-s or specialized skills. This rich heritage needs careful examination to identify fields that should be an integral part of modern Indian university education system. Learning from evolving tradition can help us to re-imagine and re-model New Universities to construct and support a vision of New India.In doing so, we should never forget what Charles Darwin said about evolution: "It is not the strongest, it is not the smartest, but it is the most adaptable and resilient of the species that survive and prevail in the long run" and William Bruce Cameron said about social thinking "Not everything that can be counted, counts. Not everything that counts can be counted." It must be emphasized that re-imagining Indian universities does not mean discarding or replacing the existing system with Indian knowledge system. This is an intellectual exercise to understand the value and contemporary relevance of Indian knowledge systems in the modern world.

Globally, universities need to break out of the stranglehold of the single cultural and intellectual tradition that has dominated knowledge institutions since the 19th century and become multicultural. They need to urgently engage in a critical review and discovery of contemporary roots in their own indigenous cultures in fields such as health sciences, agriculture, social sciences, architecture, mathematics, logic, philosophy, the fine, visual and performing arts. The modern Indian universities need not follow a uniform design. They need to adopt transdisciplinary approaches respecting both indigenous and Western scholarship for bringing innovation, academic excellence, flexibility, professionalism, and self-reliance. They can do so by integrating traditional and modern knowledge systems to be locally relevant and globally competitive so as to serve national development and the larger cause of humanity.

Ancient Indian knowledge sources Vidya-s and Kala-s can be sources of new ideas and innovation. It is important for our University system to critically

review, revise, regain, and promote these sources of knowledge, art and skills as an integral part of the education system. While adopting these sources we should not become dogmatic by taking a stand that,"We know everything." We must avoid the "self-pride-past-glory" syndrome. It is important to keep an open mind to welcome new ideas and our quest to add new knowledge must continue.

LEGACY OF INDIAN CIVILIZATION

The evolving Indian civilization excels in metaphysics as also in science, mathematics, astronomy, pharmacology, numerical, geometry, algebra, trigonometry, and medical sciences. Indian knowledge has an evolving legacy from Indus Valley Civilization, from Vedic, Buddhist, Jaina, and hundreds of local knowledge traditions. Until the advent of foreign invasions, Indian civilization was a centre of learning in several branches of knowledge for scholars from all over the world, especially South-East Asia, Middle East, and Europe. The origin of various branches of mathematics, science, art, and philosophy attributed to this civilization is truly remarkable. Indian scholarship aspired to know everything that the mind can comprehend from the atom to the universe.

The Indian legacy in scientific disciplines is profound. Panini, a Sanskrit grammarian gave a comprehensive and scientific theory of phonetics, phonology, and morphology (near 600 BC) which even today is recognized to carry the most unambiguous rules of grammar for machine translation. Charaka introduced systemic perspectives for understanding biological change, cause-effect relationship and evidence-based approach to medicine, Sushruta is the pioneer of surgical tradition all over the world (Near 400 BC). The *Sushruta-samhita* is considered one of the most important treatise on medicine and a foundation text for Ayurveda. Kautilya was an Indian teacher, philosopher, economist, jurist, and royal advisor whose *Arthashastra* is considered as a classic in political economy. Original contributions of master astronomer and mathematician, Aryabhatta (476 AD) are well recognized. In his classic text, *Aryanbhatiyam*, he describes the process of measuring the motion of planets and eclipses. Aryabhattahas proclaimed that the earth is round, that it rotates on its axis, that it orbits the Sun, and is suspended in space. Aryabhatta's most significant and well-known contribution is the concept of zero. Varahamihira (499–587), in a classic text, *PanchaSiddhanta*, notes that the Moon and the planets are lustrous, not because of their own light, but due to sunlight. In the *Brihad Samhita*, he details many discoveries in the domains of geography, botany, and animal science. Nagarjuna (800), in

the classic text, *Rasa Ratnakara*, outlines many interesting experiments in metallurgy, and bio-assimilable drugs made from metals and minerals. Bhaskaracharya (1114–1183) was another great scholar and master of arithmetic and astronomy. In his classic text, *Surya Siddhanta*, he makes a note on the force of gravity. These are merely glimpses indicating the intellectual legacy of Indian civilization. The appreciation of ancient knowledge and scholarship can help us to rediscover our own roots by tracing the history and philosophy of Indian medicine as an example.

It is noteworthy that recently prestigious national institutions such as the Indian Institutes of Technology at Gandhinagar and Kanpur are offering full courses on Indian knowledge systems. A lucid introduction to the philosophy and characteristic features of Indian knowledge systems is provided by Kapil Kapur and A.K. Singh. A good orientation to these knowledge systems can provide valuable insights for re-imagining the Indian University system.

INDIAN UNIVERSITY SYSTEM

Historical evidence shows that over fifteen ancient universities existed from the period 6th century BC to 1200 AD. Takshashila is known to be the oldest. Nalanda was established in the 5th century and remained the centreof excellence until it was destroyed in the 12th century. Other lesser-known universities include Vikramshila, Mithila, Valabhi, Pushpagiri, Odantipuri, Somapura just to name a few. Dominant schools of thought-systems represented by various Darshana-s form the philosophical foundations of the Indian knowledge and education system. It is estimated that sometime during 600 BC the Ashram system gradually evolved in several multidisciplinary universities such as Takshashila, Nalanda, Vikramshila, and many more. Takshashila was a centre of learning for several centuries, best known because of its illustrious alumni such as Kautilya, Panini, Charaka, Vishnu Sharma, and Jivaka.

The modern application of the Guru Kula system, which involved close and highly personalized interaction between the 'Guru' (teacher) and the 'Shishya' (disciple) is worth exploring to restore value education. Ancient Indian university campuses, such as Takshashila or Nalanda, were essentially multidisciplinary hubs with several spokes for specialized studies. The depth, diversity, and rigour of education in ancient Indian universities were exemplary. The pedagogy was based on inquisitiveness, enquiry, dialogue, discourse, debate, critical thinking, rationality, and an evidence-based

approach. The universities in ancient India had a unique structure akin to the hub and spoke model that was able to ensure holistic development of students to make them highly skilled professionals, artisans, thought leaders, warriors, nation builders, responsible citizens, and humble human beings. Almost till the 12th century, Indian universities used to attract students from different parts of the world.

EDUCATION TRANSITIONS

Then came the periods of declining transition in education. During Mughal invasions India faced violent attacks on cultural treasures leading to destructions of religious and knowledge temples. Many universities including Nalanda, Takshashilabecame relics. During the colonial period, the British Raj or regime, the Indian education system was completely distorted to suit the requirements of the rulers. English-dominated universities were focused on perverting or falsifying the cultural identity of locals and on developing human resource needed as a workforce for the rulers. The objective was to primarily create a bandwagon of clerks and bureaucrats to serve the rulers. These universities primed by Thomas Babington Macaulay's strategyensured the erosion of local languages, cultures, and Indian knowledge systems. This was the beginning of Macaulayism.

Macaulay identified that the then prevalent education system in India was responsible for the attachment of Indians exclusively to their tradition, culture, and rituals. He recommended a policy of introducing an English language-dominated education system. Indian knowledge systems were completely sidelined or replaced with western systems, be it sciences, humanities, engineering, and medicine. This resulted in the suppression of Sanskrit and regional languages endorsing the supremacy of English. Establishing convent schools, colleges, and universities in Mumbai, Kolkata, Chennai and many other cities triggered the process of superimposingthe British education system in India. It must be acknowledged,however, that few well-meaning British officers also helped to preserve Sanskrit, the Indian knowledge systems and even introduced technology education, which led to establishing institutions such as Sampurnanand Sanskrit Vishwavidyalaya in Kashi, Hindu College in Pune, and Thompson Engineering College in Roorkee.

The dominance of English was so powerful that many educational institutes established through the nationalist movement had to also fall in line with the British model. The primary objective of university education shifted from scholarship, knowledge generation, and innovation to assembly-line

production of graduates who could serve in colonial establishments more as a bandwagon of clerks and babus. During this period, India witnessed a transition from the Guru Kula tradition to Kula Guru system, consisting of universities led by vice-chancellors. The present Kula Guru system focuses more on the power of position, imposed regulations and memory recalls as measures of academic rigour rather than actual learning and personality growth as the gold standard. Buildings, departments, and laboratories are organized more for compliance with insufficient evidence supporting their actual use. The earlier rigour and spirit of scientific inquiry for discovery are largely missing in current conventional education and practice. While re-imagining Indian universities it is necessary to understand the comparative characteristics of the Guru Kula and Kula Guru systems (Figure 1).

EDUCATION POLICIES

The educational system in India has gone through major challenges since the infamous Macaulay's Minutes 1835, followed by Wood Dispatch 1854, and Hunter Commission 1882. After Independence, the Indian higher education system witnessed several phases. A careful review of major recommendations starting with Radhakrishnan Commission 1948, followed by Kothari Commission 1966, first National Education Policy (NEP) 1968, second NEP 1986, Yashpal Committee 1993, National Knowledge Commission 2006, Tandon Committee Report 2009, and third NEP 2019, reveals that the challenges in education were identified and possible resolves were recommended long ago.

Most of the earlier commissions and committees regarding university and education are visualizing similar reforms. For instance, the Kothari Commission Report covering letter dated 29th June 1966 has following statements "In a science-based world, education and research are crucial to the entire developmental process of a country, its welfare, progress and security." It highlights the importance of built-in flexibility to adjust to changing circumstances and underscores the importance of experimentation and innovation. Prof. Kothari further writes in the covering letter, "If I may say so, the single most important thing needed now is to get out of the rigidity of the present system. In the rapidly changing world of today, one thing is certain: yesterday's educational system will not meet today's and even less so, the need of tomorrow." He hoped that the Report may provide some basic thinking and framework for an educational revolution in the country. Few excerpts from the Kothari Commission can make this point amply clear.

"Introduction of work-experience (which includes manual work, production experience, etc.) and social service as integral parts of general education at more or less all levels of education; Stress on moral education and inculcation of a sense of social responsibility. Schools should recognize their responsibility in facilitating the transition of youth from the world of school to the world of work and life; vocationalization of secondary education; the strengthening of centresof advanced study and the setting up of a small number of major universities, which would aim to achieve the highest international standards; special emphasis on the training and quality of teachers for schools; education for agriculture and research in agriculture and allied sciences should be given a high priority in the scheme of educational reconstruction; energetic and imaginative steps are required to draw a reasonable proportion of talent to go in for advanced study and research in the agricultural sciences; development of quality or pace-setting institutions at all stages and in all sectors." The Indian education scenario as visualized in 1966 by Prof. Kothari remains more or less the same, even today. Interestingly, it has striking similarity with the third NEP 2019 submitted by a committee chaired by eminent scientist Dr.Kasturirangan. The striking similarity between the recommendations of all the three NEPs indicatesthe immediate need for theirlong-awaited effective implementation.

One of the special features of the third NEP is its emphasis on the study of the Indian knowledge systems. The Indian knowledge systems may not be studied only to know our glorious history and to feel proud. It is crucial to discover their contemporary relevance and potential for future innovations through serious academic study and rigorous transdisciplinary research.

UNIVERSITY EDUCATION

A University is considered an institutional space where a community of teachers and scholars is engaged in higher education and research. Universities are temples of knowledge where ideas, innovations, and skills are nurtured. Universities are seats for scholarship, statesmanship and universal brotherhood and theyaward academic degrees in various academic disciplines. Universities are not to be reduced to degree factories. An idea of university education merely focused on jobs and career will be too restrictive. India has the largest population of youth and therefore university education plays a very vital role to ensure the benefits of demographic and democratic dividend. University education must be holistic to inculcate the knowledge and skills necessary to shape the individual personality, develop mental capacities and universal values,in addition toa making a career. Meeting the

aspirations of the young population and empowering the youth to contribute to nation-building are possibly the most urgent priorities for India. University education is also expected to produce employable graduates. It is expected to focus on social, academic, cultural, professional, and intellectual development not only to enable students to acquire means for respectable livelihoodsbut also to emerge as responsible global role citizens. University education will have to continuously innovate to address the changing needs of humanity, civil society, and not just markets.

ROLE OF A TEACHER

To re-imagine the Indian university it is necessary to re-discover the role of a teacher from the ancient Indian tradition. The typical university teacher today is described only in one category as a 'professor'. Further distinction is based on seniority as 'assistant', 'associate'ora full-fledged Professor. The ancient Indian tradition displayed remarkable wisdom in defining the role of teachers with the help of unique titleswith profound meaning that the current modern system has not been able to emulate. A teacher who merely gives information is an Adhyapaka; one who imparts knowledge combined with information is called Upadhyaya. one who also imparts skills is an Acharya. One who can give deep insights in specialized subjects is respectfully called a Pandit.One who brings visionary views, promotes criticality and thinking, is a Drashta. The highest level of a teacher is the Guru; one who is able to awaken wisdom and show a pupil thepath from darkness to light. In the Guru Kula System, education was about educing the latent capacities and potentialities into the personality of the concerned pupil. It was treated as a process of biological development and not as a mere mechanical process operating on the basis of a collective drill and training.

In contrast to the ancient teaching tradition, the typical teaching during the colonial period was a one-way process where teachers provided information to students with the help of textbooks and notes. In recent times while teachers have started using technology, teaching is limited more to the use of word processing, powerpoint presentations, videos, and internet sources. Most of the time we use 21st-century technology with an 18th-century mindset and continue to bombard students with information. Today, teachers are not even needed to provide information because it is easily available and in fact, students are much smarter to get it faster. Today's students are not empty boxes where teachersare authorized to stuff information as per a set curriculum. With the advent of electronics, computers, and multimedia, the

teacher-centric, one-way, passive teaching process, which dominated for several decades, is now almost obsolete. The new way of education is based on interaction and with the spirit of collaborative learning, video conferencing, Skype, wikis, blogs, and other social networking in the classroom. Teachers need to change and adopt new pedagogical ways. There is an urgent need for faculty to come out from the current state of comfort or slumber. Teachers cannot continue to be mere information providers. Advances in Artificial Intelligence (AI) and social robotics can make such teachers redundant. These are real disruptive threats confronting the conventional teaching faculty in a university system.

Today, faculty, particularly related to undergraduate programs, is more involved in monotonous, monologues having monopolized the delivery of education. The average full-time permanent teacher remains largely insulated from the broad changes taking place in higher education. There is widespread perception that the development and control of content is shifting from conventional stand-alone institutions to communication networks. Colleges and universities may not remain the sole providers of education. Teachers will have to respect the capabilities and aspirations of students. They need to engage with students and become part of the active learning process. In addition to imparting knowledge and skill, they need to create an environment of self-discipline, trust, and accountability by inculcating values and enhancing principles of ethics and integrity among students. Students join a university primarily to study, to build a career, and to experience collaborative learning. Education should shape their minds and lives, encourage inquisitiveness, cherish human values and peace,inculcate tolerance, and environmental sensitivity. Teachers must inspire young students to take education seriously and not become puppets of politicians. Teachers must present themselves as role models and ensure that students stay away from any kind of violence. Teachers must protect universities and students from antisocial elements. They must channelize the youthful energy for nation-building and creativity to promote civil society. They need to be facilitators and mentors to emerging as the Guru, to be a role model.

FUTURE EDUCATION

The contours of future education are becoming visible with the advent of automation and smarter social robots. The future education will require entirely different knowledge and skill sets to develop students as global citizens (Figure 2). Future education will need more creativity, cognitive

ability, critical thinking, passion and compassion. In the future, disruptions will emerge through technology and content will be readily available making way to the new University system that is ready for Industry 4.0 revolution. It should be technology-enabled, flexible, modular, collaborative, cross-institutional, cross-cultural, where learners can play a key role as creators of knowledge challenging the monopoly of teachers. Very soon Artificial Intelligence (AI), Machine Learning (ML), Deep Learning, Cybernetics and Robotics will dominate education content and delivery. This is supposed to be more of self-directed, self-paced learning triggered by interest learning where problem-solving, innovation and creativity drive education. Future education will have to be competency-based instead of mere information or knowledge-based; demand-driven instead of supply-driven by incorporating skills capable of adapting disruptive technologies. Education in future will be more flexible, modular, lifelong with more emphasis on the Emotional Quotient(EQ) and Cultural Quotient(CQ) than Intelligence Quotient (IQ). The new education will have to meet the needs of industry, economy and development, enabling collaborative convergence of man and machines as CoBots to explore new pedagogies.

Future Universities will have to maximize the power of digital technologies, MOOCs, animated laboratories and personalized data from the interconnected world. The advances in automation, AI, ML, and robotics may soon take over several functions of professionals including teachers and doctors. Eminent entrepreneur and investor Vinod Khosla predicts that robots might replace doctors by 2035. This prediction is also applicable to the conventional teacher. In 2017 a robot named Xiaoyi (little doctor), developed by Tsinghua University and a leading AI company, iFlytek Co. Ltd., took the national medical licensing examination in China. Xiaoyidid not just pass the test but got a score much above the highest percentile. Recent studies indicate that robots show great promise in teaching restricted topics with the effects almost matching those of human tutoring. The future education may be dominated by collaborative robots where teachers and students together become CoBots. Already AI-based voice-assisted devices such as Siri, Alexa, chatbots like Eliza and humanoid robots like Asimo, Sophia and our own Indian Mitra are in action. Microsoft's recent AI-based hologram technology can immensely help to remove language-linked knowledge barriers and open the possibility of education in one's mother tongue as well. Classrooms of the future will possibly feature social robots to assist human teachers and help them to enhance their capabilities. It is now amply clear that the education sector can no longer ignore the technological advances. The early signs of disruption are already palpable. Microsoft holograph, hololense for

augmented reality; online learning management platforms; success of Coursera, Edx for MOOCs; increased popularity of virtual classroom;mobile Apps;and online degree programs areclear indications that the disruptive changes are at the doorstep. Future universities will have to adapt, survive, and thrive, taking advantage of this disruption.

BLENDED PEDAGOGY

The future education will be blended and technology enabled. Universities will have to adopt online learning component in every program. The future education will be a blend of self-learning, co-learning and learning-by-doing. The future education will be a appropriate blend of online, open-and-distance, classroom-based, community-based, internship-apprentice-based. Advances in technology are likely to disrupt monopoly of teachers and universities.
The current silos such as campus-based, correspondence, external, distance learning, online, etc will slowly disappear. The futileness to offer education exclusively by any one of these modes will be intensely realized. The future education and pedagogies can be best built onfour stages teaching-learning as described by Indian knowledge system as follows:

- **Adidhi** (information and theory): This is about gathering information and learning theory. This can be attempted by students through self-study modules exclusively with MOOCs. This may require teachers as facilitators.
- **Bodha** (understanding and analysis): This is about gaining knowledge, deeper awareness, understandingprinciples, theory, comprehension and analysis based on available information. This can be attempted by students through assisted learning with MOOCs. This may require social robots and teachers as mentors.
- **Acharana** (performance and practice): This is about using acquired knowledge, testing principles, experimenting and practicing. This can involve intense interaction between students and teachers.
- **Pracharana** (propagation and preaching): This can involve community-based learning, internship, apprenticeship, seminars and presentations.

Educational experience in lines described above can give a holistic, participative, proactive model of teaching-learning. A substantial component of most programs involves delivery of information. At one point, 'lecture notes' giving information to students was a power of teacher. Today, in the 5G world teachers are not required to do this job. Students are much smarter to get information if they are properly mentored. This component can be handled by

creating online information repository where students can self-learn. Social robots can do this job effectively and efficiently. Every program involves a theory component where the available information needs to be used to understand the basic principles of the respective subjects. This can be done by developing high quality MOOCs supported by teachers as mentors.Understanding the importance of theory requires intense interaction with teachers. This component will have to be in the classroom where the teacher is in command.Hands-on experience, practical training, internship, apprenticeship programs which can happen on the campus laboratories, workshops, industry sites or any other suitable place.

Broadly, any education program can be divided in the four stages of teaching-learning. The actual need for 'Teacher on Campus' may require in about 50% of the teaching-learning process of any program. In case of general education undergraduate programs,this may be higher while for some specialized professional programs it may be lower as well. In principle, it is possible to offer at least 40 % of the teaching with help from technology, be it online or otherwise. Of course, to implement this entirely different breed of teachers will be needed. Adopting such a blended approach may have several advantages: First, it may empower students to earn academic credits for component at their own speed and convenience. Second, the quality of education will improve because of a new focus on learning-by-doing in the blended mode. Third, infrastructural needs on the campus may be reduced. Fourth, mass production of poor-quality degrees under the pretext of open/ distance/ online programs can be controlled. Fifth, access to education will be enhanced due to use of technology in delivery. Sixth, cost of education will be drastically reduced, making it more affordable. This approach will be very appropriate especially in the post COVID era.

RE-BUILDING ONSTRENGTHS

The Indian knowledge system, as detailed earlier, comprising Vidya-s and Kala-s consists of knowledge and skills as well as theory and practical components. Ancient Indian Universities such as Nalanda and Takshashilaoffered holistic education with a unique blend of knowledge and skills. The system describes nine Darshana-s, fourteen Vidya-s as sources of knowledge and sixty-four Kala-s as specialized art and skills. Six sets of Darshana-s offer various points of view as an open knowledge system(Figure 3). The fourteen Vidya-s include four Veda-s, fourUpaveda-s and sixVedanga-s (Figure 4). Kala means performing art in Sanskrit. Kala also means specialized

skills. In ancient India, these skills were considered important for the holistic development of a cultured individual. These specialized Kala-s or skills are believed to be acquired by Lord Krishna in 64 days in the Ashram of Guru Sandipani. In Indian mythology, Lord Ganesha, considered a master of Vidya and Kala, is revered as the god of education, knowledge, and intelligence. The imagination and diversity of Kala are astonishing (Figure 5). Several Vidya-s and Kala-s remain very precious in the current context as diverse dimensions of life. Some of the Vidya-s and Kala-s may not be alive, relevant, or may have become obsolete. However, it is necessary to protect, preserve, cultivate, and enrich them by adding contemporary relevance.

Frequent invasionsandconquests had gradually led to the destruction of Indian universities. Ironically, entangled with internal and external adversities, India remained isolated from the benefits of the industrial revolution and was gradually entombed by colonial rule. Even after seven decades of Independence, India still has not been able to come out of these influences to rediscover her roots, strengths, and knowledge sources. While re-imagining Indian Universities for the future, these philosophical and historical underpinnings must be carefully considered. While one cannot live today only on past glory, it is worthwhile to draw inspiration from these achievements to demonstrate contemporary relevance and explore future innovations.

The suffering and suppression haveto give us strength and compel us to think in our own interest. Education shall remain the key driver for transformation and universities will have to own the responsibility. The aspirations of young India promise great hope to break the elitist mindset deadlock and to regain confidence and respect for our traditional knowledge, languages, and cultural heritage. While aspirations of young India are reaching tipping points, the response to change from academic is yet to gain the desired momentum. The role of the government, business, and society in this process shall never be mutually exclusive. We must ensure that quality higher education does not become the exclusive preserve of the privileged, available only to children of the rich and powerful. We must ensure that our efforts of inclusion address the problems of the digital divide in addition to the economic divide and bridge the gap between blue- and white-collared professionals by seamlessly integrating knowledge and skills in education. We must build New Universities using our past knowledge, experience, and core strengths.

NEW UNIVERSITIES FOR NEW INDIA

India has to learn from her glorious past. India must regain global leadership in education. This may not happen merely by achieving a place in the top 100 in the global ranking. India must re-discover, re-visit, re-purpose the basic tenets, philosophy, values, purpose, pedagogy to re-imagine the Indian University System. India has some exemplary efforts in the direction of creating world-class universities. This includes Banaras Hindu University established by Pandit Madan Mohan Malaviya and Vishva-Bharati Shanti Niketan by Gurudev Rabindranath Tagore. Although structurally different, both realized the intrinsic values strongly rooted in Indian ethos and scientific temperament. Even today, while several national institutes have been established, not a single university has reached even close enough to the vision of Pandit Malaviya or Gurudev Tagore in terms of holistic education in a multidisciplinary environment coupled with Indian ethos and pedagogy.

India must re-model and re-build current universities on the foundations of the Indian knowledge systems and integrating advanced science, technology, social science, contemporary art, and humanities. The Indian university system can be re-imagined and re-modelled by taking some bold steps:

- First is to shed the colonial mind set, and understand India's history and glorious heritage.
- Second, respect the value systems, cultures, and languages without losing sight of the importance of English at the global level.
- Third, wisely embrace the technology-led innovation path without losing sight of sustain ability principles.
- Fourth, revive and recognize diverse artisan skills among the diverse population as part of education.
- Fifth, ensure respect and mainstream agriculture in university education.
- Sixth, involve business, industry, governments, voluntary organizations, and society in the teaching-learning process.
- Seventh, scrupulously remove redundancy at all levels including academic faculty, courses, content, pedagogy, and governance.
- Eighth, removethe blue-collar versus white-collar divide by ensuring equal weightage to skill mastery and degree education ensuring equitable recognition to skill providing accountability-linked autonomy and encouragement to deserving organizations to innovate the new India-centric university models integrating ancient and modern approaches.
- Ninth, finally, it is possible to simultaneously offer high-quality education, knowledge, and skills that can meet the aspirations of the young to earn a respectable living, and at the same time, attend to national needs and serve the cause of humanity.

This is unlikely to happen in an incremental manner by doing the same things in different ways or merely by increasing the Gross Enrollment Ratio (GER). It will be disastrous for a country like India if the glorification of hollow degrees produced by the existing university factories churning out unemployable graduates on an assembly line continues with higher intensity. The existing model of university education must be changed before it is too late because the future generation will not wait.

Re-imagining universities does not mean discarding the Western approach or replacing current practices. The integration of the Indian knowledge systems in education cannot be done blindly or in a dogmatic manner. The main purpose of this exercise should be to explore contemporary relevance with an open mind and scientific temperament. This will require imaginative disruptive changes and a complete overhaul to prepare the future of our university education system.

NITI Ayog has articulated the strategy for New India. As we are engaged in progressing towards New India it is imperative to reform the education system and re-imagine New University. The quality of university education has to play a vital role in the proposed transformation. We should be able to face future challenges better if we can learn from our glorious past and bring in the best from eastern and western civilizations. The New Universities should be grounded on the strong foundation of Indian cultural ethos bringing a multidisciplinary ecosystem where ancient and modern, shastric values and scientific temperament, scholarship and global good coexist; where knowledge and skills, theory and practical, research and innovation are integrally integrated (Figure 6). Let us hope that we will be able to re-imagine and re-model the New Universities complementary to the vision of New India in accordance with principles of justice, liberty, equity, sustainability, and human values.

Let us remind ourselves once again, not only of our grand heritage but also of the challenge and the responsibility that comes with its endowment, by rekindling our spirit and reviving the grandest of the grand invocation that the sage author of Katha Upanishad passed on to us eons ago:

उत्तिष्ठत जाग्रत प्राप्य वरान्निबोधत ।
क्षुरस्य धारा निशिता दुरत्यया दुर्ग पथस्तत्कवयो वदन्ति ॥ २४ ॥

-Katha Upanishad, 1.3.14

Rise, Awake! Having obtained these boons, understand them!
Like the Razor's sharp edge is difficult to traverse, the path to one's Self is difficult.

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Figure 1: **Characteristics of Guru Kula and Kula Guru System**

Guru Kula	Kula Guru
Master-Disciple Relationship	Teacher-Student Requisite
Spontaneous Life-oriented Learning	Structured Teaching of Syllabus
Learning by Doing	Rote Teaching –Learning
Personality and Individual Potential	Uniform and Mass Education
Philosophy Lineages	Technical Expertise
Shastra-based Adhyayana	Sciences-based Adhyapana
Ethical Growth	Professional Excellence
Compassion: Driving Force	Commercial Success: Key Motivation
Yogic Calmness	Competitive Stress
Contentment	Disenchantment
Curiosity and Creativity	Conformity and Imitation

Figure 2:
University Student as Global Citizen

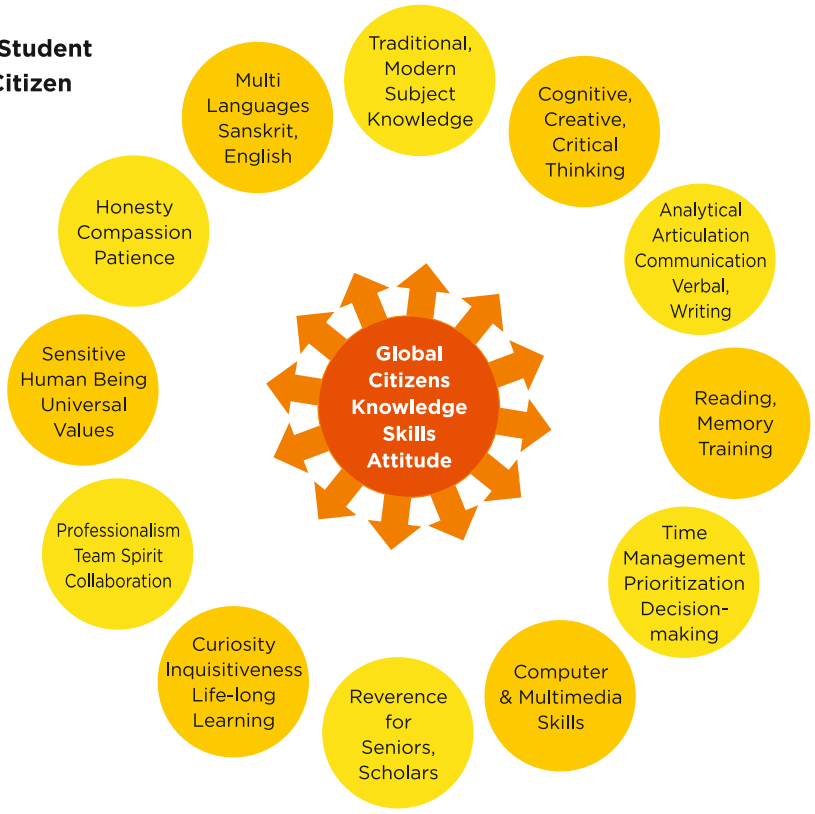
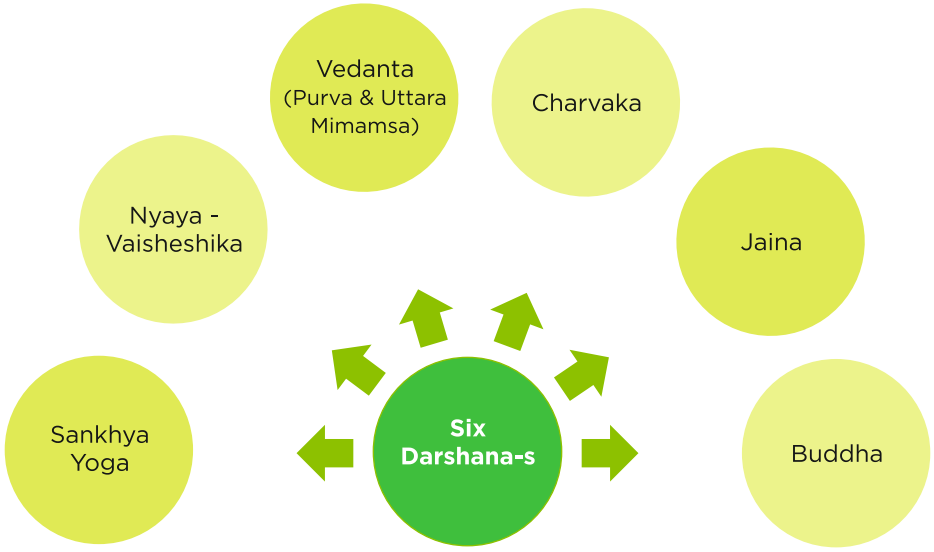


Figure 3: **Indian Knowledge System I: Darshana** (Philosophical Point of Views)



Sankhya –Yoga, Nyaya – Vaisheshika, Vedanta (Purva Mimamsa-Uttara Mimamsa), are called Astika Darshana-s because they believe in the authority of the Veda-s, and the existence of the Self (Atman). Charvaka, Jaina and Buddha are called Nastika Darshana-s because they do not believe in the authority of the Veda-s.

Figure 4: **Indian Knowledge System II: Vidya** (Knowledge Sources)

4 Veda	4 Upaveda	6 Vedanga
• Rigveda	• Arthashastra	• Shiksha
• Samveda	• Dhanurveda	• Kalpa
• Yajurveda	• Gandharvaveda	• Vyakarana
• Atharvaveda	• Ayurveda	• Jyotishya
		• Nirukta
		• Chhandas

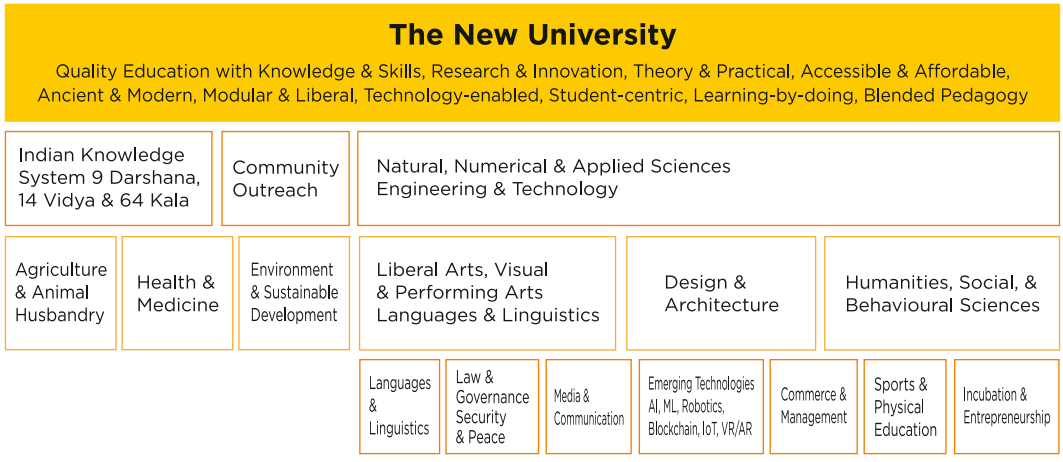
In the Indian knowledge system the term Vidya is paired with Darshana and Jnana in this sequence: Darshana, (दर्शन), Jnana (ज्ञान), and Vidya(वद्या)॰ Darshana literally means 'to see' and in the context of the Indian knowledge systems it means 'to see' or a philosophical proposition. Such a proposition results into knowledge of reality which is organized or systematized in the form of Vidya, which means a discipline of thought that can be acquired by learning.

Figure 5: **Indian Knowledge System III: 64 Kala** (Artforms and Skills)

Visual & Performing Art	Cognetive and Design Skills	Technical & Artisan Skills	Beauty & Hospitality Skills	Miscilineous Skills
Geet, Vadya, Vina-Damuraka-Vadya, Udak Vadya Nrutya, Natya, Natakakhyayika Darshan, Aalekh, Vishesh Kacchedya, Udakaghata, Chitrayog	Indrajal, Dharanmatruka, Kouchumaryog, Hastalaghav Suchikarma, Sutrakarma, Prahelika, Pratimala, Durvachakayog, Pustakvachan Kavyasamasyapurti, Pattika Vetra-Ban-Vikalpa Samvachya, Akshar Mushtikakathan, Deshbhashadnyan, Pushpa-Shakatika-Nimittadnyan	Turkakarma, Takshan Vastuvidya Roupya Ratna Pariksha, Maniraagdnyan Dhatuvad, Aakardnyan, Yantramatruka. Chalitakayoga, Abhidhankosh Chhandodnyan Vruksh Ayurvedyog, Kriyavikalpa	Tandul Kusumavali Vicar, Pushpastaran, Manibhumika Karma Malya Grantha Vikalpa, Kesha-Shekhara-Pidyojana Nepathyayog, Karnapatrabhang, Keshmarjan Koushal, Bhushanayojan Shayan Rachana, Chitra Shabdapup Bhakshya Vikar Kriya, Panaka-Rasa-Ragasava-Yojana	Mesh-kukkut-lavakyudhha vidhi, Shukasarika prapalana Mlencchitkalavikalpa, Vastragopan Dyut visesha, Aakarshan krida, Balkridakarma Vainayiki vidyadnyan, Vaijayiki vidyadnyan Dashanvasanang raag, Sugandhayukti, Utsadan, Vyayamiki vidyadnyan

Many Kala-s may not be relevant or even existing today. Many may be on the verge of extinction. Many can be contextualized to suit current needs. It is important to undertake their preservation and revival on mission mode before we completely lose them.

Figure 6: **New University for New India**



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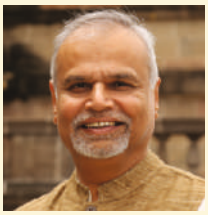

Re-imagining Indian Universities: **Learning from the glorius past for building new India**

Dr. Bhushan Patwardhan

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