National Knowledge Commission

Compilation of Recommendations on Education

NKC Snapshot November 2007

Recommendations Submitted
Till November 2007

- Libraries
- Translation
- Language
- Knowledge Network
- Right to Education
- Health Information Network
- Portals (Water, Energy)
- Vocational Education
- Higher Education
- Legal Education
- Medical Education
- Management Education
- Open and Distance Education
- Open Educational Courseware
- National Science and Social Science Foundation
- Intellectual Property Rights (IPR)
- Innovation
- E-governance

Works In Process

- Portals (Biodiversity & Teacher Training)
- School Education
- Technical Education
- More Students in Science and Maths
- Entrepreneurship
- Science and Technology
- Agriculture
- Traditional Knowledge

Foreword

The National Knowledge Commission (NKC) is pleased to present a compilation of its recommendations on education to coincide with the final deliberations on the XIth Plan document. It consolidates a set of recommendations that the Commission made on Right to Education, English Language, National Knowledge Network, Vocational Education and Higher Education as part of its first Report to the Nation along with some new ones on Legal, Medical, Management and Open and Distance Education, Open Access and Open Educational Resources. Recommendations on School Education and Technical Education are important and are in the process of being finalized.

We believe that the XIth Plan document's focus on education and the proposal to allocate Rs 2.5 trillion, a four-fold increase in the allocation for education over the Xth Plan, make the NKC recommendations particularly useful and timely. The share of education in the total plan will accordingly increase from 7.7 per cent to 19 per cent. According the highest priority to education and availability of such a large quantum of financial resources presents a historic opportunity for transforming the entire framework for education, institutions and infrastructure. In the Commission 's judgment appropriate reforms in education at this stage will have far reaching implications for the future of the country as it positions itself as a knowledge hub for the world. It will also have far reaching implications on disparity, development, demography and growth.

The first Report of NKC to the Nation made nine sets of recommendations with a focus on Access, Concepts, Creation, Application and Services. Six of the recommendations related directly to Access to Knowledge, which is essential if we are to build a knowledge society with equity and opportunity for all. With this overarching focus, the NKC has been deliberating on various aspects of the overall education system. In our recommendations, we have highlighted the significance of making the right to education a reality, on redefining the critical elements of vocational education and training as well as access to the English language at the school level. We have also stressed on expansion, excellence and access in the Higher Education system with a focus on reforms in the governance structures, leveraging information and communication technology (ICT) to create dedicated research and education networks, and the need for making our professional education streams more responsive to national realities as well as global competitive challenges.

The key to realizing these objectives is to set up new institutions based on norms, upgrade and reform existing institutions and ensure accreditation to provide benchmarks for quality. Other measures to ensure quality would include stringent information disclosure norms for all educational institutions such as their financial situation, physical assets, admissions criteria, faculty positions, academic curricula, level of accreditation, etc. There must be focus on upgrading infrastructure, improving the training of teachers and continuous assessment of syllabi and the examination systems. The system of education must recognize that there is bound to be diversity and pluralism and avoid a uniform one-size-fits-all approach. In our endeavour to expand educational opportunities and create excellence through competition and transparency we need to forge appropriate public-private partnerships and increase research at universities. The government will also need to create governance models that facilitate speedy decisions based on stakeholder participation.

In order to focus on expansion, excellence and access for all, which are inextricably connected, it is essential that we rethink the way we look at the present education system. The world is now well and truly in the midst of the information age. Advances in ICT have had a profound impact on all areas of human pursuit including

education. As a result, the concept of a classroom as learning environment with chalk, blackboard, duster, textbook, homework, exams, grades etc. will change as new methods of learning evolve. We believe we have a historic opportunity to capitalize on some of these trends and technologies to benefit teachers and students.

As the XIth Plan document approaches its final round of deliberations and the stage is set for its implementation, a compilation of NKC recommendations on education will, we believe, provide a set of inputs and ideas for discussion, debate and implementation and enable formulation of specific schemes and programmes. We look forward to working with diverse stakeholders, including the central and state governments, for providing more detailed inputs to facilitate and drive implementation.

Sam Pitroda
Chairman
National Knowledge Commission
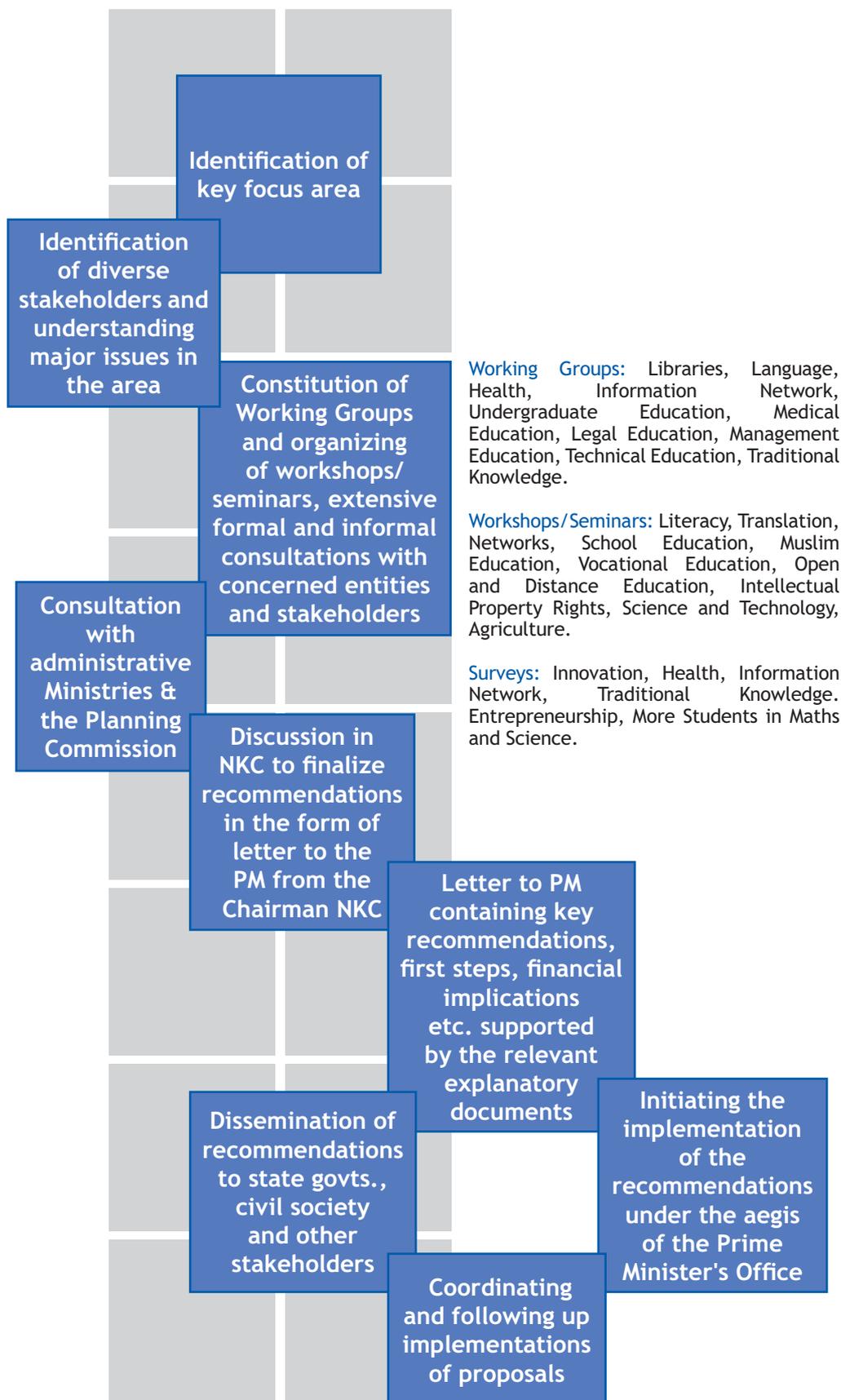6 November 2007

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Introduction

The National Knowledge Commission (NKC) was constituted on 13th June 2005 as a high level advisory body to the Prime Minister of India. The vision for NKC was articulated in the address of Dr. Manmohan Singh, Prime Minister of India, "The time has come to create a second wave of institution building, and of excellence in the fields of education, research and capability building.

The Terms of Reference of NKC are:

- Build excellence in the educational system to meet the knowledge challenges of the 21st century and increase India's competitive advantage in fields of knowledge.
- Promote creation of knowledge in Science & Technology laboratories.
- Improve the management of institutions engaged in Intellectual Property Rights.
- Promote knowledge applications in Agriculture and Industry.
- Promote the use of knowledge capabilities in making government an effective, transparent and accountable service provider to the citizen and promote widespread sharing of knowledge to maximize public benefit.

NKC has a designated time-frame of three years:
from 2nd October 2005 to 2nd October 2008

This report is a compilation of the recommendations submitted by NKC till November 2007 on reforms relating to eduction. These include: Right to Education, English Language, National Knowledge Network, Vocational Education and Training, Higher Education, Medical Education, Legal Education, Management Education, Open and Distance Education and Open Educational Resources. Wide consultations on School Education, Technical Education and Encouraging More Students in Maths and Science Streams are in process. Recommendations on these will be submitted in the coming months.

Identification of key focus area

Identification of diverse stakeholders and understanding major issues in the area

Constitution of Working Groups and organizing of workshops/ seminars, extensive formal and informal consultations with concerned entities and stakeholders

Consultation with administrative Ministries & the Planning Commission

Discussion in NKC to finalize recommendations in the form of letter to the PM from the Chairman NKC

Letter to PM containing key recommendations, first steps, financial implications etc. supported by the relevant explanatory documents

Initiating the implementation of the recommendations under the aegis of the Prime Minister's Office

Dissemination of recommendations to state govts., civil society and other stakeholders

Coordinating and following up implementations of proposals

Working Groups: Libraries, Language, Health, Information Network, Undergraduate Education, Medical Education, Legal Education, Management Education, Technical Education, Traditional Knowledge.

Workshops/Seminars: Literacy, Translation, Networks, School Education, Muslim Education, Vocational Education, Open and Distance Education, Intellectual Property Rights, Science and Technology, Agriculture.

Surveys: Innovation, Health, Information Network, Traditional Knowledge. Entrepreneurship, More Students in Maths and Science.

An Interactive, Consultation-based Work Methodology

The methodology followed by the National Knowledge Commission involves identification of focus areas in the first instance. This selection arises from wide consultation, within and outside the government. Thereafter, diverse stakeholders in these focus areas are identified and the major issues highlighted. Given the fact that the Government is already undertaking initiatives in some of NKC's focus areas, selection of areas also takes into account an analysis of unique value addition by the NKC. This could be either through proposing innovative solutions for conventional problems or bringing together disparate groups working on an area.

After the identification of focus areas, Working Groups of specialists and practitioners are constituted. Working Groups typically consist of five to ten experts, and meet periodically over a period of three to four months in order to prepare a report. Working Group reports are one of the inputs used by the NKC during deliberations to frame its recommendations. In addition, workshops and seminars are held periodically along with informal consultations with concerned entities and stakeholders to get as broad-based a point of view as possible. Through this process, the NKC serves as a forum to bring together diverse opinions, in order to understand the issues in depth. For issues requiring an understanding of a very broad spectrum of experiences, a survey is undertaken. NKC has adopted different approaches for different focus areas, with the aim of setting in place a process

| CONSULTATIONS | **Government** (Central & State)

Professionals (Academics, Vice Chancellors & Principals, Scientists, Social Scientists, Regulatory Bodies, Major National Think-tanks, Industry, NGOs, Multilateral Agencies)

Regional/National Bodies |

that is as inclusive and participatory as possible. At this stage of discussions, representatives from the relevant ministries are actively involved.

NKC Members discuss the issues raised during Consultations and in the Working Group Reports to finalize recommendations. After several rounds of deliberations, a letter is sent to the Prime Minister containing key recommendations, first steps, financial implications etc., supported by relevant explanatory documents.

Widespread dissemination of NKC recommendations to state governments, civil society and other stakeholders takes place after the recommendations have been received by the Prime Minister and the relevant ministries. The implementation of the recommendations under the aegis of the Prime Minister's Office is then initiated, along with coordination and follow up with various implementing agencies.

Right to Education Bill

NKC believes that providing universal access to quality school education is a cornerstone of development and a minimum necessary condition for any progress towards making India a knowledge society. NKC is in the process of extensive consultations and will make detailed recommendations on various issues relating to school education at a later date.

However, at this point NKC would like to respond specifically to the recent initiative of the central government of sending a model Right to Education Bill to the Secretaries of State Education Departments, with incentives for the state governments to enact this bill. NKC has perused the bill and consulted with a wide range of experts and educationists. It feels that the model bill is flawed for a number of reasons, and most importantly that such legislation must be enforced by the central government following upon the commitment made in the Constitutional Amendment Article 21A.

NKC recognizes that there may be concerns about federalism, since school education is dominantly the responsibility of the state governments at present. However, it feels that this matter can be resolved through an appropriate central legislation which takes into account the following proposals:

1. Central legislation

Legislation at the national level is required to affirm the Right to Education, which is a fundamental right mandated by Article 21A. Since it cannot be dependent upon which state a citizen lives in, a model bill sent to be enacted individually by State Governments is not adequate to meet the constitutional responsibilities of the Government of India. Therefore, a central legislation should be enacted along the lines of the Panchayati Raj (Amendment) Act, requiring the states to enact Right to Education Bills within a specified time period, and with the primary financial responsibility for this resting with the central government.

2. Financial commitment

The Central Government must provide the bulk of the additional funds required to ensure the Right to Education. Therefore there must be financial provision in the central legislation, requiring the central government to share the revenues of the Prarambhik Shiksha Kosh with state governments and to provide additional resources as required to meet the requirement of ensuring the right to all children. Estimates for the additional resources required to achieve the goal of universal elementary education currently range from 0.8 per cent to 2.5 per cent of GDP, depending on the criteria used. However, the required financial resources are likely to be at the lower end of these estimates, since there is already close to universal provision in several states and there has been recent progress in providing more access through the Sarva Shiksha Abhiyan in other states.

3. Time frame

The state-level legislation should specify the period within which universal education of reasonable quality is sought to be achieved, preferably within three years. The model bill does not provide any time frame for adoption and implementation of the provisions.

4. Schedule of norms and standards

To ensure a minimum quality of education, it is important to have a schedule of norms for all schools to follow. The model bill does not have such a schedule of norms, and there is no specification of the minimum quality of education that schools should provide. There is only a reference to 'equitable quality' without defining the parameters of quality. While ensuring quality is a complex matter, certain norms regarding infrastructure, number of teachers per school and per student, teaching methods and other facilities, must be adhered to as necessary conditions.

5. Specification for teachers

Since teachers are critical to ensuring the quality of education, it is particularly important to lay down well-defined but flexible norms for the minimum qualifications of teachers. The model bill has no specification of a teacher, or the qualifications and in-service training needed for the position. A teacher is only defined as a person who teaches in the classroom. It is necessary to specify norms for teacher qualification and training.

6. Justiciability

Any right, including the Right to Education, is only meaningful if it is justiciable. However, in the model bill sent to state governments, the onus is placed on parents or guardians of the child. The responsibility of the Government, at different levels, must be recognized and made justiciable. The example of the National Rural Employment Guarantee Act (NREGA) could be used in this context.

7. Redressal mechanism

To ensure justiciability, a redressal mechanism should be outlined and an appropriate procedure must be set in place for students or parents in case the right is not upheld.

8. Universal schooling

School education must be provided to all. This necessarily also requires that children of the disadvantaged, landless and minority communities must also be integrated, along with children with disabilities or special needs. There should be no distinction made in terms of the type of schooling provided within the government system for children from different social, economic and cultural backgrounds. The model bill has the potential of creating a parallel and discriminatory system of schooling which can result in stratification of the education system for children from disadvantaged communities and backgrounds, because it requires only provision of non-formal education in such cases, rather than mandating the provision of regular schooling.

Obviously, in all cases, the school system should be flexible enough to cater to particular needs of students.

NKC can offer detailed explanations on these points. Continuing to consult with stakeholders and examine other issues in relation to school education, it is focussing in particular on the questions of how to ensure better quality across the board; the institutional structures and forms of control by local communities that could contribute to improved quality of schooling; issues related to common schooling and neighbourhood schools; ensuring adequate quantity and quality of school teachers, especially in specified areas.

NKC will make a broader set of recommendations on school education in the near future.

In a subsequent letter to Prime Minister, NKC reiterated that the proposed central legislation on RTE must include a financial commitment on the part of the central government. NKC believes that the potential expenditure on this is probably less than has been estimated earlier. The Kapil Sibal Committee that had prepared the CABE draft had estimated an expenditure of **Rs.2,20,643 crore** for the period 2008-2012. However, this was based on population projections for the future that have since been revised downwards by the Census of India. For example, current population projections suggest that there will be at least 6 million less children in 2011-12 than the earlier projections used by the Sibal Committee had indicated. This in turn means a significant reduction in the estimated costs for universal schooling. Using the same per capita spending with the new population projections gives a total cost for the five year period 2008-2012 of **Rs. 1,51,273 crore,** based on 50:50 division of SSA. This amounts to an average of just above Rs. 30,000 crore per annum, which is much less than 1 per cent of GDP and also less than 8 per cent of total central government spending.[1]

In this connection, NKC would also like to express its concern about the recent decision of the central government to reduce the central

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[1] If the centre provides 75 per cent of the spending for SSA, the additional cost would be Rs. 37,000 crore over the 11th Plan period, that is around Rs. 7,000 crore per annum.

funding for the Sarva Shiksha Abhiyan from 75 per cent to 50 per cent. There is a fear that this may lead to a sharp curtailment of progress towards universal school education, especially in the more backward states where the gap is greater. It is worth noting that state governments are already incurring the bulk of school education expenditure.[2] NKC strongly recommends that, in addition to 50 per cent of SSA, the Centre should provide all the necessary funding to ensure the Right to Education in those states where the state government is already spending at least 15 per cent of its total budget on school education.

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[2] Currently, the ratio of central government to state government spending for school education, including SSA, is 12:88. If mid-day meals are included, it is 20:80.

English Language

The National Knowledge Commission has emphasized the importance of an inclusive society as the foundation for a knowledge society. NKC has also recognized the significance of language, not only as a medium of instruction or a means of communication but also as a determinant of access. An understanding of and command over the English language is a most important determinant of access to higher education, employment possibilities and social opportunities. School-leavers who are not adequately trained in English as a language are always at a handicap in the world of higher education. More often than not, teaching is in English. Even if it is not, in most subjects, books and journals are available only in English. And those who do not know English well enough find it exceedingly difficult to compete for a place in our premier educational institutions. This disadvantage is accentuated further in the world of work, not only in professional occupations but also in white-collar occupations overall.

This reality is not lost on our people, who recognize that the English language is a critical determinant of access to, and opportunities for a better life. Available information suggests that middle-income or lower-income households spend a large proportion of their modest income on sending their children to relatively expensive English medium schools. Such educational opportunities for children are a priority that is almost at par with health care for the family. But there are a very large number of people who simply do not have the resources for such investment. The outcome is exclusion. We believe that inclusion is possible through public provision.

There is an irony in the situation. English has been part of our education system for more than a century. Yet English is beyond the reach of most of our young people, which makes for highly unequal access. Indeed, even now, no more than one per cent of our people use it as a second language, let alone a first language.

These realities cannot be changed overnight. But NKC believes that the time has come for us to teach our people, ordinary people, English as a language in schools. Early action in this sphere, would help us build an inclusive society and transform India into a knowledge society. In just 12 years, it would provide the country's school-leavers with far more equal access to higher education and, three to five years thereafter, much more equal access to employment opportunities.

The Commission engaged in informal consultations on this subject with a wide range of people in government, academia, media and industry. It consulted some Chief Ministers in the states. It consulted Members of Parliament. It consulted people in professions such as medicine and law as well as civil society organizations. There was unanimity that this can and should be done. A Working Group was constituted to work out the modalities in terms of first steps. The report submitted by this group was used as an input in NKC's deliberations.

NKC recommends that the teaching of English as a language should be introduced, along with the first language (either the mother-tongue or the regional language) of the child, starting from Class I in school. This phase of language learning should focus on using both languages to create meaningful learning experiences for the child without disproportionate emphasis on grammar and rules.

NKC recognizes that nine States (of which six are in the north-east) and three Union Territories have already introduced English as a compulsory subject from Class I onwards. In addition, as many as 12 States and three Union Territories have made English a compulsory subject, at different stages in

primary school, by Class V at the latest. However, the implementation is slow and the quality of English language teaching is simply not good enough. The support systems, such as the number of teachers or materials for teaching, are neither adequate nor appropriate. NKC is recommending a fundamental change that seeks to introduce, nationwide, the teaching of English as a language from Class I onwards. This is not meant to be a stand-alone, add-on subject, but is meant to be integrated into the school curriculum.

Language learning cannot be separated from, and must be integrated with, content learning. Therefore, English should also be used to teach some non-language, content subjects, starting from Class III in school. The choice of subjects for this purpose can be left to schools depending on the proficiency of teachers and availability of materials. This would, in effect, create multi-medium schools. It would also help reduce the divide between English medium schools and regional language-medium schools.

The pedagogy of language learning as well as teaching should be suitably contextualized, to lend meaning to real situations and daily lives. Moreover, assessment should be based on proficiency rather than specifying achievement targets that reward mastery of single texts acquired through rote learning. To this end, a National Testing Service (NTS) for certification of language competence as well as recruitment of language teachers should be set up.

In order to meet the requirement for a large pool of English language teachers, graduates with high proficiency in English and good communication skills should be inducted without formal teacher-training qualifications. They could be selected through an appropriate procedure developed by the National Testing Service and then given a short–term orientation. The nearly four million school teachers all over the country, regardless of their subject expertise, especially teachers at the primary level, should be trained to improve their proficiency in English through vacation training programmes or other short-term courses. Most teacher training programmes are not based on a real assessment of needs of teachers. Thus, the entire teacher training system catering to pre-service and in-service training that exists today, including training for language teaching, needs to be thoroughly reviewed, recognizing the centrality of language in the curriculum.

A multiplicity of English textbooks should be made available to address the diversity of English language environments in the country. However, to ensure that certain standards are maintained, benchmarks may be laid down for the content of textbooks at each stage. For this purpose, an expert group should be set up to develop pedagogically sound English textbooks for every level, from Class I to XII. These should be used as models by states and made freely available on the web to allow easy access. While the State Council for Educational Research and Training (SCERT) may continue to be a nodal agency for textbook development for state board schools, the writing of textbooks needs to be further decentralized. To make the exercise more collaborative, civil society organizations with expertise in the domain should be involved in developing textbooks.

Since language learning takes place not only through direct instruction but also through assimilation from the environment, the classroom needs to be equipped with appropriate supplementary audio-visual and print material. Resource libraries could be set up in every classroom, comprising a collection of books, magazines, newspapers, audio-visual material and posters, appropriate to the age of the students, on a variety of subjects. Language learning opportunities should also be created outside the classroom through specific bi-lingual radio and TV channels, which could be introduced for formal and informal teaching and learning of English. Knowledge clubs could be formed to discuss and disseminate knowledge as well as extend the use of English outside the classroom. Given that language learning requires extensive resources, a centrally sponsored scheme of financial assistance for developing English language resources (teachers and materials) should be instituted to address this requirement.

State governments would need to be equal partners in the implementation of this idea. NKC therefore proposes that the Prime Minister discuss this matter with all Chief Ministers at the National Development Council, to formulate a National Plan for the teaching of English as a language, in addition to the regional language, starting in Class I. This would also ensure that at the end of 12 years of schooling, every student is proficient in at least two languages.

NKC strongly feels that to optimally utilize the potential of institutions engaged in generation and dissemination of knowledge in various areas, such as research laboratories, universities and other institutions of higher learning, including professional institutions, it is important to connect them through a high-speed broadband network. In order to explore the feasibility of establishing broadband connectivity among such institutions, NKC spent six months studying various issues and alternatives. Extensive consultations with experts, potential users, telecom service providers, government officials and various educational and research institutions provided insights on the requirements, implementation issues and benefits of creating an integrated national knowledge network.

The purpose of such a knowledge network goes to the very heart of the country's quest to build quality institutions with requisite research facilities and to create a pool of highly trained persons. Considering the magnitude of the challenge, NKC believes an immediate objective of the network will be to share the existing content, coursework, expertise, ideas, innovations, equipment and facilities available in the limited number of centres of excellence, with a wider group of institutions, educators and students.

Globally, research and development activities and innovations are increasingly multi-disciplinary, and collaborative, and require substantial computational power. The key to successful research today is live consultations, data sharing and resource sharing. Therefore it is essential to provide broadband connectivity to our knowledge institutions to improve access, quality and quantity of R&D activities.

The primary objective is to interconnect all our knowledge institutions in various fields, and at various locations throughout the country, through an electronic digital broadband network

with adequate capabilities and access speed to encourage sharing of resources and collaborative research.

NKC commissioned an expert to examine what it would take to create a national knowledge network. NKC also held detailed discussions with the office of the Principal Scientific Adviser (PSA) to the Government of India. The discussions yielded a consensus on the optimal approach to be adopted for setting up such a network, whether it is for a broad range of institutions as envisaged by NKC or a specific community of Science and Technology (S&T) research institutions. Based on the various discussions NKC recommends the following:

1. National Knowledge Network

Build a national knowledge network with gigabit capabilities to connect all universities, libraries, laboratories, hospitals and agricultural institutions to share data and resources across the country. This will ultimately require provision of connectivity to around 5,000 nodes covering all major institutions. The actual implementation could be in phases targeting 500 to 1,000 nodes in the first phase. However, the design of the network will have to be based on the final network. The prioritization of the nodes for implementation purposes should be on the basis of the institutions which are most likely to use the network from Day one and which would be able to demonstrate the benefits. Based on a detailed analysis of the country's existing optic fibre infrastructure and technologies available, it is estimated that a 500 to 1000-node network can be commissioned within three to six months.

2. Options

Wide consultations with experts and technology providers suggest that there are four possible networking options:

- The first one involves hiring dark fibres that have been extensively laid out by various telecom service providers and lighting them.

- The second involves lit fibres and differs from the first in not requiring transmission equipment procurement and its maintenance.
- The third involves using existing commercial networks, making capital investment in equipment unnecessary. It requires minimum maintenance and operations organization.
- The fourth is a hybrid approach where the Core consists of two layers in which the inner higher-speed layer is wholly owned by the stakeholders while the lower layer is provided by commercial service providers.

From the viewpoint of cost, the third approach based on the utilization of the available commercial networks appears to be most attractive to start with. This is because the capital expenditure is negligible if the operator chosen has a well established network which is being used by a large number of existing customers. However, lack of experience of architectural flexibility and security aspects of virtual private networks (VPN) set up on a commercial basis, do not allow prospective users to be entirely comfortable with this approach. Therefore, NKC recommends that existing commercial networks be utilized. Subsequently, feedback from this exercise could enable a shift to a hybrid network with a central Core, preferably of a relatively few nodes, and an outer network constituted by practically each one of the other operators' networks.

3. Architecture
The network should consist of a Core using Internet Protocol (IP) and Multi-Packet Labeled Services (MPLS) technology, an Aggregation or Distribution network, and an Access or Edge network linking the institution's local area network (LAN) to the Core. The Core network could be a single hierarchy or a two-stage network with a higher speed network at the top to accommodate architecture flexibility and security concerns in a VPN-based commercial Internet Protocol-Multi Protocol Label Switching (IP-MPLS) network. The detailed specification of the network will have to be drawn up with a view to inviting bids for speedy implementation. The network should be implemented in phases. The first phase should cover about 1000 institutions and should be commissioned in three to six months.

4. Congruence with e-governance
The question of whether the network for E-governance and the Knowledge Network should be one single network assumes importance and relevance depending upon the approach adopted for the realization of the network. In the recommended approach in the first phase, namely VPNs on commercial MPLS networks on Dense Wavelength Division Multiplexing (DWDM), this question becomes irrelevant because several VPNs can be created on a commercial network and they could be entirely un-correlated, as may be the case with these two networks. This question would assume importance only if the country were to implement a purely owned network on lighted fibres. On the other hand, even in the hybrid approach, the E-governance network with an entirely different geographical spread and much lower bandwidth requirements, can be realized as VPNs and the security and flexibility could be addressed by the inner core. The issue of congruence of the two networks therefore no longer remains important and the two aspects can be totally de-linked.

5. Security and privacy
Methods will have to be evolved both at the time of commissioning of the network as well as during operations, to ensure security of data along with privacy and confidentiality. Access to data from the Data Centre of a given institution should be under the control of the institution being addressed. An arrangement for authentication and authorization, with the participation of the connected institutions is essential to launch the network.

6. One-time support for LANs
The proposed broadband network envisages higher access bandwidth and therefore almost all user institutions will have to upgrade their networks to be able to cater to these speeds. While several institutions may have the resources for doing this, a large number will need one-time capital support to set up Fast Ethernet LAN (FELAN) which includes expenditure on routers, switches and optic fibre cable on the campus.

7. Costs
The Knowledge Network initially proposed to be launched on existing commercial networks will

therefore involve a recurring cost of Rs 20-40 lakh per institution connected, amounting to Rs 200-400 crore annually for 1000 institutions in the first phase. In addition, there will be a one-time capital investment in upgrading the LANs of these institutions to a 100 Mbps capability Fast Ethernet LAN. Thereafter, based on feedback, the installation of the inner core network of 10 Gbps or higher capability will be taken up. This will involve a capital investment of around Rs 1,000 crore on a 7 or 8-node Inner Core network, its Gigabit connectivity to the commercial IP-MPLS networks, as also direct connectivity to a few users who are particularly concerned about the security and internetworking experiments. This expenditure will be incurred over a period of time. There will be an additional recurring expenditure for this Inner Core on hiring large bandwidths from bandwidth service providers. This amount will depend on the number of nodes and the negotiated or bid-based price.

8. Organization

To ensure day to day coordination, operation and efficient utilization NKC recommends establishing a Special Purpose Vehicle (SPV) consisting of major stakeholders. Such an SPV should have professional experts pooled from various stakeholder institutions for coordinating and guiding various private vendors for speedy implementation. The policy, security and overall management should be the responsibility of the SPV and the operational support requirements should be met by the industry. One of the compelling reasons for such a mechanism is to provide assurance that the use of cyber space will in no way compromise the security concerns of the country.

9. Ownership

The Knowledge Network should be owned by the SPV consisting of major stakeholders. Government ownership is not desirable, despite the fact that substantial funding will be from the Government, because:

- It is the Government's policy to withdraw from direct operations and maintenance activities in the ICT sector.
- The type of trained manpower needed, though not large, is in great demand in the market, and therefore will require special remuneration and incentives.

10. Special group

NKC recommends the setting up of a special Working Group of experts to finalize specifications, implementation plans, cost estimates, and network plans, as well as to carry out the actual task of procurement and commissioning of the network. This group will also establish the SPV needed for running the network on a day to day basis.

NKC believes that a National Knowledge Network interconnecting our knowledge institutions and infrastructure with access speeds of 100 Mbps and more will give a major push to collaborations and sharing needed to enhance the quality of our education, research and applications and at the same time will empower our people to be competitive in the global economy.

Vocational Education and Training

NKC considers Vocational Education and Training (VET) to be an important element of the nation's education initiative. In order for VET to play its part effectively in the changing national context and for India to enjoy the fruits of the demographic dividend, there is an urgent need to redefine the critical elements of imparting vocational education to make them flexible, contemporary, relevant, inclusive and creative. The Government is well aware of the important role of VET and has already taken a number of important initiatives. Through consultations with industry groups, academics, civil society and practitioners, NKC has deliberated on ways and means to strengthen these initiatives and recommends the following long and short-term strategies.

1. Place vocational education entirely under the Ministry of Human Resource Development (MHRD)

In view of the role of VET in human resource development and importance of its linkages with other streams of education, the Government may consider placing all aspects of VET under MHRD. Currently, VET falls under the purview of MHRD as well as the Ministry of Labour, which leads to fragmented management of the VET framework. MHRD may consider setting up a National Institute for Vocational Education Planning and Development to formulate strategy, advise the Government, and undertake research and development in areas pertaining to technology and workforce development.

2. Increase the flexibility of VET within the mainstream education system through the following steps

i. Aspects of general education (such as numeracy skills) should be retained in VET as far as possible, to enable students to return to mainstream education at a later stage.

ii. Courses in training institutes and polytechnics should have distinct tracks for students of different educational attainments.

iii. Entry requirements for certain trades should reflect the requirement of the trade (as appropriate, for instance the entry requirement of Class X could be relaxed to Class VIII in some cases). Students should be permitted multiple entry and exit options in the vocational education stream.

iv. Links should be established between the vocational education stream and school education as well as higher education.

v. Courses devoted to certain skills training at the primary and secondary level should be introduced in all schools.

vi. Vocational training should be made available in various literacy and adult education schemes.

vii. Schemes for lifelong skill up-gradation, through short training programmes, should be introduced.

viii. There should be a provision for generating a cadre of multi-skilled persons.

3. Quantify and monitor the impact of vocational education

Data should be collected periodically and analyzed in order to assess the impact of training on employability. Empirical evidence on wage premium or other advantages enjoyed by VET graduates, seat utilization in training institutes, nature of employment post-training, and the efficacy of various schemes is essential for continuous improvement. A detailed exercise of manpower analysis is a necessary step to understanding the nature and quantum of demand for VET and the mismatch between the skills of VET certificate holders and the requirements of the labour market. This exercise may be undertaken by the proposed National Institute for Vocational Education Planning and Development.

4. Increase resource allocation to vocational education

In per capita terms, vocational education costs more than general education, however public expenditure on vocational education has been extremely low, as compared to general secondary education. Given the demand for skilled manpower in manufacturing and services, the Government should aim to spend at least 10-15 per cent of its total public expenditure on education, on vocational education. Some options that may be considered for raising additional funds to finance a modernized VET scheme are:

i.   Enhancing fees, coupled with student loan schemes. This would also make VET institutions more responsive to market needs.

ii. Raising funds through a cess on employers (for instance two per cent of salaries of all employees, as in Singapore).

iii. Making it obligatory for companies to finance public vocational education and training programmes (as in Korea).

5. Expand capacity through innovative delivery models

In order to meet the burgeoning requirements of skilled and unskilled labour, a massive increase in quantity of training is needed. The Government could explore new delivery models to increase capacity such as public private partnerships, decentralized delivery, distance learning and computerized vocational training. At the same time, the Government must introduce certain minimum standards as a measure of quality, and ensure that all public and private VET institutions adhere to these.

6. Enhance the training options available for the unorganized and informal sector

The greatest challenge lies in providing training for potential entrants in the unorganized/informal sector, which accounts for the largest proportion of employment. Systematic efforts need to be made to impart the skills required by the unorganized sector. These should be formally introduced in the curricula and practical training courses. In order to achieve this, the Government should act as a facilitator and provide financial support.

This aspect of VET is critical for the success of the system as a whole.

7. Strengthen the current institutional structure

The existing Industrial Training Institutes (ITIs) and Industrial Training Centres (ITCs) are widely recognized to face problems such as poor quality trainers, lack of flexibility, and outdated infrastructure. Measures to improve the existing institutions are as follows:

i.   Extent of functional autonomy must be increased, ITIs should be given more power to strengthen and adapt their training programmes to better meet local market needs.

ii.   Indicators of internal and external efficiency should be developed (by the proposed National Institute) to incentivize good performance.

iii. Modules on literacy, numeracy, communication skills, entrepreneurship and other general skills relevant to workplace requirements must be introduced in all courses.

iv.   Different tracks within courses for different levels of specialization should be introduced.

v.   Students should be offered incentives such as tools, membership of trade associations, etc., as part of their degree or diploma.

vi.   Industry and trade involvement should be enhanced not only at the internship stage, but also at the time of examinations and placements.

vii. Curricula should be constantly monitored and updated.

viii. The skills and courses offered should be reviewed periodically. The number of skills currently offered needs to be increased.

ix.   Teaching should be conducted in English as well as local languages.

x.   Infrastructure should be regularly upgraded.

xi.   Quality of teaching should be drastically improved.

8. Ensure a robust regulatory and accreditation framework

In order to achieve the desired modernization and expansion, a critical aspect will be to regulate entry of new institutions and accreditation of all institutions. NKC therefore recommends

that an independent regulatory agency for VET be established. This body would license accreditation agencies and prescribe standards for certification. The procedures and methodologies adopted by the body would need to be simple and transparent to ensure unhindered growth in the sector.

9. Ensure proper certification

At present, the process of certification is handled by the National Council for Vocational Training (NCVT), in association with State Councils for Vocational Training (SCVTs). Clear demarcation between the roles of the NCVT, the SCVTs and the Directorate General of Employment and Training is essential for the proper functioning of the certification process. In order to ensure recognition of certification by employers, both in India and abroad, an electronic database of certified training providers as well as electronic identification for certified workers should be introduced. Electronic identification should contain information regarding skills and qualifications (and eventually other relevant information as well) about certified individuals and can be used to facilitate mobility of workers, encourage bank linkages and entrepreneurial initiatives.

10. Undertake a re-branding exercise

It is widely recognized that a crucial problem with vocational training in India is a negative association with manual labour. In order to match the modern requirement of the skills and competitiveness of the workforce, a massive re-branding exercise is of the highest priority. This could be the prime task of the recently announced National Skills Mission. Initiatives such as replacing the use of terms like 'vocational education' by 'skill development' are a step in the right direction. Training institutes should try to chart out a career path for their students and introduce entrepreneurship training modules.

It is crucial to significantly increase public and private investment in VET. However, a detailed analysis of manpower requirements in terms of numbers, skills and competitiveness is essential before formulating a master plan and deciding the quantum of expenditure in the 11th Plan. A robust framework put in place as a visible and dedicated resource in the MHRD is a pre-requisite to ensuring quality and facilitating significant private investment and participation. Most importantly, the quality as well as the image of VET needs to be actively promoted in order for it to be viewed as comparable to general secondary education, and as relevant.

Higher Education

Higher education has made a significant contribution to economic development, social progress and political democracy in independent India. But there is serious cause for concern at this juncture. The proportion of our population, in the relevant age group, that enters the world of higher education is about 7 per cent. The opportunities for higher education in terms of the number of places in universities are simply not adequate in relation to our needs. Large segments of our population just do not have access to higher education. What is more, the quality of higher education in most of our universities leaves much to be desired.

Foundations are critical. NKC believes that an emphasis on expansion and reform of our school system is necessary to ensure that every child has an equal opportunity to enter the world of higher education. It is engaged in consultations on school education and will submit recommendations in this crucial area in due course. In this recommendation, it focuses on higher education.

NKC has engaged in formal and informal consultations on the issue with a wide range of people in the world of higher education. In addition, it consulted concerned people in parliament, government, civil society and industry. Concerns about the higher education system are widely shared. There is a clear, almost unanimous, view that higher education needs a systematic overhaul, so that India can educate much larger numbers without diluting academic standards. Indeed, this is essential because the transformation of economy and society in the 21st century would depend, in significant part, on the spread and the quality of education among our people, particularly in the sphere of higher education. It is only an inclusive society that can provide the foundations for a knowledge society.

The objectives of reform and change in our higher education system must be expansion, excellence and inclusion. NKC recognizes that meaningful reform of the system, with a long-term perspective, is both complex and difficult. Yet, it is imperative.

I. Expansion

1. Create many more universities

The higher education system needs a massive expansion of opportunities, to around 1500 universities nationwide, that would enable India to attain a gross enrolment ratio of at least 15 per cent by 2015. The focus would have to be on new universities, but some clusters of affiliated colleges could also become universities. Such expansion would require major changes in the structure of regulation.

2. Change the system of regulation for higher education

The present regulatory system in higher education is flawed in some important respects. The barriers to entry are too high. The system of authorizing entry is cumbersome. There is a multiplicity of regulatory agencies where mandates are both confusing and overlapping. The system, as a whole, is over-regulated but under-governed. NKC perceives a clear need to establish an Independent Regulatory Authority for Higher Education (IRAHE). The IRAHE must be at an arm's length from the Government and independent of all stakeholders including the concerned Ministries of the Government.

- The IRAHE would have to be established by an Act of Parliament, and would be responsible for setting the criteria and deciding on entry.
- It would be the only agency that would be authorized to accord degree-granting power to higher education institutions.
- It would be responsible for monitoring standards and settling disputes.
- It would apply exactly the same norms to public and private institutions, just as it would apply the same norms to domestic and international institutions.

- It would be the authority for licensing accreditation agencies.
- The role of the University Grants Commission (UGC) would be re-defined to focus on the disbursement of grants to, and maintenance of, public institutions in higher education. The entry regulatory functions of the All India Council for Technical Education (AICTE), the Medical Council of India (MCI) and the BCI would be performed by the IRAHE, so that their role would be limited to that of professional associations.

3. Increase public spending and diversify sources of financing

The expansion of our system of higher education is not possible without enhanced levels of financing. This must necessarily come from both public and private sources.

- Since government financing will remain the cornerstone, government support for higher education should increase to at least 1.5 per cent of GDP, out of a total of at least 6 per cent of GDP for education overall.
- Even this would not suffice for the massive expansion in higher education that is an imperative. It is essential to explore other possibilities that can complement the increase in public expenditure.
- Most public universities are sitting on a large reservoir of untapped resources in the form of land. It should be possible to draw up norms and parameters for universities to use their available land as a source of finance.
- It is for universities to decide the level of fees but, as a norm, fees should meet at least 20 per cent of the total expenditure in universities. This should be subject to two conditions: first, needy students should be provided with a fee waiver plus scholarships to meet their costs; second, universities should not be penalized by the UGC for the resources raised from higher fees through matching deductions from their grants-in-aid.
- India should nurture the tradition of philanthropic contributions through changes in incentives for universities and for donors. At present, there is an implicit disincentive in both tax laws and trust laws. These laws should

be changed so that universities can invest in financial instruments of their choice and use the income from their endowments to build up a corpus.
- Universities should also seek to tap other sources such as alumni contributions and licensing fees. There is need to create supportive institutional mechanisms that allow universities to engage professional firms for this purpose.
- It is essential to stimulate private investment in education as a means of extending educational opportunities. It may be possible to leverage public resources, especially in the form of land grants, to attract more (not-for-profit) private investment.

4. Establish 50 National Universities

NKC recommends the creation of 50 National Universities that can provide education of the highest standard. As exemplars for the rest of the nation, these universities would train students in a variety of disciplines, including humanities, social sciences, basic sciences, commerce and professional subjects, at both the undergraduate and post-graduate levels. The number 50 is a long-term objective. In the short run, it is important to begin with at least 10 such universities in the next three years. National Universities can be established in two ways, by the Government, or by a private sponsoring body that sets up a society, charitable trust or Section 25 company.

Since public finance is an integral constituent of universities worldwide, most of the new universities shall need significant initial financial support from the Government. Each university may be endowed with a substantial *allocation of public land*, in excess of its spatial requirements. The excess land can be a subsequent source of income generation. Exceptions need to be made in existing income tax laws to encourage large endowments. There should be no restriction on the utilization of income in any given period or in the use of appropriate financial instruments. These universities should have the autonomy to set student fee levels and tap other sources for generating funds.

The National Universities, NKC proposes, will admit students on an all-India basis. They will adopt

the principle of *needs-blind admissions*. This will require an extensive system of scholarships for needy students. Undergraduate degrees in the National Universities, in a three-year programme, should be granted on the basis of completing a requisite number of credits, obtained from different courses. The academic year will therefore be semester-based and students will be internally evaluated at the end of each course. Transfer of credits from one National University to another would also be possible. An appropriate system of appointments and incentives is required to maximize the productivity of faculty in these National Universities. Strong linkages would be forged between teaching and research, universities and industry, and universities and research laboratories. The National Universities shall be department-based and shall not have any affiliated colleges.

II. Excellence

5. Reform existing universities
The endeavour to transform higher education must reform existing institutions. Some essential steps are:
- Universities should be required to revise or restructure curricula at least once in three years.
- Annual examinations, which test memory rather than understanding, should be supplemented with continuous internal assessment which could begin with a weight of 25 per cent in the total to be raised to 50 per cent over a stipulated period.
- NKC proposes a transition to a course credit system where degrees are granted on the basis of completing a requisite number of credits from different courses, which provides students with choices.
- Universities must become the hub of research once again to capture synergies between teaching and research that enrich each other. This requires not only policy measures but also changes in resource allocation, reward systems and mindsets.
- There must be a conscious effort to attract and retain talented faculty members through better working conditions combined with incentives for performance.

- The criteria for resource allocation to universities should seek to strike a much better balance between providing for salaries or pensions and providing for maintenance, development or investment. It should also recognize the importance of a critical minimum to ensure standards and strategic preferences to promote excellence.
- The elements of infrastructure that support the teaching-learning process, such as libraries, laboratories and connectivity, need to be monitored and upgraded on a regular basis.
- There is an acute need for reform in the structures of governance of universities that do not preserve autonomy and do not promote accountability. Much needs to be done, but two important points deserve mention. The appointments of Vice-Chancellors must be freed from direct or indirect interventions on the part of governments, for these should be based on search processes and peer judgment alone. The size and composition of University Courts, Academic Councils and Executive Councils, which slow down decision-making processes and sometimes constitute an impediment to change, need to be reconsidered on a priority basis.
- The need is for smaller universities which are resposive to change and easier to manage, and these should be created.

6. Restructure undergraduate colleges
The system of affiliated colleges for undergraduate education, which may have been appropriate 50 years ago, is no longer adequate or appropriate and needs to be reformed. There is an urgent need to restructure the system of undergraduate colleges affiliated to universities.
- The most obvious solution is to provide autonomy to colleges either as individual colleges or as clusters of colleges, on the basis of criteria that have been stipulated. However, this would provide a solution for a limited proportion, or number, of undergraduate colleges.
- Some of these affiliated colleges could be remodelled as community colleges, which could provide both vocational education and formal education.

- A Central Board of Undergraduate Education should be established, along with State Boards of Undergraduate Education, which would set curricula and conduct examinations for undergraduate colleges that choose to be affiliated with them. These Boards would separate the academic functions from the administrative functions and, at the same time, provide quality benchmarks.
- New undergraduate colleges could be established as community colleges and be affiliated with the Central Board of Undergraduate Education or State Boards of Undergraduate Education, or with some of the new universities that are established.

7. Promote enhanced quality

The higher education system must provide for accountability to society and create accountability within. An expansion of higher education which provides students with choices and creates competition between institutions is going to be vital in enhancing accountability.

- There should be stringent information disclosure norms for all educational institutions such as their financial situation, physical assets, admissions criteria, faculty positions, academic curricula, as also their source and level of accreditation.
- Evaluation of courses and teachers by students as well as peer evaluation of teachers by teachers should be encouraged.
- There must be a focus on upgrading infrastructure, improving the training of teachers and continuous assessment of syllabi and examination systems.
- It is particularly important to enhance the ICT infrastructure. Websites and web-based services would improve transparency and accountability. A portal on higher education and research would increase interaction and accessibility. A knowledge network would connect all universities and colleges for online open resources.
- It may be necessary to rethink the issue of salary differentials within and between universities along with other means of attracting and retaining talented faculty members. Such salary differentials between

and within universities could be effective without being large.
- It is necessary to formulate appropriate policies for the entry of foreign institutions into India and the promotion of Indian institutions abroad, while ensuring a level playing field for foreign and domestic institutions within the country.
- The system of higher education must recognize that there is bound to be diversity and pluralism in any system of higher education, and avoid a uniform 'one-size fits-all' approach. This sense of pluralism must recognize, rather than ignore or shy away from, such diversity and differentiation.

III. Inclusion

8. Ensure access for all deserving students

Education is the fundamental mechanism for social inclusion through the creation of more opportunities. It is therefore essential to ensure that no student is denied the opportunity to participate in higher education due to financial constraints. NKC proposes the following measures.

- Institutions of higher education should be encouraged to adopt a *needs-blind admissions* policy. This would make it unlawful for educational institutions to take into account any financial factor while deciding whether or not to admit a student.
- There must be a well-funded and extensive National Scholarship Scheme targeting economically underprivileged students and students from groups that are historically, socially disadvantaged.

9. Affirmative action

A major aim of the higher education system must be to ensure that access to education for economically and historically socially underprivileged students is enhanced in a substantially more effective manner.

- Reservations are essential, but they are only a part, and one form, of affirmative action.
- Disparities in educational attainments are related to caste and social groups, but are also strongly related to other indicators such as income, gender, region and place of residence. There is need to develop a meaningful and

comprehensive framework that would address the multi-dimensionality of differences that still persist. For example, a deprivation index could be used to provide weighted scores to students and the cumulative score could be used to supplement a student's school examination score.

NKC's recommendations require action at three different levels: reforms within existing systems, changes in policies, and amendments in, or the introduction of, new statutes or legislation. The suggested changes would also be implemented at three different levels:

universities, state governments and the Central Government.

It is important to recognize that there is a quiet crisis in higher education in India which runs deep. The time has come to address this crisis in a systematic and forthright manner. NKC's recommendations constitute an important beginning; the changes suggested would make a real difference. Of course, the process of reform and change is continuous. There is more to be done, and NKC will continue to think about next steps, but it emphasizes the urgency of the situation, because India's future depends on it. It is important to act here and now.

Note on Higher Education

1. Introduction

The spread of education in society is at the foundation of success in countries that are latecomers to development. In the quest for development, primary education is absolutely essential because it creates the base. But higher education is just as important, for it provides the cutting edge. And universities are the life-blood of higher education. Islands of excellence in professional education, such as Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs), are valuable complements but cannot be substitutes for universities which provide educational opportunities for people at large.

There can be no doubt that higher education has made a significant contribution to economic development, social progress and political democracy in independent India. It is a source of dynamism for the economy. It has created social opportunities for people. It has fostered the vibrant democracy in our polity. It has provided a beginning for the creation of a knowledge society. But it would be a mistake to focus on its strengths alone. It has weaknesses that are a cause for serious concern.

There is, in fact, a quiet crisis in higher education in India that runs deep. It is not yet discernible simply because there are pockets of excellence, an enormous reservoir of talented young people and an intense competition in the admissions process. And, in some important spheres, we continue to reap the benefits of what was sown in higher education 50 years ago by the founding fathers of the Republic. The reality is that we have miles to go. The proportion of our population, in the age group 18-24, that enters the world of higher education is around 7 per cent, which is only one-half the average for Asia. The opportunities for higher education, in terms of the number of places in universities, are simply not enough in relation to our needs. What is more, the quality of higher education in most of our universities requires substantial improvement.

It is clear that the system of higher education in India faces serious challenges. It needs a systematic overhaul, so that we can educate much larger numbers without diluting academic standards. This is imperative because the transformation of economy and society in the 21st century would depend, in significant part, on the spread and the quality of education among our people, particularly in the sphere of higher education. It is only an inclusive society that can provide the foundations for a knowledge society.

The challenges that confront higher education in India are clear. It needs a massive expansion of opportunities for higher education, to 1500 universities nationwide, that would enable India to attain a gross enrolment ratio of at least 15 per cent by 2015. It is just as important to raise the average quality of higher education in every sphere. At the same time, it is essential to create institutions that are exemplars of excellence at par with the best in the world. In the pursuit of these objectives, providing people with access to higher education in a socially inclusive manner is imperative. The realization of these objectives, combined with access, would not only develop the skills and capabilities we need for the economy but would also help transform India into a knowledge economy and society.

We recognize that a meaningful reform of the higher education system, with a long-term perspective is both complex and difficult. Yet, it is imperative. And we would suggest the following building blocks in this endeavour. First, it is essential to reform existing public universities and undergraduate colleges. Second, it is necessary to overhaul the entire regulatory structure governing higher education. Third, every possible source of financing investment in higher education needs to be explored. Fourth, it is important to think about pro-active strategies for enhancement of quality in higher education. Fifth, the time has come to create new institutions in the form of National Universities that would become

role models as centres of academic excellence. Sixth, the higher education system must be so designed that it provides access to marginalized and excluded groups.

2. Universities

Universities perform a critical role in an economy and society. They create knowledge. They impart knowledge. And they disseminate knowledge. Universities must be flexible, innovative and creative. They must be able to attract the best talent whether teachers or students. They must have the ability to compete and the motivation to excel. We cannot even contemplate a transformation of our higher education system without reform in our existing universities.

There is, however, a serious cause for concern about universities in India. The number of places for students at universities is simply inadequate. The quality of education at most universities leaves much to be desired. The gap between our universities and those in the outside world has widened. And none of our universities rank among the best, say the top 50, in the world. The symptoms are clearly visible, even if we do not wish to diagnose what ails our universities. Of course, every problem does not exist everywhere. And there are exceptions. But the following problems are common enough to be a cause for concern. First, curricula, which have remained almost unchanged for decades, have not kept pace with the times, let alone with the extending frontiers of knowledge. Second, learning and creativity are at a discount in a system of assessment that places a premium on memory rather than understanding. Third, the milieu is not conducive to anything beyond the class room, for it is caught in a 9.30 to 1.30 syndrome. Fourth, the academic calendar is no longer sacrosanct for classes or for examinations, as there are slippages in schedules so much so that, at several places, classes in the timetable are not held and results are often declared with a time-lag of 6 to 12 months. Fifth, the infrastructure is not only inadequate but also on the verge of collapse. Sixth, the boundaries between disciplines have become dividing walls that constitute barriers to entry for new disciplines or new courses, while knowledge is developing most rapidly at the intersection of disciplines. Seventh,

the importance attached to research has eroded steadily over time. Eighth, the volume of research in terms of frequency of publication and the quality of research reflected in the frequency of citation or the place of publication, on balance, is simply not what it used to be. Ninth, as in most public institutions, there is little accountability, because there are no rewards for performance and no penalties for non-performance. Tenth, structures of governance put in place 50 years ago are not responsive to changing times and circumstances but the system is readily subverted by vested interests.

It is difficult enough to provide a complete diagnosis of what ails our universities. It is even more difficult, if not impossible, to outline a set of prescriptions for our universities. Nevertheless, it is clear that a reform of existing institutions must be an integral part of our endeavour to transform higher education. We recognize that this is easier said than done. Even so, we believe that reforms in the following spheres, along the lines suggested by us, are not only possible but would also make a difference.

Number and size: India has about 350 universities. This number is simply not enough with reference to our needs in higher education, or in comparison with China which has authorized the creation of 1250 new universities in the last three years. Yet, some of our universities are much too large, for ensuring academic standards and providing good governance. We need to create more appropriately scaled and more nimble universities. The moral of the story is not only that we need a much larger number of universities, say 1500 nationwide by 2015, but also that we need smaller universities which are responsive to change and easier to manage.

Curriculum: The syllabi of courses in universities, which remain unchanged for decades, need to be upgraded constantly and revised frequently. The laws of inertia reinforced by resistance to change must be overcome. Universities should be required to revise or restructure curricula at least once in three years. These revisions must be subjected to outside peer review before implementation. The process for such revisions should be streamlined

and decentralized, with more autonomy for teachers, through a change in statutes wherever necessary. For existing systems often act as major impediments to a timely or speedy revision of curricula. There should be some mode of censure for departments or universities that do not upgrade their courses regularly. It needs to be recognized that it is very difficult to introduce new courses or innovative courses in universities because of departmental divides. Appropriate institutional mechanisms should be put in place to resolve this problem.

Assessment: The nature of annual examinations at universities in India often stifles the teaching-learning process because they reward selective and uncritical learning. There is an acute need to reform this examination system so that it tests understanding rather than memory. Analytical abilities and creative thinking should be at a premium. Learning by rote should be at a discount. Such reform would become more feasible with decentralized examination and smaller universities. But assessment cannot and should not be based on examinations alone. There is a clear need for continuous internal assessment which empowers teachers and students alike, just as it breathes life back into the teaching-learning process. Such internal assessment would also foster the analytical and creative abilities of students which are often a casualty in university-administered annual examinations. To begin with, internal assessment could have a weight of 25 per cent in the total but this should be raised to 50 per cent over time.

Course credits: The present system is characterized by too many rigidities and too few choices for students. Universities that are smaller, or run semester-based systems, are obviously more flexible. Even in large universities, however, it is necessary to introduce greater diversity and more flexibility in course structures. This would be the beginning of a transition to a course credit system, where degrees are granted on the basis of completing a requisite number of credits from different courses. Every student should be required to earn a minimum number of credits in his/her chosen discipline but should have the freedom to earn the rest from courses in other disciplines. It is essential to provide

students with choices instead of keeping them captive.

Research: We attempted to create stand-alone research institutions, pampered with resources, in the belief that research should be moved out of universities. In the process, we forgot an essential principle. There are synergies between teaching and research that enrich each other. And it is universities which are the natural home for research. What is more, for universities, research is essential in the pursuit of academic excellence. It is time to reverse what happened in the past and make universities the hub of research once again. This would need changes in resource-allocation, reward-systems and mindsets. Substantial grants should be allocated for research. The provisions of these grants should be competitive and the criteria for these grants should be different from the usual criteria for non-plan and plan grants.

Faculty: There must be a conscious effort to attract and retain talented faculty members. This is necessary because talented students who are potential faculty members have choices that are far more attractive in other professions in India or in the academic profession outside India. It is necessary to provide working conditions in the form of office space and research support combined with housing. But it may not be sufficient. This must be combined with some incentives and rewards for performance. There is, however, another dimension to the problem. Universities do not always choose the best in part because of native-son/daughter policies which leave them to select their own former students. This tends to lower quality and foster parochialization in universities. Therefore, cross-pollination between universities should be encouraged. It may be worth introducing a ceiling, say one-half or even one-third, on the proportion of faculty members than can be hired from within the university. This would almost certainly engender greater competition and more transparency in faculty appointments.

Finances: There is a serious resource crunch in universities which leaves them with little financial flexibility. In general, about 75 per cent of maintenance expenditure is on salaries and pensions. Of the remaining 25 per cent, at least

15 per cent is absorbed by pre-emptive claims such as rents, electricity, telephones and examinations. The balance, less than 10 per cent, is not even enough for maintenance let alone development. Laboratories and libraries languish while buildings crumble. But that is not all. In most universities, plan (investment) expenditure is less than 5 per cent of non-plan (maintenance) expenditure. Such a small proportion of investment in total expenditure can only mortgage the future. It is doing so. The time has come for some strategic thinking on the re-allocation of budgets for universities with some allocation for development grants and on needs other than salaries. The criteria for resource allocation should seek to strike a much better balance between providing for salaries/pensions and providing for maintenance/development/investment. These criteria should recognize the importance of a critical minimum to ensure standards and strategic preferences to promote excellence.

Infrastructure: The elements of infrastructure that support the teaching-learning process, most directly, need to be monitored and upgraded on a regular basis. This means attention, particular attention to libraries and laboratories, in addition to class rooms, sports facilities and auditoriums. It is imperative that universities provide broadband and connectivity to all students and teachers in campuses. In parallel, information technology systems should be used for admissions, administration and examinations along with other relevant web services for campus communities. And, as soon as possible, a digital infrastructure for networking universities should be put in place.

Governance: There is an acute need for reform in the structures of governance of universities. The present system is flawed. On the one hand, it does not preserve autonomy. On the other, it does not promote accountability. The autonomy of universities is eroded by interventions from governments and intrusions from political processes. This must be stopped. At the same time, there is not enough transparency and accountability in universities. This must be fostered. It is exceedingly difficult to provide generalized prescriptions. Some steps, which would constitute an important beginning, are clear. First, the appointments

of Vice-Chancellors should be based on search processes and peer judgment alone. These must be freed from direct or indirect intervention on the part of governments. Once appointed, Vice Chancellors should have a tenure of six years, because the existing tenure of three years in most universities and five years in central universities is not long enough. Second, the size and composition of University Courts, Academic Councils, and Executive Councils slows down decision-making processes and sometimes constitutes an impediment to change. University Courts, with a size of 500 plus, which are more a ritual than substance, could be dispensed with. Large Academic Councils do not meet often. Even when they meet, decisions are slow to come. Thus, Standing Committees of Academic Councils, which are representative, should be created for frequent meetings and expeditious decisions. The Vice-Chancellor should, then, function as a Chief Executive Officer who has the authority and the flexibility to govern with the advice and consent of the Executive Council which would provide checks and balances to create accountability. Third, experience suggests that implicit politicization has made governance of universities exceedingly difficult and much more susceptible to entirely non-academic interventions from outside. This problem needs to be recognized and addressed in a systematic manner not only within universities but also outside, particularly in governments, legislatures and political parties.

3. Undergraduate colleges

Undergraduate education, which accounts for about 85 per cent of the enrolled students, is the largest component of our higher education system. It is imparted through colleges where students enrol for first degrees in Arts, Science or Commerce. There are a total of about 17,700 undergraduate colleges. Of these, a mere 200 colleges are autonomous. The rest, as many as 17,500 colleges, are affiliated to, or constituent in, 131 universities. On average, each university has more than 100 affiliated colleges, but there are some universities each of which has more than 400 affiliated colleges.

This system of affiliated colleges for undergraduate education, which may have been appropriate fifty years ago, is neither adequate nor appropriate

at this juncture, let alone for the future. It is cumbersome to manage. And it is difficult to ensure minimal academic standards across the board. The problem has at least three dimensions. First, it imposes an onerous burden on universities which have to regulate admissions, set curricula and conduct examinations for such a large number of undergraduate colleges. The problem is compounded by uneven standards and geographical dispersion. Second, the undergraduate colleges are constrained by their affiliated status, in terms of autonomy and space, which makes it difficult for them to adapt, to innovate and to evolve. The problem is particularly acute for undergraduate colleges that are good, for both teachers and students are subjected to the 'convoy problem' insofar as they are forced to move at the speed of the slowest. There is also a problem for undergraduate colleges that are not so good, or are poor, because universities cannot address their special needs or unique problems. Third, it is difficult to set curricula and assess performance for such a large number of students where there is such a large dispersion in performance at school before entering college. This reality tends to make courses less demanding and examinations less stringent across the board. In fact the design of courses and examinations needs to be flexible rather than exactly the same for large student communities.

There is an urgent need to restructure the system of undergraduate colleges affiliated to universities. In doing so, it is important to make a distinction between undergraduate colleges that already exist and undergraduate colleges that will be established in the future. It is also important to remember that undergraduate colleges are afflicted by problems which are very similar to those that afflict universities.

The most obvious solution is to provide autonomy to colleges, either as individual colleges or as clusters of colleges.

Individual colleges: Colleges with a proven record of academic excellence and efficient administrative functioning can be granted autonomy in terms of academic self-governance. Existing affiliated or constituent colleges should be granted autonomy in phases after due assessment by professional accreditation bodies. A review of performance of these colleges should be institutionalized and they may be granted university status on the fulfilment of stated criteria of academic and administrative performance. The college authorities should be given financial autonomy with regard to internal allocation of resources. However existing methods of financing should be retained. In operational terms, then, the autonomy would be accorded in setting of curriculum and evaluation of students.

College clusters: Autonomy can be provided to clusters of colleges, selected on the basis of criteria such as similar standards or geographical proximity. These colleges could then form a group, complementing each other, offering different courses between them. In time, these clusters could be upgraded to universities. The course-credit system can be implemented in these autonomous clusters, whereby different colleges offer semester-based courses on a credit system and credits can be transferred across colleges. A mechanism for the administration of courses across colleges and for the resolution of problems should be institutionalized with provision for representation in committees.

Such autonomous colleges, or clusters of colleges, would constitute a part of the 1500 universities we propose nationwide by 2015. It must be recognized, however, that this is, at best, a limited solution. There are two discernible problems.

The first problem with the model of autonomous colleges is the principal-agent problem of providing autonomy as an option. It becomes necessary to distinguish between the motivations and the capabilities of colleges. We need to make a distinction between colleges that wish to become autonomous but do not deserve to, and colleges that have the capabilities to be autonomous but do not wish to opt for autonomy. For colleges that wish to become autonomous but may not be suitable, clear cut criteria should be put in place as a filtering mechanism for colleges wishing to attain autonomous status: critical number of faculty and disciplines, governance, track record in terms of students, faculty and research, administrative competence measured by utilization of grants, regularity of audits, office resources and account

maintenance, contribution to university processes, infrastructural facilities and ratings, if available, by accreditation agencies. For colleges that can be autonomous but do not wish to be, appropriate incentives have to be designed, especially for the teaching staff to encourage a move towards autonomy. Institutional incentives relating to funding and resource generation and professional incentives for staff including positions of professors, research grants and greater mobility should be provided.

The second problem with the model of autonomous colleges is that it would be able to provide a solution for a limited proportion, or number, of undergraduate colleges. There would be a significant number of undergraduate colleges that would remain because they may not have the capabilities to become autonomous or join an autonomous cluster. The obvious solution would be for this latter group to continue as affiliated colleges with their present universities. In that event, problems will persist not only for these undergraduate colleges but also for their affiliating universities. Nevertheless, a proportion of these undergraduate colleges will continue to be affiliated to their present universities on the basis of stipulated criteria. There are two other possibilities that could be explored.

The first possibility is that some of these affiliated colleges could be remodelled as community colleges. These colleges could provide both vocational education through two-year courses and formal education through three-year courses. This would serve the needs of a particular segment of the student population better. They could focus on promoting job-oriented, work-related, skill-based and life-coping education. These community colleges could provide a unique opportunity to provide holistic education and eligibility for employment to the disadvantaged.

The second possibility is that we establish a Central Board of Undergraduate Education along with State Boards of Undergraduate Education which would set curricula and conduct examinations for undergraduate colleges that choose to be affiliated with them. These Boards would separate the academic functions from the administrative

functions and at the same time provide quality benchmarks. Governance would become much simpler. It is possible that some of the existing undergraduate colleges, particularly those that are at some geographical distance from their parent university, may wish to affiliate themselves to these Boards.

New undergraduate colleges are bound to be an integral part of the expansion of opportunities in higher education. Where would these be located? It would be difficult for them to become autonomous colleges without a track record. It may be possible for some to join a cluster of autonomous colleges but this would be more the exception than the rule. It would not be possible for them to affiliate with existing universities which are already overloaded. Hence, there are three possible options for new undergraduate colleges to come. First, they could be established as community colleges. Second, they could be affiliated with the Central Board of Undergraduate Education or State Boards of Undergraduate Education. Third, they could be affiliated with new universities that are established.

There are, of course, issues related to governance, curricula, examinations, course credits and access which arise in the context of undergraduate colleges. These have been discussed in the context of universities in the preceding section of this note.

4. Regulation

There is a clear need to establish an Independent Regulatory Authority for Higher Education (IRAHE). Such a regulatory authority is both necessary and desirable.

It is necessary for two important reasons. First, in India, it requires an Act of Legislature of Parliament to set up a University. The deemed university route is much too difficult for new institutions. Entry through legislation alone, as at present, is a formidable barrier. The consequence is a steady increase in the average size of existing universities with a steady deterioration in their quality. The absence of competition only compounds problems. Second, as we seek to expand the higher education

system, entry norms will be needed for private institutions and public-private partnerships. The institutional framework for this purpose must be put in place here and now.

It is desirable for four important reasons. First, it would minimize conflicts of interest as it would create an arm's-length distance from stakeholders. Second, it would replace the present system which is over-regulated but under-governed, through more appropriate forms of intervention. Third, it would rationalize the existing system where mandates are both confusing and overlapping. Fourth, it would dispense with the multiplicity of regulatory agencies to provide a single-window clearance.

The present regulatory system in higher education is flawed in many respects. The barriers to entry are too high. The system of authorizing entry is cumbersome. And there are extensive rules after entry, as the UGC seeks to regulate almost every aspect of an institution from fees to curriculum. The system is also based on patently irrational principles. The UGC Act section 3.1.2(a) suggests that permission for receiving grants will be accorded only if the Commission is satisfied that the existing institutions in the state are not adequate to serve the needs of the state. The other regulators, say in the sphere of professional education, are often inconsistent in their adherence to principles. There are several instances where an engineering college or a business school is approved, promptly, in a small house of a metropolitan suburb without the requisite teachers, infrastructure or facilities, but established universities experience difficulties in obtaining similar approvals. Such examples can be multiplied. These would only confirm that the complexity, the multiplicity and the rigidity of the existing regulatory structure is not conducive to the expansion of higher education opportunities in India.

In sum, the existing regulatory framework constrains the supply of good institutions, excessively regulates existing institutions in the wrong places, and is not conducive to innovation or creativity in higher education. The challenge is therefore to design a regulatory system that increases the supply of good institutions and fosters accountability in those institutions. An independent regulator has to be the cornerstone of such a system.

The proposed IRAHE will rationalize the principles on which entry is regulated. There are two aspects to this rationalization: what is to be regulated and what are the principles used for regulation.

In higher education, regulators perform five functions: (1) Entry: licence to grant degrees. (2) Accreditation: quality benchmarking. (3) Disbursement of public funds. (4) Access: fees or affirmative action. (5) Licence: to practice profession.

India is perhaps the only country in the world where regulation in four of the five functions is carried out by one entity, that is, the UGC. The purpose of creating an IRAHE is to separate these functions. The proposed IRAHE shall be responsible for setting the criteria and deciding on entry. It would, in addition, license agencies to take care of accreditation. The role of the UGC will be limited to disbursing public funds. Issues of access will be governed by state legislation on reservations and other forms of affirmative action. And, professional associations may, in some institutions, set requirements to determine eligibility for conducting a profession. All other regulatory agencies such as the AICTE will need to be abolished while the MCI and the BCI will be limited to their role as professional associations. These professional associations could conduct nationwide examinations to provide licences for those wishing to enter the profession.

The second aspect of regulation is the principle used to regulate. The IRAHE will determine eligibility for setting up a new institution based on transparent criteria rather than discretionary controls. Its main role would be to exercise due diligence at the point it approves a licence to grant degrees. In doing so, it would assess the academic credibility and the financial viability of the proposed institution on the basis of information submitted in accordance with the stipulated criteria. It will apply exactly the same norms to public and private institutions, just as it will apply the same norms to domestic and international institutions.

The IRAHE would be constituted as follows. It would have a Chairperson and six Members. The tenure of the Chairperson would be six years. The tenure of the Members would also be six years. One-third of the Members of the Authority will retire every two years. The Chairperson would be a distinguished academic from any discipline with experience of governance in higher education. The Members would be distinguished academics drawn from the following sets of disciplines: physical sciences, life sciences, social sciences, humanities and professional subjects such as engineering, medicine, law or management. The IRAHE could have some part-time members or standing committees drawn from academia to advise the Authority in each of the aforesaid sets of disciplines. The Chairperson and the Members of the IRAHE would be appointed by the Prime Minister based on the recommendations of a Search Committee.

The IRAHE would have to be established by an Act of Parliament. It would be the only agency that would be authorized to accord degree granting power to higher education institutions. It would also be responsible for monitoring standards and settling disputes. It should also be thought of as the authority for licensing accreditation agencies. The IRAHE must be at an arm's-length from the government and independent of all stakeholders including the concerned Ministries of the Government. The Acts of the UGC, AICTE, MCI and BCI would have to be amended. The role of the UGC would be re-defined to focus on the disbursement of grants to, and maintenance of, public institutions in higher education. The entry regulatory functions of the AICTE, the MCI and the BCI would be performed by the IRAHE, so that their role would be limited to that of professional associations. These professional associations could conduct nationwide examinations to provide licenses for those wishing to enter the profession.

5. Financing

The expansion of our system of higher education, which is both necessary and desirable, is not possible without financing. For an increase in supply of quality education depends upon an increase in investment which, in turn, requires financial resources. There are several sources of such financing.

Government support: There is no system of higher education in the world that is not based upon significant public outlays. And government financing will remain the cornerstone of any strategy to improve our system of higher education. The present support for higher education, at 0.7 per cent of GDP, is simply not adequate. In fact, over the past decade, in real terms, there has been a significant decline in the resources allocated for higher education, in the aggregate as also per student. In an ideal world, government support for higher education should be at least 1.5 per cent, if not 2 per cent of GDP, from a total of 6 per cent of GDP for education. This is easier said than done. But the government should endeavour to reach these levels by 2012. Even this magnitude of state financing, however, would not suffice for the massive expansion in higher education that is an imperative. Therefore, it is essential to explore a wide range of possibilities which can be complements to the increase in public expenditure.

Better asset management: Most public universities are sitting on a large reservoir of untapped resources in the form of land. In effect, with some imagination, many of our universities can be converted into institutions that are similar to land grant universities. Each university should thus have an innovative asset management plan. Such plans should be in consonance with objectives of universities. At the moment, however, universities have no strategy in this sphere. And there is considerable room to think in strategic terms about the use of physical assets in the possession of universities. It should be possible to draw up norms and parameters for universities to use their land as a source of finance.

Rationalization of fees: On an average, fees constitute less than 10 per cent of total expenditure in our universities. And, in most universities, fees have remained unchanged for decades. In theory, universities have the freedom to decide on fees. In practice, however, universities have not exercised this freedom in part because of some genuine concerns about access but in larger part because of the rhetoric and populism in the political process.

The problem has been compounded by the UGC method of providing grants-in-aid to bridge the difference between income and expenditure. Consequently, there is no incentive for universities or colleges to raise income through higher fees as that sum would be deducted from their UGC (or State government) grants. The low fees in public universities, without any means test, have meant unquantifiable benefits for unintended beneficiaries. But private players and foreign institutions have not been restrained in charging fees that the market can bear. The time has come to rethink, as we have no choice but to rationalize fees. It is for universities to decide the level of fees but, as a norm, fees should meet at least 20 per cent of the total expenditure in universities. In addition, fees need to be adjusted every two years through price indexation. Such small, continuous, adjustments would be absorbed and accepted far more easily than large, discrete changes after a period of time. This rationalization of fees should be subject to two conditions: first, needy students should be provided with a fee waiver plus scholarships to meet their costs; second, universities should not be penalized by the UGC for the resources raised from higher fees through matching deductions from their grants-in-aid.

Philanthropic contributions: It is clear that we have not exploited this potential. In fact, the proportion of such contributions in total expenditure on higher education has declined from more than 12 per cent in the 1950s to less than 3 per cent in the 1990s. It should be possible to nurture this tradition of philanthropy through changes in incentives for universities and for donors. In the present system, there is an explicit disincentive. If universities mobilize resources from elsewhere, they are in effect penalized through a matching deduction in their grant-in-aid. What we need to do is exactly the opposite. Universities which mobilize resources through contributions should be rewarded with matching grants-in-aid. At present, there is also an implicit disincentive in both lax laws and trust laws. Endowments of universities can only be placed in specified securities where rates of return are low and barely keep up with rates of inflation. What is more, trusts must spend 85 per cent of the income stream from the endowment in the same year, so that only

15 per cent of the income stream can be used to build up the corpus in the endowment. These laws should be changed so that universities can invest in financial instruments of their choice and use the income from their endowments to build up a corpus.

Other sources: Obviously, universities must not be driven by commercial considerations. But it would be both prudent and wise to tap other sources such as alumni contributions, licensing fees, or user charges (for facilities in universities used by people from outside). We need to create supportive institutional mechanisms that allow universities to engage professional firms for this purpose. Mobilizing resources, even from former students, is a task that cannot be performed by academics because it needs specialized talents and experience. Current UGC practice also penalizes universities for any resources mobilized with a matching deduction from the grants-in-aid provided to the institution. Rather than penalizing universities for raising resources, the UGC should incentivize them. In addition, universities must have the autonomy and flexibility to mobilize resources from elsewhere by creating or using appropriate institutional mechanisms.

Private investment: In three professions – engineering, medicine and management – there has been a *de facto* privatization of education so that two-thirds to three-fourths of the seats are in private institutions. But private investment in university education, where more than 70 per cent of our students study, is almost negligible. It is essential to stimulate private investment in higher education as a means of extending educational opportunities. We must recognize that, even with the best will in the world, government financing cannot be enough to support the massive expansion in opportunities for higher education on a scale that is now essential.

Public-private partnerships: It might be possible to leverage public funding, especially in the form of land grants, to attract more (not-for-profit) private investment. The present system of allotment of land, where political patronage is implicit, discourages genuine educational entrepreneurs and encourages real estate developers in disguise. In principle, it should be possible to set up new institutions in

higher education, not just more IITs and IIMs but also more universities, as public-private partnerships where the government provides the land and the private sector provides the finances. Such public-private partnerships which promote university- industry interface would also strengthen teaching and research.

International students: India is not an attractive destination for international students, not even as much as it used to be 30 years ago. It is time for us to make a conscious attempt to attract foreign students to India for higher education. This would enrich our academic milieu. This would enhance quality. This would be a significant source of finance. Even 50,000 foreign students charged fees at an average rate of US$ 10,000 per annum would yield US$ 0.5 billion: the equivalent of Rs 2,300 crore per annum in current prices at current exchange rates. The other side of the coin is perhaps even more important. Estimates suggest that there are about 160,000 students from India studying abroad. If their average expenditure on fees and maintenance is US$ 25,000 per student per year, Indian students overseas are spending US$ 4 billion: the equivalent of Rs 18,400 crore per annum in current prices at current exchange rates. This has an enormous potential as a source of finance for higher education in India, if only we could crate more opportunities for students with increased places and enhanced quality in our system.

6. Quality

The introduction of an independent regulator in higher education, the reform of existing public universities and the creation of national universities, taken together, would contribute to enhancement of quality in higher education. But this needs to be supported with some pro-active steps that would foster quality in higher education.

Accountability: The quality of higher education depends on a wide range of factors. But accountability, at every level, is a critical determinant. The higher education system must, therefore, provide for accountability *vis-à-vis* the outside world and create accountability within the system. Accountability of universities must not be confused

with control of the state. Institutional mechanisms, based on checks and balances, constitute the most effective system for this purpose. The essential objective of accountability to society must be to empower students to take decisions rather than simply increase the power of the state. Stipulated performance criteria or inspections are forms of control. We need to create systems that enable students, or their parents, to choose between and assess universities.

Competition: The supply constraint on higher education is an impediment to accountability. When students have relatively few choices, institutions have greater power over them. An expansion of higher education which provides students with choices and creates competition between institutions is going to be vital in enhancing accountability. Such competition between institutions within India is, of course, essential. But the significance of competition from outside India, more qualitative than quantitative, must not be underestimated. For this purpose, we must formulate appropriate policies for the entry of foreign institutions into India and the promotion of Indian institutions abroad. Such policies must ensure that there is an incentive for good institutions and a disincentive for sub-standard institutions to come to India. The present regime does the opposite: sub-standard players rush in while premier universities stay away as they care more about their autonomy and wish to set benchmarks for themselves. However, a level playing field should be ensured and all rules that apply to domestic institutions should also be applicable to foreign institutions. At the same time, policies must encourage rather than discourage Indian institutions to create campuses abroad not as business opportunities but as competition opportunities in their quest for academic excellence. Of course, expansion abroad should not be at the cost of domestic provision, either at present or in the future.

Accreditation: So far, we have sought to create accountability by increasing the powers of government regulators. Yet, it has done little to improve the quality of higher education. Consider, for example, the National Accreditation and Assessment Council (NAAC). This system has

three characteristics which significantly erode its credibility. First, it grants one institution, the NAAC, monopoly power over accreditation. Second, NAAC itself does not have the capacity to rate all the institutions. It has rated just about 10 per cent of the total number so far. Third, the methodology of NAAC is much too discretionary. Instead of vesting one institution created by the state with monopoly power, the IRAHE may be empowered to license a number of accreditation agencies, public and private, to do the ratings. In doing so, the regulator would set standards for them. This will need to be accompanied by stringent information disclosure norms for all educational institutions, including the source and level of their accreditation. The rapid growth in higher education, particularly in the private sector, has created a strong need for empowering students and parents with reliable information from a credible accreditation process. This system can be supplemented with the creation of self-regulatory bodies in the higher education system and the freedom to seek recognition from global accreditation systems.

Internal systems: In most universities, the main stakeholders, students, are minimally part of any mechanism for accountability. Obviously, student evaluations need to be used with care. Even so, they can be part of a baseline set of accountability measures which could at least establish whether classes scheduled in the timetable are held. But that is not all. Evaluation of courses and teachers by students is also needed, just as much as we need peer evaluation of teachers by teachers. Such internal systems of evaluation would strengthen accountability in the teaching-learning process. These must be combined with institutional mechanisms for accountability in other dimensions of university systems.

Information: Almost everywhere, information in the public domain is an important source of accountability. Higher education should be no exception. There should be disclosure norms for universities and institutions imparting higher education. They should be required to place basic information relating to their financial situation, physical assets, accreditation ratings, admissions criteria, faculty positions, academic curricula,

and so on, in the public domain. This would empower students and parents and enable them to make informed choices. Information, along with competition, fostered by increased supply, will close the accountability loop.

Incentives: Even if we cannot introduce penalties for non-performance, it is necessary to introduce rewards for performance. We must, of course, recognize that universities are different from the hierarchical worlds in governments and corporate structures. The web of incentives is far more subtle. Even so, the time has come to think of salary differentials within and between universities as a means of attracting and retaining talented faculty members. The salary differentiation among teachers within the same university needs to reflect the opportunity costs for teachers in some departments. This will help retain talent in some disciplines where remuneration in the market is much higher than in other subjects. Salary differentiation may enable some universities to develop centres of excellence in some disciplines. At the same time, it is important to ensure that disciplines which are essential for a good liberal education such as social sciences and humanities, as well as basic sciences which are not necessarily rewarded by the market, are given appropriate incentives to attract both teachers and students. Such salary differentials between and within universities could be effective without being large. Indeed, there is a good reason to stipulate a maximum ratio for differences in salaries between faculty members so as not to threaten the identity of the professoriate. Obviously, universities cannot compete with salaries elsewhere, but they should endeavour to provide a comfortable minimum for all, with some premium for those who perform. It is also important to think of other incentives, such as housing, good facilities for teaching and research and some flexibility for non-teaching professional activities so long as these do not impinge on the primary responsibilities to the institution.

Differentiation: We have to recognize that there is bound to be diversity and pluralism in any system of higher education. Therefore, in a country as large as India, we cannot afford to adopt the principle that one-size-fits-all. We must allow diversity to blossom. This could have many dimensions: curriculum,

specialization, institutional architecture, students' composition, and so on. Similarly, differentiation is inevitable if not natural. Even if we do not wish to recognize it, such differentiation is a reality. Students and parents have clear preferences, possibly implicit rankings, based on their perceptions derived from available information. Our sense of pluralism must recognize, rather than ignore or shy away from, such diversity and differentiation. It is characteristic of every higher education system in the world. For higher education is about a quest for excellence. It is, at least in part, about distinction and not always about levelling. The institutions which excel are the important peaks that raise the average. They are also role models others seek to emulate. And institutions that become such role models could mentor and guide other selected institutions.

7. National Universities

We need to create substantial additional capacity in higher education for achieving a quantum jump in the gross enrolment ratio for a rapidly expanding population of young people. It would be expeditious to do so by simply expanding on our existing educational infrastructure. A fundamental paradigm shift in our understanding of quality and standards in higher education, however, requires creating completely new institutions that operate unconstrained by the current institutional and regulatory framework. We recommend the creation of up to 50 National Universities that can provide education of the highest standard. As exemplars for the rest of the nation, these universities shall train students in a variety of disciplines, including humanities, social sciences, basic sciences, commerce and professional subjects, at both the undergraduate and post-graduate levels. The number 50 is a long term objective. In the short run, it is important to begin with at least 10 such universities in the next three years. It is worth noting that the National Universities need not all be new universities. Some of the existing universities could also be converted into National Universities, on the basis of rigorous selection criteria, to act as exemplars. We recognize that there could be a human resource constraint if faculty members are not available in adequate numbers to establish these universities. But, for such centres of academic excellence, it should be possible to attract talent from among those who

choose other professions in India or the academic profession outside India.

National Universities can be established in two ways, by the government, or by a private sponsoring body that sets up a Society, Charitable Trust or Section 25 Company. Since public finance is an integral constituent of universities worldwide, most of the new universities shall need significant initial financial support from the government. This could be in several forms. Each university may be endowed with a substantial *allocation of public land*, in excess of its spatial requirements. The excess land can be a subsequent source of income generation, its value rising over time due to the growing stature of the university. In the case of privately executed Charitable Trusts, exceptions need to be made in existing Income Tax laws to encourage large *endowments*. In particular, there should be no restriction on the utilization of income in any given time period, the Trusts should be allowed to invest their funds in financial instruments of their choice, and all proceeds from the sale of capital assets should be exempt from capital gains tax. These universities shall have the autonomy to invest in financial instruments of their choice, by employing private fund managers if required. Appropriate mechanisms also need to be put in place for the optimal *management of physical assets*, like laboratories, libraries, classrooms and other facilities. Finally, these universities shall have the autonomy to set *student fee levels* and tap other sources for generating funds such as industry collaborations, overseas operations, as also commercial use of university facilities and alumni networks.

The National Universities we propose shall admit students on an all-India basis. They shall adopt the principle of *needs-blind admissions*, thereby ensuring that an applicant's ability or inability to pay shall not influence the admission decision made by a university. Further, once admitted, the university should ensure that no student has to forego his/her place due to financial constraints. This will require a host of scholarships, freeships, bursaries and awards for economically disadvantaged students. At the undergraduate level, a nationwide test that objectively measures the verbal, quantitative and

analytical abilities of applicants shall be administered by an independent testing body. Admissions shall be based on a combination of Class XII results, scores from the nationwide test, application materials including written work and personal statements, as also interviews. At the postgraduate level, admissions shall be based on a combination of the applicant's academic record, application materials, interviews and academic or professional references that indicate his/her aptitude for further studies in the relevant discipline.

Undergraduate degrees in the National Universities shall have a duration of three years so that these are in conformity with the duration of undergraduate courses elsewhere in India. In the first year, students shall have the opportunity to study foundation, analytical and tools courses before choosing a specific discipline in the second year. They shall also have the option, at the end of the second year, of completing an integrated five-year master's degree. Degrees should be granted on the basis of completing a requisite number of credits, obtained from different courses. Each student shall be required to earn a minimum number of credits in his/her chosen discipline, and shall have the freedom to earn the rest from courses in other disciplines. The academic year shall therefore be semester-based and students shall be internally evaluated at the end of each course. Transfer of credits from one National University to another shall also be possible. A wide variety of courses shall be offered, in traditional academic disciplines, employment-oriented specific areas and cross-cutting competencies. Syllabi shall be revised every year to keep up with changes and current developments in various disciplines. Departments that do not update their syllabus for two consecutive years shall be asked to provide justification. Students shall have the option of taking up internships in private companies or research institutions in lieu of a certain number of credits.

An appropriate system of appointments and incentives is required to maximize the productivity of faculty in the National Universities. There shall be scope for salary differentials between National Universities and also between disciplines. Faculty training will be contingent on periodical reviews of research output and student evaluation. The most accomplished faculty members shall be encouraged to teach undergraduate courses. There shall be no career advancement schemes and appointments at every level shall be through open competition. The total number of faculty positions may be specified, but there should be complete flexibility in choosing the level at which faculty appointments are made, so that, for talented faculty members, career paths are not constrained by the number of vacancies. In order to maintain the quality of the National Universities, mechanisms should be in place to monitor and evaluate the performance and progress of teachers including peer reviews. The procedures and results of these evaluations will be open and transparent.

The research outputs of these universities shall be vital contributors to India's socio-economic development and progress in science and technology. Strong linkages shall be forged between teaching and research, universities and industry, and universities and research laboratories.

The National Universities shall be department-based and shall not have any affiliated colleges. Each department will administer undergraduate and post-graduate courses. Non-teaching functions should be outsourced wherever possible, and a maximum ratio of 2:1 should be maintained between non-teaching and teaching staff. Each university should appoint an internal ombudsman for the redressal of faculty, staff, student and public grievances. Administrative processes, wherever possible, should be streamlined and made transparent and accountable by the use of information and communications technology.

8. Access

Education is an essential mechanism for inclusion through the creation of social opportunities. It is, therefore, essential that in addition to ensuring that no student is denied the opportunity to participate in higher education due to financial constraints, access to education for economically and historically socially underprivileged students is enhanced in a substantially more effective manner.

Economic barriers to higher education can be addressed by ensuring financial viability for all

students wanting to enter the world of higher education. This can be done through two strategies. One is to adopt a *needs blind admissions* policy. This would make it unlawful for educational institutions to take into account any financial factor while deciding whether or not to admit a student. Every institution will be free to use a variety of instruments to achieve this aim: scholarships or cross-subsidies. In addition, academic institutions would be able to set a fee of their own choice subject to the provision that there are at least two banks that are willing to finance the entire cost of education at that institution, without any collateral other than the fact of admission. The cost of education includes not just fees but also reasonable living expenses including costs such as hostel and mess fees and any other expenses associated with the course of study. Since commercial banks may be wary of funding economically deprived students, especially in non-professional courses, we need a well-funded and extensive National Scholarship Scheme targeting economically underprivileged students and students from historically socially disadvantaged groups, particularly students from rural and backward areas. The success of this proposal depends on generous government support. For instance, the government should endeavour to make available about 100,000 scholarships for such students. These scholarships should be set at a level where students are empowered to go to any institution of their choice.

We also need to undertake more proactive forms of affirmative action to ensure inclusion of marginal and excluded groups. Reservations are essential but they are a part, and one form of, affirmative action. Disparities in educational attainments are related to caste and social groups, but are also strongly related to other indicators such as income, gender, region

and place of residence. Access to quality higher education is further limited for students from certain types of schools. Therefore deprivation of educational opportunities is a multi-dimensional problem and attention needs to be paid to different salient levels of deprivation faced by students. A meaningful and comprehensive framework would account for the multidimensionality of differences that still persist. Such a deprivation index could provide weighted scores to students and the cumulative score could be used to supplement a student's school examination score. After adding the score from the deprivation index, all students could compete for admissions.

The indicators need to be easily identifiable and verifiable for the system to work effectively. They should cover the different types of disadvantages that a student could face at the school level, and while applying for admissions to higher education. This system serves the dual purpose of considering various disadvantages and ensuring that a reserved category student who has otherwise enjoyed other benefits does not get great preference at the time of admissions.

Illustrative indicators of backwardness that need to be measured by such an index could include *social background* covering caste (keeping in view regional variations), religion and gender, *family education history*, *family income*, *type of school* distinguishing between government and private schools and between schools from different locations, the medium of instruction, *place of residence* distinguishing between urban and rural areas and accounting for regional deprivation by sorting districts along an index of infrastructure or access to social benefits and *physical disability*.

Medical Education

The quality, the quantity, distribution and availability of human resources for the health sector in India at present, need to be improved substantially to deliver care-driven, rural oriented and equitable health services. Over the years, health related education and training has become more urban oriented, doctor-centric and technology-driven. The environment of medical education needs to be both nationally sensitive and globally competitive. To realize these objectives, our medical education system needs radical reforms.

The National Knowledge Commission (NKC) therefore considered it imperative to carry out a comprehensive appraisal of the system. For this purpose, Working Group was constituted which included some of the most distinguished members of the medical profession in India, chaired by Dr. Sneha Bhargava, former Director, AIIMS. Based on the inputs provided by the Working Group and further consultations with concerned stakeholders, NKC recommended the following:

1. Regulation and Accreditation

Regulation
At present, medical education in India is regulated by the Medical Council of India (MCI). This system of regulation is neither adequate nor appropriate to meet the needs of the profession. Therefore, in conformity with NKC recommendations on Higher Education, a Standing Committee within the structure of the Independent Regulatory Authority for Higher Education (IRAHE) may be constituted. The primary function of the Standing Committee will be to ensure that medical practice and teaching are updated and revised regularly and minimum quality standards are maintained. The members of the Standing Committee would include faculty from recognized universities, practicing physicians, members of civil society, students and a director from autonomous institutions representing educators. The Chairman and the members of the Standing Committee would be accountable to IRAHE. The Standing Committee would look into manpower planning and development based on disease-profile, doctor-population ratio and skill-mix ratio.

Professional Councils
The Indian Medical Council Act should be amended such that MCI functions only as a professional association, with powers to conduct nationwide examinations, and to provide licenses for those who wish to join the profession. Similar changes are needed for all the other Councils viz. Nursing Council, Pharmacy Council, Dental Council and Rehabilitation Council.

Accreditation
IRAHE should be empowered to license suitable agencies for accreditation. Accreditation agencies could award different degrees of accreditation, such as "Full", "Provisional" or "On Probation" and have the power to de-recognize. Institutions would have to ensure transparency in their admission processes, able and responsible faculties, a multidisciplinary academic learning environment, transparency in assessment of students and close linkages with regional health care and delivery systems, in order to be accredited.

Admission
Policies of admission and fee structure of private colleges have to be regulated, not only to stop them from becoming sources of political and financial power but also to arrest falling standards. There should be only one All India Common Entrance Test for all students who would like to get admission to Self Financing Medical Colleges. Since the CBSE conducted examination for the 15 per cent All India quota in Government Medical Colleges is taken by a very large number of students, this would appear to be the ideal examination whose ambit can be expanded. All self-financing Medical

Colleges should announce their fees in their prospectus so that students can make their choice for admission. Information Technology should be used to increase transparency and efficiency in the admission, examination, administration, teaching, content delivery and other related processes.

2. Quality

Curriculum

All institutions must constitute Curriculum Committees that plan curricula and instructional methods, which are regularly updated. The structure and composition of the curriculum must describe the content, scope and sequencing of the courses, including the balance between core and optional courses. Integration of ICT in the learning process is essential. Incorporating new skills like management, disciplines like health economics and frontier areas like bioinformatics should be considered.

Standards test

An independent and standardized National Exit Examination at the end of 4 ½ years of study, is essential to conduct a national level assessment of skills and knowledge. The National Exit Examination could be conducted immediately after the University examination, and would also serve as a postgraduate entrance exam.

Internship assessment

The internship year must be assessed to ensure skill development. The current practice of students continuing to study in the internship year without going to clinics needs to be addressed. There must be compulsory rotation from the teaching hospital to the community and district hospital during the internship period. Duration of the term in the district hospital should be six months, in the Community Health Centre three months and in the tertiary care hospital the remaining three months. Each intern should be assigned a "mentor" at the district hospital and the credits should be based on the assessment by the mentor. The entrance to postgraduate programmes should be based on a summation of the pre & post internship examinations.

Continuing education

There is a need to revamp Continuing Medical Education (CME) based on distance learning. All professionals should be required to undergo a re-certification process every five years, which can be evaluated by credits earned through CME. ICT can be used extensively to provide CME at the convenience of the learner.

3. Faculty development

Teaching

Attracting and retaining quality faculty should be accorded top priority. Measures such as opportunities to attend international conferences regularly, sabbaticals, dual appointments, rewarding research, fast-track promotions, and dissociating remuneration from government pay scales should be explored. All institutions must clearly lay down exact definitions of what constitutes conflict of interest for faculty members in public medical colleges, who have a private practice in addition to their official duties, and receive a full time teacher's salary. Those who flout these regulations should be penalized.

Research

With a view to encouraging research in medicine, a Mentored Medical Student Research Programme should be set up as a catalyst to introduce medical students to a potential career in patient-oriented/ community-oriented research including interdisciplinary research. Two points of entry into PhD programmes should be considered: one after MBBS and another after MD depending on the student's interest. The government should facilitate setting up of research centres in medical colleges. Validating Indian Systems of Medicine using bio-sciences tools should form an integral component of the research effort.

Training

Five Regional Centres for teacher training/faculty development should be set up so that teachers from the outlying regions can be sent to these centres periodically for up-gradation of their teaching skills.

4. Post graduate education

General physicians
The medical profession needs to be structured like a pyramid with the base made up of general physicians. At present there is little if any space for such doctors in post graduate courses. Therefore, we suggest that adequate representation should be given to general physicians while carrying out expansion of post graduate seats such that 50 per cent seats are reserved for general physicians. New streams for post graduation should be looked at based on needs.

Admissions
Admission to post graduate courses should be done on the basis of credits received in the National Exit Examination and pre and post internship clinically oriented exams after internship. There is a need to reserve post graduate seats (upto 20 per cent of total available seats) for graduates who have worked in rural areas for at least three years.

5. Regional balance

Location priorities
The number of medical colleges in relation to population in some states is much higher than in other states. The Central Government should aid new colleges in these states to address this regional disparity. For instance, north eastern states require urgent attention in this context. The Central Government can develop a list of priority sites for establishing new colleges where the impact of new clinical facilities would benefit the surrounding rural population.

Role models
Further at least one institution should be identified in each State that can serve as a centre of excellence and role model for the other institutions of the state. These institutions should have state-of-the-art infrastructural equipment such as research laboratories, teacher training facilities, and libraries, as well as talented faculty of adequate strength to act as a common resource and also to serve as a benchmark of excellence.

Medical education cannot be standalone. It requires support in the form of trained nurses, pharmacists, paramedic workers. It must all also serve the essential purpose of delivering health care to the people. Therefore, NKC also set out some recommendations on education for supporting services and public health.

6. Education for support services

Nursing
There is a need to create additional capacity for training nursing staff. In addition, every district hospital should have attached to it a nursing school, which offers diploma in nursing specifically to operate primary health centres as nurse practitioners. A career growth pathway should be ensured for nurses after a specific period of primary health care service. For graduate nurses in city hospitals, specialized courses for family nurse practitioners, nurse anesthetists and in areas of tertiary care are recommended.

Pharmacy
Pharmacy education should be popularized and the number of seats for pharmacy education should be increased substantially. Gradual phasing out of untrained pharmacists should be considered.

Paramedics
The role of Paramedic workers should be expanded. A Paramedical Council needs to be immediately established, which would prepare training programmes for multi skill and specialty technicians and oversee their delivery and quality. Paramedics, such as compounders, dressers, and laboratory technicians can also perform public health functions, such as health education, providing immunization, and first aid. Such a health worker could be trained through vocational training at the higher secondary level followed by a one year diploma. Career paths should be built into their service in order to retain them because international demand is high.

7. Public health

Education

A three tiered structure consisting of a one year diploma course, a three year B.Sc course and a three year Master's course may be introduced. These programmes can be attached to departments of Community Medicine in all medical colleges for providing hands on training. All universities, all district hospitals and the Public Health Foundation of India can run them.

ASHA

The role of Accredited Social Health Activists (ASHA) needs to be re-conceptualized within this framework, and ASHA must be viewed as an accessible and effective health worker. The training period of the ASHA needs to be lengthened from its current duration. Steps should be taken to review the system of remuneration and improve the working conditions of the ASHA workers.

Legal Education

The National Knowledge Commission, while deliberating on issues related to knowledge concepts, recognizes legal education as an important constituent of professional education. The vision of legal education is to provide justice-oriented education essential to the realization of values enshrined in the Constitution of India. In keeping with this vision, legal education must aim at preparing legal professionals who will play decisive leadership roles, not only as advocates practising in courts, but also as academics, legislators, judges, policy makers, public officials, civil society activists as well as legal counsel in the private sector, maintaining the highest standards of professional ethics and a spirit of public service. Legal education should also prepare professionals equipped to meet the new challenges and dimensions of internationalization, where the nature and organization of law and legal practice are undergoing a paradigm shift. Further, there is need for original and path breaking legal research to create new legal knowledge and ideas that will help meet these challenges in a manner responsive to the needs of the country and the ideals and goals of our Constitution. As part of a consultative process, NKC constituted a Working Group of experts, including distinguished members of the Bar, the bench and academia under the chairmanship of Justice M. Jagannadha Rao to suggest necessary measures to improve the quality of legal education in India. Based on further consultations with stakeholders, NKC has proposed the following:

1. Regulatory reform: A new standing committee for legal education

A new regulatory mechanism under the Independent Regulatory Authority for Higher Education (IRAHE), vested with powers to deal with all aspects of legal education and whose decisions are binding on the institutions teaching law and on the union and state governments should be established. The Standing Committee for Legal Education may consist of 25 persons (including eminent lawyers, members of the Bar Council of India/BCI, judges, academics, representatives from trade, commerce and industry, economists, social workers, students and others) and it must aim at revamping legal education to meet the needs and challenges of all sections of society.

At the time of enactment of the Advocates Act, 1961, it was envisaged that legal education would only produce lawyers for the courts and accordingly the BCI had been entrusted with the limited role of 'promoting legal education and laying down minimum standards of legal education' required for students who 'are entitled to practice'. In the last 50 years, and particularly after liberalization in 1991, the entire concept of legal education has changed considerably. Today, legal education has to meet not only the requirements of the Bar but also the new needs of trade, commerce and industry, in the context of growing internationalization of the profession. The need for improvement in overall quality to match global standards has become even more salient when viewed from such a perspective. In light of the changed scenario in the last 50 years and the existing gaps and deficiencies in overall quality, it is clear that the BCI has neither the power under the Advocates Act, 1961 nor the expertise to meet the new challenges both domestically and internationally. It is, therefore, necessary to constitute a new regulatory mechanism with a vision both of social and international goals, to deal with all aspects of legal education and to cater to the needs of the present and the future. The BCI would however continue to exercise its powers to recommend minimum standards required for practice in the courts. Further, the BCI would continue to enjoy its powers of discipline so far as the members of the Bar are concerned.

2. Prioritize quality and develop a rating system

There is a need to develop an independent Rating System based on a set of agreed criteria to assess the standard of all institutions teaching law as a

mechanism to ensure consistent academic quality throughout the country. The criteria for rating would be evolved by the Standing Committee for Legal Education while the rating would be done by independent agencies licensed by IRAHE for the purpose. Recognition could be either granted or withdrawn on the basis of such ratings. The rating results should be reviewed annually, regularly updated, monitored and made available in the public domain.

3. Curriculum development

Curriculum should be made contemporary, integrated with other disciplines ensuring regular feedback from stakeholders. Autonomy may be granted to universities, National Law Schools (NLSUs) and other law schools to decide the core and optional courses to be offered. This is a departure from current practice where the BCI largely determines curricula and syllabi. A committee should be formed that includes faculty and practitioners and seeks student feedback to discuss curricula, syllabi and reading material of all core and optional courses, and devise a 'model' syllabus for all core and optional courses. Law schools and universities would be free to use and depart from the 'model' syllabus.

Law teaching must be interwoven with related contemporary issues, including international and comparative law perspectives. The curricula and syllabi must be based in a multidisciplinary body of social science and scientific knowledge. Curriculum development should include expanding the domain of optional courses, providing deeper understanding of professional ethics, modernizing clinic courses, mainstreaming legal aid programmes and developing innovative pedagogic methods. Legal education must also be socially engaged and sensitize students on issues of social justice.

4. Examination system

The prevailing examination systems may be revised and evaluation methods be developed that test critical reasoning by encouraging essential analytical, writing and communication skills. The end-semester examination should be problem-oriented, combining theoretical and problem oriented approaches rather than merely test memory. Project papers, project and subject viva, along with an end-semester examination to be considered as pedagogic methods imperative for improving quality.

5. Measures to attract and retain talented faculty

To attract and retain talented faculty, better incentives, including improving remuneration and service conditions may be introduced. It may be necessary to think of salary differentials within and between universities and law schools along with other means of attracting and retaining talented faculty members. Such salary differentials between and within universities and law schools could be effective without being large. This will help retain talent in legal academia where the problem of inadequate remuneration is far more acute than in other disciplines. Salary differentials could be considered as a means to retain quality talent and also promote a culture of excellence.

To foster quality and create better incentives, there is also need to remove fetters on faculty that pertain to opportunities in legal practice (such as consultancy assignments and legal practice in courts). These reforms need to be introduced in a balanced, reasonable and regulated manner to ensure adequate incentivization for faculty without compromising on the maintenance of consistent academic quality. As a further incentive, it is necessary to create better opportunities for active involvement of academia in the shaping of national legal education policy.

There is also need to reconsider existing promotional schemes and avenues to promote meritorious faculty members. Other incentives for faculty include fully paid sabbaticals; adequate House Rent Allowance (HRA); instituting awards to honor reputed teachers and researchers at national and institutional levels; flexibility to appoint law teachers without having an LL.M degree if the individual has proven academic or professional credentials; faculty exchange programmes with leading universities abroad and upgrading existing infrastructure.

6. Developing a research tradition in law schools and universities

Creating a tradition of research in law schools and universities is imperative if India has to transform itself from being only a consumer of available legal knowledge to being a leading producer in the world of new legal knowledge and ideas. The following measures are required to develop such a serious culture of research: emphasizing analytical writing skills and research methodology as integral aspects of the LL.B programme; creating excellent infrastructure (including research friendly library facilities, availability of computers and internet; digitization of case law; access to latest journals and legal databases available worldwide); rationalizing the teaching load to leave faculty members sufficient time for research; granting sabbatical leave to faculty to undertake research; creating incentives if research results in peer reviewed publications, either through additional increments (beyond the UGC scheme) or in any other appropriate manner; institutionalizing periodic faculty seminars; establishing quality peer-reviewed journals; prescribing research output as one of the criteria for promotion; creating a database of citations to identify the most cited and influential writings as well as considering such data for promotion purposes; establishing prerequisites such as a mandatory dissertation in the LL.M programme, a pre-registration presentation and a course in methodology for M.Phil and PhD programmes respectively; and establishing four new centres for advanced legal research.

7. Centres for Advanced Legal Studies and Research (CALSAR)

There is need to set up four autonomous, well networked Centres for Advanced Legal Studies and Research (CALSAR), one in each region, to carry out cutting edge research on various aspects of law and also serve as a think-tank for advising the government in national and international fora. The CALSARs would maintain adequate linkages and institutionalized interaction opportunities with law schools and universities, including continuing legal education for faculty. Some other specific functions and objectives of these centres would include: publishing a peer reviewed journal of international quality; facilitating multi disciplinary approaches to law; institutionalizing arrangements for scholars in residence; organizing workshops and undertaking in-depth research on new and developing areas of law.

Each CALSAR would require an initial investment of around Rs. 50 crore to build an academic complex, conferencing facilities, a world-class library and other infrastructure. These institutes would also need to be provided with an annual budget to the tune of Rs. 5 crore for salaries, fellowships, administrative expenses and related expenses. The initial investment and the annual budgets should be borne by the central and respective state governments (that would host the CALSAR) respectively, but the CALSARs should gradually aim at financial self-sustenance, through innovative financial methods.

8. Financing of legal education

It is for law schools and universities to decide the level of fees but as a norm, fees should meet at least 20 per cent of the total expenditure in universities. This should be subject to two conditions: first, needy students should be provided with a fee waiver plus scholarships to meet their costs; second, universities should not be penalized by the UGC for the resources raised from higher fees through matching deductions from their grants-in aid. The central and state ministries may also be urged to endow chairs on specialized branches of law. State financing can be complemented with endowments from the private sector, including synergistic arrangements such as appropriate public private partnerships. Incentives such as tax holidays for donations above a high minimum threshold by the corporate sector may be considered. Institutions should be given the autonomy to evolve their own innovative methods of financing to maximize infrastructure and resource utilization.

9. Dimensions of internationalization

Building world class law schools today will require creatively responding to the growing international dimensions of legal education and of the legal profession, where it is becoming increasingly necessary to incorporate

international and comparative perspectives, along with necessary understanding of domestic law. Suggested initiatives to promote such international perspectives include building collaborations and partnerships with noted foreign universities for award of joint/dual degrees; finding ways of evolving transnational curricula to be taught jointly by a global faculty through video conferencing and internet modes; as well as creating international faculty, international courses and international exchange opportunities among students.

10. Technology for dissemination of legal knowledge

For maximum dissemination of legal knowledge, all information available in the Indian Law Institute ("ILI"), Supreme Court Library, Indian Society for International Law ("ISIL") as well as those of all law schools, universities and public institutions in the country, be networked and digitized. Such networking is in addition to the need for adequate infrastructure such as computers, law journals, legal databases and excellent libraries in the institutions teaching law.

Management Education

Management education has seen phenomenal growth in the past six years with the number of institutions providing undergraduate and post-graduate level courses rising to over 1700. Of these, more than 1000 were added after the year 2000. This has been possible largely due to the entrepreneurial initiative of promoters, taking advantage of the ever increasing demand for management graduates, hence management education. Unfortunately, this has also led to an exploitative and commercial environment with quality being compromised. Regulatory focus only on physical infrastructure rather than research, qualified faculty and relevance of courses has created a mismatch between supply and demand.

As a part of its consultative process, NKC constituted a Working Group of experts from academia and industry under the chairmanship of Mr. P.M. Sinha. The names of the members are listed in the annexe to this letter. Based on the Working Group's inputs and consultations with concerned stakeholders, NKC proposed the following set of initiatives:

1. New regulatory framework

NKC advocates good governance rather than the prevalent system of a priori control being exercised by AICTE in this sphere. The current regulatory regime focuses on punitive actions rather than on nurturing institutions. NKC proposes that an autonomous Standing Committee for Management Education be set up under the Independent Regulatory Authority for Higher Education. Its main role would be to exercise due diligence at the point it approves a license to grant degrees/diplomas. In doing so, it would assess the academic credibility and the financial viability of the proposed institution on the basis of information submitted in accordance with the stipulated criteria. It will apply exactly the same norms to public and private institutions, just as it will apply the same norms to domestic and international institutions. It would, in addition, license agencies to take care of accreditation. Other

responsibilities of the Standing Committee will be to collate as well as communicate information on Management Educational Entities (MEEs)[1]; set up an information exchange; conduct demand forecasting of managerial manpower and develop and maintain a low cost e-monitoring system.

2. Grading institutions

The Standing Committee will stipulate grading norms and nominate independent rating agencies to assess and categorize MEEs. Mushrooming private MEEs necessitate a reliable rating system to help the market function better, enabling students and employers to compare different MEEs. Hence, a two stage rating process is recommended. In the first stage, rating covering infrastructure may be mandated before an MEE can admit students. The second stage would consist of rating of quality (admission process, teaching, research and publications) which shall be conducted every three years to ensure accountability. Grading norms for each of these steps should be established in consultation with experts. CRISIL and ICRA were consulted in the process and they have agreed to undertake rating of MEEs. The Standing Committee shall decide on a fair and transparent mechanism to deal with conflicting points of view between a rating agency and an MEE.

3. Accreditation

For MEEs which wish to go beyond rating, the Standing Committee shall determine the criteria and the processes of accreditation in consultation with experts from academia and industry. Mentoring to help MEEs sustain quality standards should be an integral part of the process. Select international accreditations may also be recognized. Branding of accreditation, similar to international standards such as ISO 9001, may be considered to encourage MEEs to pursue excellence.

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[1] In view of the variety of institutions delivering management education, MEE is used to cover all educational institutions; Institutes, Departments, Affiliated and Autonomous colleges, Departments in Deemed Universities, Private Business Schools etc.

4. Improve access: In addition to the framework of affirmative action already in place, we suggest improving access based on work experience and educational loans. NKC believes that management education can be made available to a much wider student community by adopting a two pronged approach. First, we suggest that more weightage be assigned to work experience in admissions. This would help in overcoming disadvantages faced by prospective students due to lack of proficiency in English. Secondly, steps may be taken to ensure easier access to educational loans through banks. Default concerns can be addressed if the respective MEE and the first employer cooperate with the banks. MEEs must also offer scholarships to socially disadvantaged students.

5. Social context

It is essential to widen the scope of management studies and enhance its relevance.

- Sensitize management education to our unique socio-cultural situation by including India specific case studies in the curriculum, reflecting our diversity and incorporating traditional wisdom.

- Integrate management with other knowledge sources and increase research funding for management and supporting disciplines. With globalization, the need for management education to pursue a wider scope and realize a more wholesome impact on society has increased. Management departments in universities should therefore draw upon knowledge sources in other departments.

- Encourage MEEs to design and offer executive programmes for government officials, NGOs and defence personnel. Short term courses for government officials will help them in their role as economic managers.

- Revamp the existing Bachelor's degree in management, the Bachelor's in Business Administration, to cater to the burgeoning need of management graduates. Compulsory apprenticeship in organizations and study of under managed sector areas should be included as part of the programme. The current bookish nature of the curriculum is not sufficient to prepare students for junior management levels.

- Distance learning has considerable potential in this domain. We therefore need to fully realize the potential of Online Management Programmes to bridge the demand-supply gap.

6. Faculty development

Non availability of adequate proficient faculty is a major constraint for sustainable growth of quality management education in India. An autonomous, financially sound and academically credible institute with active support from the leading management institutes, industry and Government should be set up for faculty development. Standards for curriculum covering the entire spectrum need to be set. Active involvement of MEE faculty in training, conferences, industry engagement and curriculum revision should be encouraged. Given the current demand-supply gap, additional faculty would need to be attracted by appropriate incentives.

7. Mentoring

To achieve excellence in the field of management, NKC recommends that all the leading Management Institutions adopt 3-4 MEEs for mentoring and upgradation of quality. Funding and other modalities can be mutually worked out between the institutions.

8. New institutions

There is a need for a new wave of management institutions which will focus on entrepreneurship, leadership and innovation. These institutions will enable to launch India in to the global arena, without the legacy associated with operating in a protected environment. These institutions should set new standards and become role models for MEEs that have the desire to become leaders in the global market place. Incentives need to be provided to Indian entrepreneurs/corporates to setup institutions of excellence on their own or in collaboration with foreign universities. We could also consider allowing reputed foreign universities to enter this field, regulations for them being at par with private institutions.

9. Autonomy

All existing management institutes excluding management departments in universities

should register with the Standing Committee of IRAHE and be accorded independent status. In the case of MEEs set up by Central and State governments, government should be treated as a promoter. Registered institutes will benefit from the Standing Committee's mentoring and better funding opportunities apart from other advantages associated with autonomy.

10. Governance

NKC recommends a board of governors for all MEEs, consisting of 50 per cent independent members as there are independent directors under Company Law. The key focus of the governing board should be to continuously improve quality of education and research. For this purpose, they would have to maximize the resource/fund inflows and allocate/spend them purposively and efficiently. The Board should encourage faculty to publish reputed journals and publications, obtain regular feedback from students on teaching-learning process, obtain recruiter feedback for improving quality, institutionalize faculty evaluation and management system and encourage faculty to write India based case studies. The appointment of Directors of public MEEs should be freed from direct or indirect interventions on part of the governments, for these should be based on search processes and peer judgement alone. Likewise, the appointment of directors of private MEEs should be based on a transparent selection process. This would of course be accompanied by enhanced accountability based on performance indicators and independent external evaluation.

11. Non-traditional management education

The need for better management in education, health, local government, co-operatives, and civil society organizations and so on has often been felt. However, the experience of graduates of Institute of Rural Management and Institute of Forestry Management shows that a lack of advancement opportunities in the Government acts as a barrier to the success of such programmes. There is a need to establish career opportunities in public management, and systematize recruitment and retention policies. Structure of fees for these courses should be formulated in accordance with earning opportunities. We also need to encourage reputed MEEs to develop specialized courses for agri-business, rural banking, public utilities, regulatory agencies and services sector in the coming years as private players entering this space would create demand for the same. The Standing Committee should undertake a study in this field to institutionalize these programmes.

Open and Distance Education

The National Knowledge Commission (NKC) believes that a radical reform of the system of Open and Distance Education (ODE) is imperative to achieve the objectives of expansion, inclusion and excellence in higher education. The significance is obvious. For one, more than one-fifth of the students enrolled in higher education are in the ODE stream. For another, ODE has an enormous potential to spread higher education opportunities beyond the brick and mortar world. But there are reasons for concern. First, the quality of higher education provided in large segments of ODE, particularly in correspondence courses in universities, leaves much to be desired. Second, it is not sufficiently recognized that ODE provides educational opportunities not only to those who discontinue formal education on account of economic or social compulsions, but also to young school leavers who are simply unable to secure admission in the formal stream at universities. It is time to address these problems. There is a clear need to improve the quality of ODE and to make it more appropriate to the needs of society. It is just as important to expand opportunities in higher education through the use of technology in ODE. It would not be possible to attain a gross enrolment ratio of 15 per cent by 2015 without a massive expansion in ODE. In this endeavour, we must not forget that ODE is seen as inferior to conventional classroom learning. This perception, and the reality, both need change. We must realize that ODE is not simply a mode of educational delivery, but an integrated discipline engaged in the creation of knowledge.

In light of the above, NKC constituted a Working Group composed of distinguished experts in this field, chaired by Prof. Ram Takwale, former Vice-Chancellor, IGNOU. Based on inputs provided by the working group and consultations with stakeholders, NKC recommended the following reforms:

1. Create a national ICT infrastructure for networking ODE institutions

A national Information and Communication Technology (ICT) infrastructure must be set up through government support for networking all ODE institutions. In this regard, we recommend that the digital broadband Knowledge Network proposed by NKC should have provision for interconnecting the major ODE institutions and their study centres in the first phase itself. Eventually, minimum connectivity of 2 Mbps must be extended to the study centres of all ODE institutions. A national ICT backbone would enhance access and e-governance in ODE, and enable the dissemination of knowledge across all modes, that is, print, audio-visual and internet based multimedia.

2. Set up a National Education Foundation to develop web-based common open resources

A National Educational Foundation with a one-time infusion of adequate funds must be established to develop a web-based repository of high quality educational resources. Open Educational Resources (OER) must be created online through a collaborative process, pooling in the efforts and expertise of all major institutions of higher education. The OER repository would supply pedagogical software for various programmes run through ODE and be available for utilization by all ODE institutions. An enabling legal framework that would allow unrestricted access without compromising intellectual authorship must be devised for this purpose.

3. Establish a credit bank to effect transition to a course credit system

Transition to a course credit system must be carried out to enable the learner to undertake programmes across all ODE institutions and disciplines. As a part of this process, an

autonomous credit bank must be established for storing and filing credits acquired by every learner. In addition, admission criteria and the system of credits should be as flexible and adaptable as possible. Provisions must be made for multiple entry points and exit points, a flexible time-table and assessment mechanisms for supporting life-long learning.

4. Establish a National Education Testing Service for assessing ODE students

An autonomous National Education Testing Service (NETS) must be established through legislation and invested with functional powers and responsibility for assessing all potential graduates in ODE. This unified examination system would test the learners' ability to perform intellectual and practical tasks. All courses, degrees and activities offered through ODE should be certified through this system.

5. Facilitate convergence with conventional universities

The lack of convergence between programmes run by open universities and correspondence courses offered by the distance education wings of conventional educational institutions is a cause of great concern. Rather than function as parallel systems at odds with each other, open universities must forge organizational alignments with conventional universities geared towards common goals and strategies. They must engage each other in the collaborative creation of pedagogical resources via OER and its delivery along shared modes. Programmes and courses offered by each should be subject to the same stringent norms of quality assurance. This implies that the distance education departments operating within conventional universities must be encouraged to put correspondence courses through the NETS for purposes of assessment. At the same time, universities must also ensure that their distance education programmes are not stand-alone, but should benefit from regular interaction with university departments in concerned disciplines. The aim of such convergence is to eventually enable learners to move freely from one system to the other.

6. Set up a research foundation to support research activity in ODE

An autonomous and well-endowed Research Foundation must be established to commission and facilitate multidimensional and multidisciplinary research in ODE. In addition, a favourable environment for research must be created by setting up infrastructure like libraries, digital databases and online journals, holding regular workshops and seminars, granting sabbatical leave for undertaking research, establishing a peer reviewed journal to provide a platform for publication for scholars, and other such measures. A robust research environment is essential to accord ODE value as a discipline, as opposed to it being consigned to a 'mode'.

7. Overhaul training programmes for educators

Training and orientation programmes must be conceptualized to enable educators and administrators to effectively utilize technology to cater to diverse learners' interests. The content of the training modules must promote familiarity with the theories and practices of self-learning. Their delivery should take place through several modes, including web-supported, audio-visual and face-to-face interaction on a regular basis with experts, practitioners and peers. Most importantly, these packages must be updated regularly and administered directly. The B.Ed. curriculum must also be revised, updated and made to emphasize theories and practices of self-learning.

8. Increase access for learners with special needs

Special Education Committees must be set up in all ODE institutions to address the needs of learners with disabilities as well as senior citizens. These committees must devise mechanisms to ensure their participation and provide effective mechanisms for monitoring, evaluation of policies, and collection of feedback. Admission criteria and time tables must be flexible enough to provide diverse options for meeting programme requirements to differently able learners and senior citizens. Pedagogical tools and components from the open educational resources must be adaptable to alternative formats

for special learning needs. This could include, for example, Braille, colour-contrast texts and voice recordings for the visually disabled.

9. Create a new standing committee for the regulation of ODE

At present, the Distance Education Council (DEC) under IGNOU arbitrates standards and disburses funds for ODE institutions across the country. NKC believes that this arrangement cannot provide adequate and appropriate regulation. A new regulatory mechanism must be established by appointing a Standing Committee on Open and Distance Education under the Independent Regulatory Authority for Higher Education (IRAHE) proposed by NKC. This statutory body would be responsible for developing broad criteria for accreditation as well as laying down standards for quality assurance. It would be accountable to stakeholders at all levels and to IRAHE, and have representation from public, private and social institutions involved in the education and development sectors. These include the central open university, state open universities, private open universities, conventional education institutes, as well as chairpersons of the specialized bodies to be set up to look into infrastructural requirements of ODE.

In addition, two specialized bodies should be established under the aegis of the Standing Committee:

(i) A Technical Advisory Group with representatives from the IT sector, telecom, space and industry should be constituted to provide guidelines, ensure flexibility and track the latest developments in application. The most important function would be to devise common standards for labelling learning content developed by different agencies in order to support indexing, storage, discovery and retrieval of this content by multiple tools across multiple repositories.

(ii) An Advisory Group on Pedagogical Content Management should be set up to provide guidelines on curricular content and development of repositories, exchange of material, access to students and other such issues.

The Standing Committee on Open and Distance Education would also serve as the nodal agency for the National Educational Foundation on open educational resources, the National Education Testing Service (NETS) and the Credit Bank.

10. Develop a system for quality assessment

Reliable external assessment is valued by employers, students and other stakeholders in the given context of a market driven economy. In view of this, a rating system to assess the standard of all institutions imparting ODE must be evolved and made publicly available. The Standing Committee would stipulate grading norms and independent rating agencies would be licensed by IRAHE to carry out this function. In addition, it is recommended that every ODE institution has an internal quality assurance cell to ensure that statutory quality compliances are regularly met.

Establishment of the new organizations proposed above, namely, the National Education Testing Service, the Credit Bank, the National Educational Foundation for developing common open resources, the Technical Advisory Group and the Advisory Group on Pedagogical Content Management would initially require financial support from the government. Additional finances for networking ODE institutions and creating access centres, developing training programmes for educators and administrators and providing scholarships and services for needy students would also be required.

Open Educational Resources

Our success in the knowledge economy hinges to a large extent on upgrading the quality of, and enhancing the access to, education. One of the most effective ways of achieving this would be to stimulate the development and dissemination of quality Open Access (OA) materials and Open Educational Resources (OER) through broadband internet connectivity. This would facilitate easy and widespread access to high quality educational resources and drastically improve the teaching paradigm for all our students. As a part of its consultative process, NKC constituted a Working Group of experts, including distinguished members from the academia, government, private sector and users to suggest necessary measures to improve the quality of Open Access in India. NKC consultations with stakeholders helped identify a few key reform proposals which are elaborated as follows:

1. Support the production of quality content by a select set of Indian institutions

A set of key institutions should be selected and experts representing diverse knowledge areas like agriculture, engineering, medicine, arts, humanities, science, education, etc. should be asked to develop standards-based content, which can be customized to diverse user needs. This should be made available not only to Indian institutions but also for global use. The efforts made through the project of Ministry of Human Resources Development – National Programme on Technology Enhanced Learning (NPTEL) for creation of OER in the areas of Engineering and Technology should be applied in other areas of education also. The content in the repositories should be multimedia, interactive and available in different regional languages. These projects should cover a wide range of subjects mentioned above. To speed up the creation, adaptation, and utilization of OER, it is necessary to launch a 'National *E-content* and *Curriculum* Initiative'.

2. Leverage global open educational resources

Sustainable development of quality content relevant to India is a difficult and expensive proposition, given the diverse needs of various sectors in our emerging knowledge economy. Emerging international and national initiatives are offering quality educational content as open resources. It is vital for India to leverage these initiatives as they are readily available for adoption and adaptation and to serve as a model for further indigenous content production. NKC found that there are already 200-300 free knowledge repositories available across the world. The National Knowledge Commission (NKC) is separately disseminating this information through its website.

3. Encourage open access

Open Access material stimulates research and helps students, teachers and researchers across the world, as discussed in the attached report. Therefore at the policy level, all research articles published by Indian authors receiving substantial government or public funding must be made available under Open Access and should be archived in the standard OA format at least on his/her website. As a next step, a national academic OA portal should be developed. The government should allocate resources to increase the current digitization efforts of books and periodicals which are outside copyright protection. Separate funding should be allocated to develop a new high quality OCR software package so that new and old fonts in many different Indian languages can be converted into ISCI/ASCI code and OA portals and servers could be upgraded regularly. Appropriate financial resources should be earmarked for these endeavours. This will also facilitate machine translation of these valuable resources.

4. Develop network-enabled delivery infrastructure

Along with the national initiative for content development, we must develop a network-enabled

delivery infrastructure with a focus on two primary areas: access and delivery. For access to the network, high bandwidth connections across institutions and a national backbone that provides advanced networking capabilities are major requirements. Additionally, connectivity to global networks is essential. Delivery of the OER content would be done through distributed repositories of educational resources.

5. Create a faculty and institutional development programme

Faculty development and teacher training is the primary area that needs to be addressed in order to realize the benefits of extended access and improved quality through OER. The training programme must develop domain competencies and teaching skills using new educational technologies. The training will also help developers of new OER and in contextualizing existing educational resources. Centres at specific institutions should be identified so that the faculty of these institutions will eventually own, modify, and expand OER repositories. These must be integrated into university curricula and organizational structures.

The availability of learning management systems and other quizzing, authoring and collaborating tools should be increased. The evaluation system should be based on the use of the content and the pedagogy in OER.

To implement and monitor the above recommendations urgently and efficiently, the Government of India may designate a suitable organization or establish a new institution with necessary mandate to achieve the above objectives. This institute may serve the following functions:

- Provide leadership and coordination of network-based open education resources
- Select institutional collaborations for developing content
- Develop adoption support strategies
- Recommend and monitor standards for content development and adoption
- Advise on policy implications vis-à-vis licensing, intellectual property rights, etc.
- Identify and set benchmarks based on global best practices
- Establish relationships with global OA and OER initiatives.

Highlights of other Recommendations of NKC

Libraries
- Set up a National Commission on Libraries
- Prepare a National Census of all Libraries
- Revamp Library and Information Sciences education, training, and research
- Re-assess staffing of libraries
- Set up a Central Library Fund
- Promote Information Communication Technology applications in all libraries
- Facilitate donation and maintenance of private collections
- Encourage Public Private Partnerships in LIS development
- Modernize library management, encourage greater community participation in library management.

Translation
- Project Indian languages and literatures through high-quality translation
- Provide quality training and education for translators
- Establish a store-house of information on all aspects of translation involving Indian languages
- Create and maintain various tools for translation
- Project Indian languages and literatures within South Asia and outside
- Promote book launches, festivals, fellowships and prizes
- Promote printed as well as virtual publication of translation studies
- Translate pedagogic materials at all levels specifically in Natural and Social Sciences
- Set up a national web portal on translation
- Organize Annual National Conferences on translation
- Set up a National Mission on Translation for this purpose
- Provide impetus for developing translation as an industry.

National Science and Social Science Foundation
- Set up a National Science and Social Science Foundation (NS3F) which will look at all knowledge as one seamless entity
- The Foundation to suggest policy initiatives to make India a leader in the creation and use of knowledge, to ensure that science and technology are maximally used for the betterment of the lives of people, and to develop the scientific temper in the country.

E-governance
- Re-engineer government processes first, to change our basic governance pattern for simplicity, transparency, productivity and efficiency
- Select 10 to 20 important services that make a critical difference, simplify them and offer them as web-based services
- Develop common standards for services and transactions with citizens
- Make data collected by government agencies available to all agencies
- Provide a nationwide secure broadband infrastructure
- Open source software should be widely used
- Invest 1-2 per cent of national programme budgets to establish new processes and associated e-governance infrastructure
- Establish an organization, in mission mode, to facilitate e-governance reforms
- Establish specialized information technology officers in state and central ministries
- Begin all new national programmes (like Bharat Nirman, Rural Employment Guarantee Scheme, etc.) with well-engineered e-governance implementation and web interface.

Portals
- Create national web based portals for basic needs on certain key sectors such as Water, Energy, Environment, Education, Food,

Health, Agriculture, Employment, Citizen Rights

◆ A consortium consisting of representatives from a wide range of stakeholders from the sector should own and manage the portal

◆ Provide access to government held data

◆ Encourage collaborative funding.

Portals on Water and Energy have been developed and opened.

The Water Portal has been developed by Arghyam Trust Bangalore, and the Energy Portal by The Energy Research Institute Delhi.

Legislative framework for public- funded research

◆ Enact a legislation that would give universities and research institutions ownership and patent rights over inventions arising out of government funded research thereby creating an enabling environment for commercialization of such inventions through licensing arrangements where inventors would also be allowed to receive a share of the royalty

◆ The proposed enactment should incorporate important safeguards for exceptional circumstances where the government could be given 'march in rights' to protect public good.

Health information network

◆ Initiate development of Indian Health Information Network

◆ Establish national standards for clinical terminology and health informatics

◆ Create a common Electronic Health Record (EHR)

◆ Frame policies to promote use of IT in health care

◆ Create appropriate policy framework to protect health data of citizens

◆ Medical Informatics to be part of medical and paramedical curriculum

◆ Create an institutional framework for implementation.

Intellectual Property Rights

◆ Scale up efforts to build a world class IPR infrastructure, including steps to modernize the patent offices with computerization, e-filing, process re-engineering, human resource development, transparency, documentation, accessibility and building global standards

◆ Intensify IPR training in IP Offices as well as in educational institutions and develop IPR Cells

◆ Establish new structures such as a separate IPR Tribunal, a national institution for cutting edge IPR policy and a Global Technology Acquisition Fund

◆ Protect TK, create incentives for TK and also explore mechanisms for identification of key IPR issues in new technology areas.

Innovation

◆ NKC's Innovation Survey reveals that innovation is emerging as one of the key factors in India's economic growth, where both large firms and SMEs have increased innovation related revenues. The strategic prioritization of innovation has also increased significantly since the start of economic liberalization

◆ Crucial firm level structures and processes play a key role in innovation but skill shortage arising out of lack of emphasis on experimentation/problem solving in the curricula is a critical barrier. There is also need for more effective synergies between industry, government, the educational system, R&D environment and the consumer. A comprehensive campaign is needed across the entire economy from the grassroots to the large firm level to make India a global leader in innovation.

The full text of these recommendations is available at www.knowledgecommission.gov.in

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