

# Knowledge Center Initiative for Transforming India into a Knowledge Destination

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**Abstract**— This paper is based on the aspirations of several thinkers, planners, reformers and common people of India towards her transformation into an ultimate knowledge destination. We discuss the fundamental role of knowledge in relation to education policies and strategies in India and bring out how this role can be optimized through the development of knowledge centers that can facilitate natural learning based on the ignorance and curiosity of learners through a cafeteria approach leading to their enjoyment, employment, empowerment and enlightenment. It is further discussed how such centers can guide comprehensive reforms in our higher education system, and can be consonant with public, private and PPP models to foster innovative ideas for smooth admissions and career selection, creation of new job opportunities and accommodation of the rich variety of our natural and indigenous knowledge.

**Index Terms**— Knowledge centers, knowledge spirals, knowledge reforms, knowledge economy, knowledge destination, education policies, educational strategies

## I. INTRODUCTION

The word, ‘knowledge’ is as old as humanity and had been the source of all human progress since antiquity. In recent times knowledge has become the crucial factor in deciding the economic growth of a country and the yardstick to decide the status of a country as developed or developing. The frequent use of phrases like knowledge society, knowledge economy and knowledge management in recent years has brought into sharp focus the deeper and wider imports and implications of this word [1]. The UNDP's Human Development Report (2006) lists three essential elements for human development [2]: long and healthy life, knowledge, and a decent standard of living. Dahlman and Utz [3] observe, “A knowledge economy creates, disseminates and uses knowledge to enhance its growth and development”.

In the past India prospered as a knowledge society but the long colonial rule systematically destroyed her knowledge base. Recently we discussed how the idea of a Knowledge Center (KC) can accelerate the reemergence of India as a knowledge society [4]. The idea was discussed in relation to the recent work of several workers in this direction (references 2, 3, 6-8, 10, 12 cited in [4]). Among these works, Basole emphasized the concept of *lokavidya*, a concept broader than the traditional and indigenous knowledge. Subramanian *et al* analyzed the developmental disparity that exists between

urban and rural areas in India and described in detail the Village knowledge Center Project. They observe that India, which is currently a U.S. \$1 trillion economy still lags far behind in the sphere of human development and for the fruits of India's economic growth to truly reach a majority of its people, access to knowledge is critical.

The encouraging results of the experimentation of our idea motivate us to propose KC as a new leaning paradigm for engineering education in India [5] and as a new and clear strategic direction towards the ambitious goal of becoming an ultimate knowledge destination.

## II. KNOWLEDGE IN RELATION TO EDUCATIONAL POLICIES AND STRATEGIES

Whereas the word, ‘*knowledge*’ encompasses everything that can be known, the word, ‘*education*’ has always evoked discussions and debates about how knowledge can be disseminated in a structured manner. In India, research studies based on this aspect have culminated into several vision, mission, policy and strategy documents that led to the restructuring of the higher education system from time to time [6,7 and references 2 and 3 cited in [4]]. However, the restructuring reforms perennially experienced following confronting issues.

### A. Educating Classes versus Educating Masses

On one hand the emphasis on quality of education resulted in creation of few world class premiere institutes in India. On the other hand the emphasis on quantity led to mushrooming of a large number of institutes that are awfully short of quality. There is an appalling dearth of motivations and initiatives for ‘excellence out of mediocrity’.

### B. Limitations of the ‘One Size Fits All’ Approach

Though it is often agreed that the ‘one size fits all’ approach does not work, the problem of developing a system that caters to the plural and diverse needs of India has been beset with enormous complexities. These complexities often arise due to the fact that education always tries to structure knowledge, which is itself unstructured.

### C. Holistic Knowledge versus Fragmented Knowledge

Knowledge is holistic, seamless, interdisciplinary and multidisciplinary. However, education structures in India have often fragmented knowledge into disciplines with sharp

boundaries thus losing the essential characters and the concomitant powers of knowledge.

Contrary to the popular idea of knowledge as passive information, the compulsive accumulation of which is often overwhelming, stressful, fragmenting and alienating, Husemoen and Zhang [8] developed an understanding of human knowledge as active living processes and states of relaxed, intuitive, creative and meaningful first hand knowing and well-being. They differentiate living knowledge as alive, experiential, contextual, purposeful and enjoyable from the fragmented information that they call as dead knowledge. Giarini and Malitza [Ref. 8 cited in [4]] expressed the need to liberate knowledge from the tyranny of disciplines to develop a knowledge society.

The need for knowledge based alternative approaches to our present education system been felt by several education researchers and reformers [6,7 and references 2 and 3 cited in [4]]. Such approaches gave birth to initiatives such as science centers and exploratories [9] on school level to fill the knowledge gaps in school education. Recently, Maharashtra government announced a scheme to fund science centers in schools to inculcate a culture of innovation and reasoning and make science interesting for students [10]. However, there are no such initiatives at the UG level.

The present system is based mainly on the vision of Lord Macaulay who introduced the system about a century and half back primarily to serve the British rule. Mahatma Gandhi observed in his address at Chatham House, London, on 20 October, 1931, “ ---- *I say without fear of my figures being challenged successfully, that today India is more illiterate than it was fifty or a hundred years ago, and so is Burma, because the British administrators, when they came to India, instead of taking hold of things as they were, began to root them out. They scratched the soil and began to look at the root, and left the root like that, and the beautiful tree perished. ----*” [11].

Table I lists a few other significant observations from the literature that convince the need and relevance of our knowledge center initiative.

### III. KNOWLEDGE OPTIMIZATION THROUGH KCS

The KC Initiative is a fresh and distinct initiative, which is different from the two well known components of education field, viz., teaching and research. Whereas teaching in our present system aims at covering the syllabi and teaching and studying for examinations, KC aims at uncovering and discovering the syllabi and guiding and learning for knowledge. Whereas research in our present system generally pertains to career goals of faculty and is mostly an activity by the experts for the experts, that in KC is an activity by the experts for ensuring better future of learners.

#### A. Premise

The basic premise of our KC initiative is that the learning based on one’s natural ignorance and innate curiosity can be promoted through a cafeteria approach leading to the enjoyment, employment, empowerment and enlightenment of

learners, i.e., learning can be promoted not for marks and degrees but for joy, job, wealth, prestige and wisdom.

TABLE I. SOME OBSERVATIONS THAT NECESSITATE THE KNOWLEDGE CENTER INITIATIVE

Observation	Reference
“---- Most instrumentalities of our education harm the potential of human mind for constructing and creating new knowledge. We have emphasized delivery of information and rewarded capability of storing information. This does not help in creating a knowledge society. This is particularly vile at the university level because one of the requirements of a good university should be to engage in knowledge creation – not just for the learner but also for society as a whole. ---” “---- A university is a place where new ideas germinate, strike roots and grow tall and sturdy. It is a unique space, which covers the entire universe of knowledge. --- Established notions of truth are challenged in the pursuit of knowledge. This universal approach to knowledge demands that boundaries of disciplines be porous and scholars be constantly on guard against the tendency towards ‘cubicalization’ of knowledge. --” “---- it would be necessary that the universities adopt a curricular approach which treats knowledge in a holistic manner and creates exciting opportunities for different kinds of interfaces between the disciplines, which is unthinkable today in most of the universities and institutions of higher learning. ---”	[6]
“---- The enormous potential for India to become a leading knowledge power in the coming years can be realized only if our younger generation has opportunities for all-round good education and training, especially in science and technology. Unfortunately, however, the present state of higher education in the country is rather poor. In order to make it more relevant to the changing needs of society and thus to propel India to a position of leading knowledge power, we need massive investments as well as well-planned radical changes in our higher education system. ---”	[reference 3 cited in [4]]
“---- The four pillars of the knowledge economy are: 1. An economic and institutional regime that provides incentives for the efficient creation, dissemination, and use of existing knowledge 2. An educated and skilled population that can create and use knowledge 3. An efficient innovation system of firms, research centers, universities, consultants, and other organizations that can tap into the growing stock of global knowledge and assimilate and adapt it to local needs, as well as to create relevant new knowledge 4. ----” “---- India can no doubt reap tremendous economic gains by developing policies and strategies that focus on making more effective use of knowledge to increase the overall productivity of the economy and the welfare of its population.--- ”	[7]
75 percent engineering students in India are unemployable.	[12]
The entire process of teaching-learning (education) is very structured. ---- The challenges thrown to pupil are also either ‘known’ or ‘similar’ to known. ---- Let the thick walls of examination ‘pattern’, assessment ‘schemes’, ‘framed’ course curriculum and all such rigid structures be demolished. --- Instead let student be taught fundamentals of the course and made to ‘explore’ the course of his own. Let entire education process be made as unstructured as possible and lifelike.	[13]

Natural learning is a journey from the womb to the tomb. Mother’s womb is the first natural KC with which a foetus starts learning. An expectant mother also becomes a natural learner during this period as nature equips her with the

knowledge to accept and rear the foetus. Even the period of lactation is synchronized naturally as lactation starts to fulfill the need of the young one and stops when mother's milk is not needed for the baby.

Thus we can optimize the process of leveraging knowledge for human development in India if our structures are closer to the natural ones, i.e., the ones that facilitate and maintain the harmony of natural learning. In this model the different streams of knowledge gain a new and wider perspective than that is generally offered by our current education structures. In this perspective arts and science become, respectively, learning and appreciating the beauty and intelligence in nature. The application of this knowledge is like emulating nature and forms the branches such as technology, engineering, and medicine. Knowledge in the context of society becomes social science and that in the context of self becomes spiritual science.

In this model of natural learning, a learner earns knowledge from nature depending on his / her ignorance and curiosity. As each natural entity contains infinite knowledge learning in this way becomes an unending process. Table II illustrates this with an everyday example of water.

TABLE II. INFINITE KNOWLEDGE IN WATER

<p>If a question, 'What is water?', is posed to learners it can evoke following possible responses.</p> <ul style="list-style-type: none"> <li>• An illiterate person may plead ignorance and say that the only thing that he knows is that it is used for drinking.</li> <li>• A school student may explain it with his level of knowledge as a liquid with a chemical formula <math>H_2O</math>, few of its physical and chemical properties and its importance as a natural resource.</li> <li>• A college student may add further knowledge to it by mentioning about its structure, bonding, phases, density, solubilities, surface tension, etc., with corresponding more uses.</li> <li>• A research student may elaborate further with details such as dielectric constant, polarization, ultrasonic velocity and attenuation, electrical and thermal conductivity and recent research results and their corresponding applications.</li> </ul> <p>These responses convince us that water is something that contains infinite knowledge and various learners know about it by various extents based on their own capacity.</p>
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Organization of knowledge in KCs thus has a natural hierarchy. It graduates learners from natural curiosity to basic knowledge concepts that can be validated by experiments and lead to useful applications; knowledge on nature's scale being recognized as the ultimate form of knowledge. For example, the concepts of charge transfer in static electricity can be understood through the well known experiment of a comb that attracts pieces of paper upon friction. The ideas can be taken to the next level of understanding and application through knowing about the working of electrostatic devices such as Vande Graff generator. If we go further, we find that a still

higher (ultimate) level of knowledge of this phenomenon can be found in nature in the form of lightning.

### B. Methodology

The methodology adopted to address the objectives of KC is based on the optimum use of the unstructured character of knowledge. Thus, instead of fitting knowledge in any structure, the methodology explores and develops ways to enhance the knowledge output of a learner through the resonance between his /her natural propensity and the knowledge activity he / she undertakes. In this perspective, knowledge is there to quench someone's curiosity, get someone a job, prosper someone in a job or build someone's wisdom (to guide society in general, and youth, in particular), thus addressing the fourfold objective mentioned earlier.

KCs don't have fixed syllabi but implement syllabi in the form of open and flexible knowledge spirals [14-18] to enable learners to achieve this resonance. The depth of the spiral represents new knowledge acquired through research and breadths at various depths represent applications of knowledge at that depth. Thus a learner can explore the appropriate breadths and depths of the spiral in pursuit of one's natural propensities. Table III explains the openness and flexibility of knowledge spirals.

TABLE III. OPENNESS AND FLEXIBILITY OF KNOWLEDGE SPIRALS

<p>Knowledge spirals provide an appreciation of the folded layers of knowledge – as one starts unfolding the layers, one sees more new layers emerging out confronting us with an unending treasure of knowledge. The exploration becomes a bottomless search; more we know more we come to know that there is much more to know. Knowledge spirals capture this spirit and brings to fore the immense scope of knowledge through discoveries of newer routes and fresher insights.</p> <p>Knowledge spirals overcome the rigidity of the syllabi of the present education structures and bring out the seamless, interdisciplinary and multidisciplinary character of knowledge: the way it enters in a complex way in any human endeavour. They present knowledge from our real, everyday world and not the one that is 'taught' in 'the building of an educational institute'. They have lot of navigation flexibilities of entry, exit and comeback to address the needs of individual learners.</p>
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To elaborate further using an example, knowledge spirals of science will be repositories of the knowledge of matter (108 basic elements listed in periodic table and the countless combinations of the atoms of these elements), knowledge of energy (different ranges of electromagnetic radiation) and the knowledge arising out of interactions between matter and energy. Myriad such interactions aroused human curiosity and brought forth knowledge that we understand as science today. However, infinite such interactions constitute nature's knowledge.

There can be different ways to address the fourfold objective mentioned above. Here we explain the ways adopted by us. The objective of enjoyment is addressed by presenting knowledge that helps to learn and grasp concepts in an enjoyable way, e.g., through stories, charts, exhibits and models [19-22]. Platforms like *Curiosity Corner* and *knowledge Clinic* are developed for this purpose to facilitate curiosity based and need based learning. The objective of



employment is served by developing skill building modules based on the application of knowledge acquired through curiosity corner and knowledge clinic. A platform called *knowledge café* is developed to facilitate learning the applications of knowledge. The objective of empowerment is addressed through packages that enhance / sharpen the knowledge / skills acquired through the platforms mentioned above. This objective convinces learners that greater depth assures a larger breadth in the knowledge spiral. The objective of enlightenment is addressed through research leading to better appreciation of the philosophical aspects, creation of new knowledge and further development of the KC.

The initiative, which started with physics [23], has been recently extended to other knowledge domains in our institute. The initiative has produced encouraging results and has emerged as a new learning paradigm by overcoming the limitations of our rigid education structures. In particular, it has proved quite useful in aspects related to accreditation, quality and assessment, active learning, open educational resources, measures for bright students and weak students and UG research experiences [5]. This motivates us to propose it on a national level to quicken our march towards a knowledge destination.

#### IV. HOW KCs CAN QUICKEN INDIA'S TRANSFORMATION INTO A KNOWLEDGE DESTINATION

##### A. Present Scenario

From about 20 universities and 500 colleges at independence to over 650 universities and 30000 colleges at present [24], India has gone a long way and stands globally as a nation with the largest number of institutions of higher learning. Despite this impressive expansion it can accommodate only about 22.5 % of our youth eligible for higher education at present [7], a fraction smaller than that for the developing countries such as Brazil, China, Philippines and Malaysia. This fraction is more than 40 % for all the developed countries.

Moreover, knowledge, which is the main aim of education, seems to have almost gone out of the focus of our rigid education system. Only four Indian higher education brands featured in the Times Higher Education World University Rankings 2013-14 of the top 400 global universities, whereas the number is 12 for China, 25 for Australia, 49 for UK and 109 for US. Out of the 48 countries studied, India ranks second last in the U21 rankings of national higher education systems. The relative impact of citations for India is 0.51, which is about half of that of the world average (1.0) [7].

In the speech delivered at the convocation of SIDO KANHU MURMU, the President, Pranab Mukherjee, observed [7], "There is need for Indian universities to catch up with counterparts in the quality of teaching and research. Research and innovation must be given new impetus. Out of 260 lakh students who were enrolled at the undergraduate level and above in 2011-12, only one lakh or 0.4 per cent had registered for PhD. The total number of patent applications filed by Indians in 2010, was close to only six thousand, while 3 lakh applications were filed by Chinese, around 1.7 lakh

filed by Germans, 4.5 lakh by Japanese, and 4.2 lakh by Americans. The number of patent applications by Indians comprised only 0.3 per cent of the total applications filed in the world."

The Human Development Report of UNDP (2007-08) gives India a Human Development Index score of 0.619, which places it in the 128th position among 177 countries.

##### B. KC – A Right Step towards a Systematic Overhaul

Considering the vast knowledge needs of India, Sam Pitroda, Chairman, National Knowledge Commission, expressed a need for an overhaul of education system that fulfills demands of both the quantity as well as quality of education. KCs can prove to be right step towards this overhaul. Generally reforms in our systems end up in bringing up premiere institutes where the brightest of our young talents enter and flourish. However, putting apart few winners from the majority losers cannot be a fully correct measure to build a healthy knowledge society. KCs promise to provide ample opportunities for 'excellence out of mediocrity'.

Knowledge, which is created through research and applied to industry, is disseminated through education structures. However, our present education structures have almost obscured these links and often education is just for the sake of education. KCs promise to strengthen these links by shifting the emphasis to education for the sake of knowledge by their knowledge oriented, knowledge centric and knowledge intensive approach. On one hand they will attempt to fill the gaps between knowledge and its application to industry through employable knowledge packages and on the other hand they will attempt to create new gaps through education research. This will also improve the percolation dynamics of knowledge from research to education.

KCs promise the benefits of experience of the 'internalization of knowledge' as against the current experience of mere exposure to 'knowledge-in-books-and-for-exams'. KCs can open the floodgates of knowledge and can create new opportunities for jobs. They can lead towards development of a career thesaurus out of the knowledge thesaurus to match the plural and diverse interests of our demographically favourable young population. This win-win situation can truly usher us in an era of knowledge revolution.

The foreword of the knowledge paper, 'Higher Education in India: Vision 2030' [7] mentions, "--- by 2030, India will be amongst the youngest nations in the world. With nearly 140 million people in the college age group, one in every four graduates in the world will be a product of the Indian higher education system. --- In order to realize the goals we envision for 2030, a transformative and innovative approach would be required across all the levers of higher education: from curricula and pedagogy to the use of technology to partnerships, governance and funding. ---"

KCs can provide such an approach by institutionalizing comprehensive knowledge reforms in our ailing higher education system. They can de-bureaucratize our system and improve the processes of knowledge creation, knowledge dissemination and knowledge management as discussed in Table IV.

TABLE IV. KNOWLEDGE REFORMS FOR HIGHER EDUCATION

<p><b>Knowledge for Enjoyment :</b> Natural pursuits of learning are inherently joyful as the processes involve the excitement and thrill of exploration and understanding of nature. However, our present education structures miss this spirit. With knowledge spirals this natural spirit is preserved as the learner learns what inspires him / her to learn rather than what is required to be learnt. Thus, the spirals facilitate learners to decide their own syllabi and curricula based on their needs and competencies. This ensures the freshness of learning making it intrinsically innovative. Knowledge reforms thus focus on learning instead of teaching and promises an ecosystem that promotes natural creativity.</p>
<p><b>Knowledge for Employment :</b> In the present education structures the employability of knowledge is not given the emphasis it deserves. There are no convincing links between what is learnt as a part of the education and what is required in the jobs. After completing their graduation / post graduation students often realize that what was taught in these courses has little or no relevance to the jobs they are searching for, enhancing their unemployability and subjecting many of them to shocks, surprises and disillusionments. Knowledge reforms are based on the premise that the infinite knowledge wealth of nature has the potential to accommodate and employ everyone ensuring a win-all situation. KCs will enhance the transparency of links between efforts and outcomes and will replace ‘winners and losers’ with ‘triers and achievers’. They will thus create knowledge workers with necessary skills and knowledge to be fully engaged in the knowledge economy. This will reduce the stress that is presently involved in the career making and make learners relaxed and ambitious at the same time.</p>
<p><b>Knowledge for Empowerment :</b> Though knowledge is considered a power in today’s world, the links between growth of an individual and his / her knowledge are rather weak in our education structures. Knowledge reforms will strengthen these links and facilitate knowledge based progress in society. They will de-bureaucratize our education system and facilitate evolution of unambiguous set of criteria that can evaluate and assess knowledge competencies from all quarters.</p>
<p><b>Knowledge for Enlightenment :</b> The knowledge reforms will help us in rediscovering the glory that sustained our civilization for millenniums. Scientific knowledge that paves way for technological growth and development also enlightens us with the secret intelligence and wisdom in nature. Today’s world is plagued by serious menaces such as environmental degradation, violence, turmoil and disharmonies because of wrong models of development. The confluence of modern scientific approach and our rich metaphysical treasures promise to bring to fore how knowledge offers enlightenment and can lead us to better models of development.</p>

The higher education scenario today presents grim paradoxes of overcrowding of some courses and no takers for others. For example, out of a large number of students who appear for the competitive examinations for admission to engineering courses only about less than 1 % get admission to premiere institutes like IITs and NITs whereas a large number of seats remain vacant in other engineering colleges. KCs promise to strike a balance in this scenario by replacing ‘education for the sake of education’ by ‘education for the sake of knowledge’ and by replacing the present indirect practice of ‘earn a degree and compete for a job’ by a direct practice of ‘acquire the knowledge demanded by a particular job to get that job’. In this way KCs can multiply the opportunities for our large aspiring youth population by fostering innovative ideas of smooth admissions and career selection and can lead to a snug matching of aspirations with outcomes.

For quickening our march towards a knowledge destination, there is a need to blur the artificial boundaries created by education structures with other sectors of society. The idea of KC discussed above preserves this inclusive character of knowledge. It brings in its ambit the various components of the

society and can be consonant with different public, private and PPP models. KCs can thus be launched on a large number of platforms within and outside education to percolate in the national psyche and become the people’s movement. They can accommodate the rich variety of our natural and indigenous knowledge and can guide policy reforms and strategic initiatives to harness this knowledge so that the productivity of our economy enhances.

Bhargava [25] explained how India has far from optimally utilized its traditional and cultural knowledge built over five millennia for her social and economic gain and suggested the following important ingredients of a policy that would make India a knowledge-based society: recognition of the attributes of knowledge and weaving them into the social fabric, setting up systems for disseminating and communicating knowledge that would make the country’s citizens informed citizens (not only through formal education but also through non-formal means on a continuous basis) and judicious use of both new and traditional knowledge. The idea of KC is quite in consonance with this suggestion.

KCs also promise to bring us closer to Gandhi’s concept of *Nai talim*, which emphasizes the unity of knowledge and work, i.e., of head and hand. Prof Anil Sadgopal [26], Chairman, National Focus Group on ‘Work and Education’, also observed, “---The exclusionary character of the education system in India is to a great extent founded on the artificially instituted dichotomy between work and knowledge (also reflected in the widening gap between school and society). Those who work with their hands and produce wealth are denied access to formal education while those who have access to formal education not only denigrate productive manual work but also lack the necessary skills for the same. ---”

India has captured global attention through her stupendous success in the field of information technology. This success inspires us to march ahead from information to knowledge and from information technology to knowledge technology, the most enabling technology ever that promises to transform India into an ultimate knowledge destination.

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