

# Knowledge and practice

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INDIA has always been a land of great contrasts, and more so now, in the welfare of its people. While a mere 100 individuals corner about 20% of our nation's GDP,<sup>1</sup> millions are forced to subsist on less than two meals a day. Moreover, this inequality seems to be increasing not only in terms of earning power, but in most other attributes such as access to education, health, livelihoods or water.<sup>2</sup> The reasons for this are hotly debated by many economists,

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1. See, for example, Arundhati Roy in *Financial Times*, 12 January 2012. Also, 'For Richer, For Poorer', *The Economist*, 13 October 2012, which points out that 48 individuals account for 11% of GDP.

policy makers and public figures and a host of theories have been proposed. This paper argues that there are many systemic deficiencies which are unlikely to be corrected by purely macroeconomic arrangements. Addressing these deficiencies will require a more profound intellectual inquiry about the engagement between society, government and its institutions. Our main thesis is that the formation of knowledge and its management is deeply flawed. Only when this is corrected will better outcomes emerge.

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2. J. Das and T. Zajonc, 'India Shining and Bharat Drowning: Comparing Two Indian States to the World-wide Distribution in Mathematics Achievement'. Policy Research Working Paper 4644, The World Bank, June 2008; or WB-ICSSR, Report on the Workshop on Human Development in India: Emerging Issues and Policy Perspectives. (Supported by the World Bank and the ICSSR, 2010.)

The main points of this paper are (i) practice is an essential part of a knowledge system and requires distinctive skills; (ii) training in practice is largely absent in our education and knowledge systems; (iii) this practice deficit has severe consequences, foremost in leading to poor development outcomes, and the imminent threat of knowledge capture; and finally (iv) a possible way out using the development agenda itself as a training tool. It may be noted that the focus on knowledge generation and consumption as a basis for development has also been highlighted by Stiglitz.<sup>3</sup>

Practice, of course, is a well-known paradigm of learning, and one which is closely connected to empirical observations. Be it personal or societal, practice involves executing certain protocols, observing outputs, and then suitably modifying the protocols and iterating this loop till a desirable outcome is obtained. I define societal or developmental practice as comprising of the following interactions between *agents* and *society*: (i) a sequence of protocols executed by agents, with outcomes observable by society; (ii) a system of evaluation of these outcomes by society and a feedback to agents; and finally, (iii) a system of adapting the protocols by agents to achieve better outcomes. A culmination of this iterative refinement is defined as good practice.

Practical knowledge within a society is important for two reasons: (i) it is the basis for employment, and (ii) it leads to value creation and better outcomes within the society. There are obvious similarities between the practice loop and the science loop of observation, theorizing and validation. Both are iterative and incremental,

start with concrete inputs and yet end in a desirable but abstract output. In our opinion, a good practice, the output of a practice loop, is also knowledge.

The simplest good practices are perhaps those of artisans, e.g., the blacksmith or potter, which consist of only a handful of protocols. Then there are the more advanced good practices, e.g., design and operation of a rural water supply system, and massive practices engaging several companies and agencies, such as public transport systems. Indeed, most industrial societies recognize the value of good practices which are now embedded into their companies, factories, government bureaucracies, various departments at universities and consultancies.

A training in good practice must encompass three basic skills. These are (i) *interfacial* skills of observing, modelling and parametrizing societal problems and of deploying solutions, (ii) *design* (i.e., creative and interdisciplinary) skills of analyzing and decomposing problems into domains and then synthesizing solutions, and finally (iii) *technical* or *domain* skills of solving well posed problems in the applied or pure physical or social sciences.

Society, for us, is an aggregate of its people, practices and incentives, together with their resources. The Indian polity may be coarsely classified into two distinct (caricatures of) societies, viz., (i) *Bharat* and (ii) *India*. *Bharat*, consisting of about 80% of India's population, has agriculture and older traditional practices as its practice loops. However, most of its knowledge resources, such as in artisanship, house building, personal health care, and so on, whatever their scientific basis, are now dwindling. The people of *Bharat* are expected to eventually develop into 'India'. The current popu-

lation of 'India' is about 20% of the country's population and is largely urban. Knowledge production in 'India' is also highly compromised with a large and stubborn informal sector, low investments in R&D, and poor outcomes of education. 'India' has nominal control over *Bharat* via a government whose upper echelons belong to 'India'. Most elected representatives of 'India' come from or migrate to 'India'. Two other stylized societies are the *West* represented by much of the western world, and *Global*, an idealized society proposed by the World Bank, with itself as the chief knowledge provider.<sup>4</sup>

The educational system in a society is, of course, central to its reproduction and the success of its development aspirations. First, we explore the system of professional education in India and its recent trajectory. Engineering education in India began in 1847, with the Thomson College (now IIT Rourkee), and subsequently, the College of Engineering, Pune and others of similar vintage.<sup>5</sup> These colleges trained engineers in the technical aspects of the field and for a reasonably clear professional trajectory, either in the public services or in key industries. Good practices were codified and maintained within the institutions and public departments. Much of engineering practice in India is derived and sustained through such standards distilled from the experiences of that time.

Nehru's dream of a modern India led to the setting up of the Indian

4. See for example, the blog by Kaushik Basu, Chief Economist, World Bank, of 26 February 2013: <http://blogs.worldbank.org/developmenttalk/the-business-of-knowledge> or the more recent WB Policy Research Working Paper No. 6623, Towards a Conceptual Framework for the Knowledge Bank.

5. M. Sohoni, 'Engineering Teaching and Research in IITs and its Impact on India', *Current Science* 102, June 2012, pp. 1510-1515.

3. J. Stiglitz, 'Rethinking Development Economics', *World Bank Research Observer* 26(2), 2011, pp. 230-236.

Institutes of Technology (IITs), which were to assimilate international science and technology and to adapt it for India's development. The IITs were based on a knowledge system and a notion of validity based on abstract scientific analysis rather than practice and long experience. This system was borrowed from elite institutions, such as the Massachusetts Institute of Technology (MIT) in the 1950s. At that point, the maturity of the 'West's' companies, the breadth and depth of engineering practice, the centrality of that 'West's' scientists in the subsequent development in physics, etc., was ignored while inscribing this abstract DNA into the IITs.

Right from the beginning the IITs worked in quite the reverse way: instead of bringing in international scientific practices, it took away trained Indian scientist-engineers and introduced them into the international job market. Since the training at the IITs was what was meant for companies of the 'West', these graduates were quickly absorbed there. The huge differential between the productive and remunerative power of 'West' and 'India' created a massive demand for the IITs among prospective students. This was construed as a vindication of abstract engineering and the influence of the IITs on the national discourse on engineering training and research increased. This led to a mis-allocation of engineering graduates which has now percolated to other colleges as well, with global service or engineering ancillaries as the jobs of choice. Thus, the engineering job market has essentially failed and works primarily for allocating wage-arbitrage jobs for the West.

Yet we persist not only with the abstract model but also with the incentive structures which have caused this failure. In fact, a recent World Bank and Ministry of Human Resource

Development (MHRD) project attempts to cement the linkage between engineering education and 'global' demand.<sup>6</sup> This training completely ignores the development needs of India or Bharat and the interfacial and interdisciplinary skills which these require. For example, the ordinary dug well, the drinking water source for over 50% of our people, remains outside our curricula.

The social sciences pose a more interesting, and perhaps a more ominous problem. First, it is not clear if Indian social scientists have considered *good practices* and especially *design*, as integral to a curriculum. At the bachelor level, training in social sciences stresses largely on mastery and reading of a choice of texts with regional, national and international contexts. It does not usually probe the local context, and certainly not with a view to intervene. Thus, the question of developing or transmitting good practices does not arise.

The social work programme, as revised by the UGC, is practice driven.<sup>7</sup> This revision itself came after a 30 year lull during which the curriculum remained frozen within a framework of community service. The training here is closest to developing societal and interfacial skills within the limited scope of social entities such as the individual, group and community.

At the graduate level, the Tata Institute for Social Sciences (TISS), founded in 1936, is an exception to the typical graduate institute, in that it offers a clear applied programme. However, these programmes are usu-

6. TEQIP, National Project Implementation Unit (at [www.npiu.nic.in](http://www.npiu.nic.in)), the unit of MHRD in charge of monitoring and implementation of TEQIP, 2012.

7. UGC, Report of the Curriculum Development Committee on UG and PG Social Work Education, 2006. Available at: [www.ugc.ac.in/oldpdf/modelcurriculum/report.pdf](http://www.ugc.ac.in/oldpdf/modelcurriculum/report.pdf)

ally limited purely to social attributes and their interactions, and thus fail to capture interdisciplinarity and design. Second, many of the practices are based on an 'ideological' understanding of wealth redistribution and thus have limited applicability. An illustration is the design by TISS of the training programme for the prestigious Prime Minister's Rural Development Fellows.

The leadership in social science teaching and research lies within a small set of institutions. Most of these, such as the Jawaharlal Nehru University or Delhi School of Economics, have been pursuing excellence via research. The training and the output of these graduate schools is frequently contextualized by a relationship to the West, and in many cases, financially supported by it.<sup>8</sup> While many migrate to the West, some graduates go on to form the backbone of the development and policy dialogue and populate the amorphous development space of NGOs, academicians and advisors to the government.

While most engineering curricula have at least a nominal representation of courses from the social sciences, this possible window of influence is generally ignored by social scientists. On the other hand, surprisingly, no such interdisciplinarity is required in the social science curricula. Indeed, though millions of rural women spend much time and energy at the dug well, most social scientists do not see it as a social device at all, and worthy of study.

8. Partha Chatterjee, 'Institutional Context of Social Science Research in South Asia', *Economic and Politically Weekly* 37, 31 August 2002, pp. 3604-3612; ICSSR, Restructuring the Indian Council of Social Science Research: Report of The Fourth Review Committee, March 2007, ICSSR, New Delhi; Satish Deshpande, 'Social Science Research Capacity in South Asia: Some Questions for Discussion', *Economic and Politically Weekly* 37, 31 August 2002, pp. 3628-3630.

Finally, there is the ever fashionable domain of policy. Outside India, policy generally refers to the ‘principles or rules to guide decisions and achieve rational outcomes’ (from *wikipedia*), i.e., a faculty useful in many situations, starting at the college cafeteria or the bus station. However, policy discussion in India engages primarily at the national level and occasionally at the state level. Decision making at the district, taluka or levels below that is rarely studied or taught. Simple problems at the taluka level, e.g., fixing a policy for taluka level public transport, are thus left unattended, leading to poor outcomes, and thus results in their politicization.<sup>9</sup>

Consequently, rarely do we come across a curriculum that actually teaches protocols which start from society and end with it. Or promote an understanding that societies function because of virtuous cycles which generate value and need to be carefully nurtured. Nowhere is there a mention that an educational institute should function as a regional knowledge resource and problem solver.

The developmental consequences for Bharat are, expectedly, devastating. Many of the millennium development goals, such as provision of water and health care are related to good practices. Our performance in most such indicators is dismal and we will not go into depressing details but just focus on one example, that of rural drinking water.

Drinking water in Bharat largely depends on the dug well. Even so, its

science and engineering are poorly understood. Design of suitable region and use-specific yield tests and their practice remain to be established. Simple design of piped water supply systems is error prone and unreliable. Most schemes face repeated failure due to a variety of reasons – they are either too expensive to operate, or the community too fragmented, or the source too weak, and so on, all of which should have been determined before the fact. The state machinery is too weak or ill-trained to deliver. The design and analysis protocols have not changed in decades. There is no attempt at simulation and optimization. There is no failure analysis and very few standards evolved for reporting. There is no serious protocol of knowledge and practice transmission within the department itself and many senior engineers are demoralized. There is of course, no collaboration with research institutions.

The people suffer immensely. Many parts of Maharashtra cannot bathe or wash clothes for months together. Women are forced to walk several kilometres to fetch drinking water or fight with their neighbours when tankers arrive, but never on schedule. Many migrate to towns or to hard temporary jobs such as brick making, leaving behind their children and the old. All this creates a charged backdrop ripe for politicization of the simple function of drinking water provisioning.

This absence of practice has also led to a variety of phenomena, foremost among them is the large space for NGOs who are generally outside the formal knowledge structures.<sup>10</sup> They seek to introduce these missing knowledge workers to development problems. However, the scale of the problem

10. Mihir Shah, ‘Rainfed Authority and Watershed Reforms’, *Economic and Politically Weekly* 43, 2008, pp. 105-109.

has led NGOs to highlight the need for capacity building. It includes among other things, an attempt to create bare-foot professionals who should actually have been trained in our colleges, or to develop accounting or map reading skills, which should have been taught in our schools, and so on. The poverty of trained professionals alongside poor protocol design has created a monitoring gap which is then expected to be compensated by community based organizations. The language of capacity building, community participation and so on has now entered government lexicon and has led to an NGO-fication of many development functions. Massive asset creation programmes, e.g., the National Rural Employment Guarantee Scheme (NREGS) and the Integrated Watershed Management Project (IWMP) now depend crucially on NGOs.

Coming to ‘India’, our cities are in shambles. There are few who can plan a sewage system or persuade citizens of its utility, or who will design and optimize public transport. Large cities may have the money to employ foreign consultants, but smaller cities have no access to routine consultancy. An overall absence of practice has also changed how we govern ourselves. Our knowledge and policy space is now dominated by multilateral agencies and consultancies whose interests may conflict with broader social interests.

The wider implication is of course, a discourse on education which has lost its bearings. A small set of elite institutions and their definition of excellence has led to their own stultification and exploitation by the West’s institutions, by the students and a *rentier* faculty body. This excellence of science has created notions of ‘taking science to the rural areas’, i.e., science as an output of the urbanized and developed world to be distributed evenly (much

9. K.S. Challam, ‘Social Science Research: The Social Context’, *EPW* 37, 28 September 2002, p. 4080; P. Balakrishnan, ‘Social Science Research in India: Concerns and Proposals’, *Economic and Politically Weekly* 43, 2 February 2008, pp. 28-33; IHS (2012), Video of Professor Smriti Srinivas, advisor to the Indian Institute for Human Settlements. (Accessed on 6 October 2012): <http://www.youtube.com/watch?v=XB5kgIhpkeA>

like the polio vaccine). It has created a small upwardly mobile elite set, which subsists on the value that it has for the West, rather than for 'India' or Bharat. This actually causes the broader society-to-society accountability loop of an educational system to unfold into a hierarchy of societies, and a personal (as opposed to social) outcome where 'excellent' members of a lower society prove themselves meritorius, i.e., fit to migrate to the next stage. Accountability within is substituted by an upward compatibility called merit.

It has also modified the very definition of education as a process which helps in movement to a better society rather than on *in situ* improvement. Education is seen as the only train out of Jhunjhunu (and not a better life within it), thus making every student a temporary resident in her own town. This creates a restlessness in the educated with their own location and a highly distracting aspirational mobility. The main casualty is the focus on empirically verified knowledge, the very basis of science. It is obviously difficult to teach a student to observe and record the village well if s/he regards himself as a temporary resident.

More important, this sequence of graded societies terminates at the ultimate knowledge role models for India, and these are the elite knowledge institutions of the West, i.e., the MITs, the Harvards and the World Bank and elite consultancies. This crystallization of the knowledge hierarchy is recent and has created an Indian version of the knowledge society. In this version we have a collective recognition that (i) knowledge can be branded, (ii) only branded knowledge is true, i.e., has the ability to discern, and (iii) 'true' knowledge can bring desirable outcomes and change. It is the collective outcome of

these three elements that closes the practice loop for us, completely subsuming India within the Global. Thus, this process ends with the truly knowledgeable international elite institutions advising our government on most issues ranging from adolescent girls and drinking water to massive urban systems.

This long knowledge cycle has several important consequences. First, it makes the practice loop enormously expensive. We see that simple advice, such as 'please ensure that your design has a separate drinking water source for each community', must come from an expensive and branded consultant for it to be put into practice. Further, we see that monitoring of outcomes must also be done by the knowledge elite, for only they can discern truth. This leads to a complete shutting out of local institutions, local intellectual leadership and entrepreneurship. Such a globalization of the practice loop leads to a complete breakdown in local empiricism, i.e., the local capacity to gather data and organize it to local benefit. This relegation of empiricism to a higher knowledge elite and the subsequent loss of scientific temper, we term as knowledge capture. Economically speaking, such relegation is of course, irrational, and leads to very inefficient outcomes such as rent seeking by the knowledge elite, poor suitability of solutions and so on.

Indeed, the rent seeking system has resulted in the virtual disappearance of the Indian public intellectual. More and more of the popular development discourse is now dominated by researchers from universities of the West and other professional intellectuals, i.e., intellectuals without stakes. Many NRI and foreign professors are now regular contributors to our big newspapers, or hold advisory and executive positions within the govern-

ment. Many of them have personally benefited from and will benefit from multilateral agencies which have a direct financial and strategic interest in influencing policy in India. The brand equity of the professional intellectuals is also crowding out the local intellectuals, especially those with stakes, and is also exacerbating an existing divergence between the vernacular or the experiential and the English speaking or the analytic intellectual.

There is now a belief in a universal science, or worse, universal engineering, both commodities of great value, and held by the few. In India, this belief is near hegemonic. Indian corporate houses make donations to the international knowledge elite for work in India, e.g., the Tata-MIT Centre for Frugal Engineering. The children of our ministers, bureaucrats, professors, the rich, the professional – all study in these elite institutions. Those who return form networks and alliances which make this belief self-fulfilling.

The behaviour of the global elite institutions is not very heartening, for they see knowledge concentration as a strategic advantage and not as an iceberg in the path of science, which will destroy its internal machinery, and ultimately sink it. The World Bank (and the consultancies) studiously avoids facilitating collaborations between regional premier institutions and regional governance. Rather, it supports a globalization of engineering through projects such as the National Project Implementation Unit. Sadly, the Harvards and the MITs (which are not banks) also seem to propagate this knowledge concentration.

Development is a very complex process mediated by many forces such as the political economy, governance and so on, besides just knowledge structures, and it would be foolish to assume that fixing any one of them will be

adequate to bring about change. All the same, knowledge has proved an important ingredient in transforming both governance and the political economy.

Clearly, the focus should be on a redesign of our processes of accumulation and transmission of knowledge and practice to enable its generation and consumption at the lowest, broadest and most inclusive levels. There are many possibilities for this, each with its pros and cons. We choose what is most convenient for us, situated as we are in an 'institute of excellence' and perhaps what is most direct, viz., the provision of development services such as *sadak, bijli, paani*.

There are two distinct strands to follow. The first is to hold elite knowledge institutions to a higher accountability of outcomes. This will demand a research programme where such institutions, funding agencies such as the DST, and various national flagship programmes are placed under intense scrutiny. It may also mean putting research funding in the hands of state and district agencies and tying them to concrete outcomes. In other words, it is a call for greater transparency, accountability and people's participation in the working of the elite knowledge agencies.

The second strand is to create and propagate good practices at the district and taluka level. This will mean a broad partnership between elite institutions, regional partners and stakeholders so that a new pedagogy of knowledge emerges. A good device is the development of mundane but important case studies, e.g., taluka-level drinking water security plans, which deliver value and are replicable by regional knowledge institutions. This aims to transform elite knowledge into a trusteeship for civil society, away from mere employee production. The working of CTARA, at IIT Bombay, is based on this very premise.