

**Report
of a
Discussion Meeting on School Education**

The scientific community, as with the rest of the civil society, is concerned about the state of the education system in the country. The three national academies of science viz., Indian National Science Academy (Delhi), National Academy of Sciences of India (Allahabad) and Indian Academy of Sciences, Bangaluru representing collective voice of this community have taken several initiatives to enhance the quality of science education. The initiatives include those addressing problems of post graduate education and more recently also undergraduate science education. This was due to the realization that many students embarking on research were not adequately equipped for it by their Bachelor or Masters degrees. We also noticed that many students entering colleges— especially from economically and socially backward communities do not get schooling that prepares them for advanced learning. It is possible—that a lot of good talent is lost due the inadequacies of our school system. School education is a vast area and with formidable problems leads to diffidence for academies to enter. Nevertheless, it was felt that the academies need to take an interest in school education too, especially in the context of the move towards a revision of education policy. Further, at this level, viewing learning through a separation of sciences and humanities is not meaningful; mathematics and science education in schools should also not be seen only in terms of skills and examination performance. The Science Academies

are thus concerned with learning at the school level as a whole, not just the learning of science subjects.

As a first step, the academies organized a 'Discussion Meeting' on school education to discuss the current state of our school education system (covering several aspects) and obtain ideas for improvement. The participation in the meeting was by invitation, mostly school teachers from all over the country with some educators having experience of schools and teacher. Half a dozen were to be Fellows of the science academies. Teacher participants were to submit papers on the conference themes.

The 'Discussion Meeting' was held in Bangaluru at the Raman Research Institute during 18-20 August 2017. There were 40 school teachers and 20 other participants. The Indian Academy of Sciences provided stay and boarding for the participants and hosted several meetings of the Organizing Committee.

The discussions were held over 5 sessions, each covering a specific aspect of school education. There was a panel for each session which ensured that the focus was on the specific topic assigned to the session. In a departure from convention, the teachers spoke the first and then the panellists spoke, reacting to the issues raised from the floor. The participants were then given an opportunity to intervene again. The enthusiastic participation of the teachers made the sessions lively and the general impression was that the teachers found the meeting enjoyable. Many teachers shared that they had

learned a lot from the meeting and were happy to have been a part of the discussion.

The report presented here gives a gist of the discussions and the (necessarily) broad recommendations (from the

discussions) aimed at revamping our system of school education. The report is in five sections. Each section contains observations and recommendations of the panel for that session.

ROLE OF THE STATE IN EDUCATION

OBSERVATIONS	RECOMMENDATIONS
1.1.The freedom movement articulated a vision of compulsory and entirely free school education for all children in independent India. Mahatma Gandhi offered a vision of education that integrates work and education. True universalization of education has not been realised despite the enactment of the Right to Education Act. An overwhelming majority of the marginalised and oppressed sections of society do not have access to social advancement through education, as all indicators demonstrate.	1.1Every child of school age should be in school, and there should be no compromise in providing equitable education for all, from pre-school to completion of higher secondary school education. The policy of 'No Detention' should be continued at least until Class 8 as at present. Inclusion of the marginalised sections of society has to be prioritised in all policies. Social protection for the vulnerable requires not only free access but in goods and services as well, and in the case of Disabled children, special means of access.
1.2. State expenditure on education has to be perceived in terms of ensuring the democratic right of every child to become a participant in nation building with dignity. India's expenditure on education remains miniscule as a percentage of the GDP, and the argument that the country is too poor to provide quality education for all is specious.	1.2. A strong publicly funded education system is necessary for providing equitable education of good quality. Therefore, realising the right to education requires manifold increase in state expenditure on education.
3. After education moved to the concurrent list, there has been increasing centralisation. As a result, States have tended to withdraw from their responsibilities, and in some cases education has become a confrontation of State vs Centre. The autonomy of states as well as participation of civil society is essential for diversity and robustness of the system.	3. Healthy and equal partnership between the Centre and the states, as well as the State and the Civil Society, is essential for education and hence an atmosphere of critical thinking and free speech needs nurturing. We need to develop strategies that build collective ownership and participation.
4. The trend towards privatisation in education must be resisted by strengthening the public funded education system. Even in a scenario where enrolment in government schools is going down, there are some who are doing well and reversing the tide, attracting children from private schools back to them. Authenticating and sharing data on the status of schools, teachers and children is essential.	4. The strengthening of government schools is a top priority. Examples should be made of government schools that function well by way of recognition and support. The Kendriya Vidyalaya system has proven to be good, and may be replicated all over the country (at the state level).
5. The state cannot withdraw from its responsibility of providing education to its children, leaving it to parents and market forces. A large percentage of private schools are unregulated and offer abysmal quality	5. Regulation of all schools is a government responsibility; on the other hand, autonomy in management and administration needs to be provided to schools that are based on sound educational principles. The country

of education, whereas regulation ends up as interference in the autonomy of small alternative schools that offer a high quality of education.	needs a diversity of schools and multiplicity of educational experiments.
6. There are insufficient numbers of qualified teachers in the country, especially in the north-east. The teaching profession is not attractive enough, primarily in terms of the working conditions of the teacher, and a decline in respect for the profession.	6. Providing adequate number of qualified teachers is the responsibility of the state. The section of the RTE Act that allows teachers to be used for non- school government duties (such as census) should be deleted. A 'Teachers Service' may be considered, with emoluments, service conditions, in- service training and prestige like those of the civil services. A legal framework is needed that protects, encourages, supports and motivates teachers, and strengthens their relationship with society.

CURRICULUM AND PEDAGOGY

OBSERVATIONS	RECOMMENDATIONS
1. The National and State Curricular Frameworks (NCF/SCFs) are critical and well-drafted. However, the change visualised in them for an enjoyable schooling for children has not translated into reality. Pedagogy is not considered in its full complexity, including aspects such as nature of the learner, nature of content, goals of education, and so on.	1. NCF and SCFs should provide the broad framework, so that curricula can be contextualised, and schools and teachers enabled to use their initiative and abilities to co-create appropriate curricula for their learners. We need thinking teachers and classrooms to generate thinking citizens.
2. A more expansive conceptualisation of what curriculum subsumes is required. Its hidden but deeply significant aspects gravely impact the classroom environment and quality of learning of each individual in it.	2. The curriculum needs to focus on relating knowledge to the children's lived experiences, and on relating the world of work and education. Classrooms must provide the space for children and teachers to exercise their agency.
3. The diversity that characterises the composition of a school, in terms of the socio cultural background of the students, poses a tremendous challenge for the teachers. The failure of the curriculum to factor this in, as well as issues such as the reservation of seats from the EWS, not being able to give children with disabilities (CWD) the support they require, and multilingualism, are among real issues to be dealt with.	3. Enhancing sensitivity to important social issues and re-examining and re- constructing of attitudes and even developing attitudes in teachers conducive to the goals of education must be components of Teacher Education Curricula. (This needs to be seen in conjunction with Point 7)
4. Teachers, administrators and certifying bodies have a traditional notion of assessment and evaluation, interposed with the changed ways recommended by the NCF/SCFs. For example, CCE in practice has become a huge bugbear, in contradiction to what it is actually meant to be.	4. Evaluation should be internal to the curriculum, determined by curricular objectives and pedagogy. Evaluation norms and procedures should be worked out by curricular agencies like SCERT and NCERT and not by certifying boards like CBSE/ ICSE. The CCE should be strengthened. This will create a greater space for teacher to track and support the learning of each child.

	For inclusion and diversity in evaluation, the objectives of evaluation should be tailored to the needs and abilities of students. This is particularly relevant in the case of children with disabilities.
5. The current syllabus for 'classical subjects', whether in humanities or sciences, is overloaded.	5. Curriculum load on current subjects needs to be reduced. More time must be given for the arts, sports and community/productive work
6. Science, Social Studies and languages are not taught in an integrated manner keeping in mind the children's experiences. Textbooks do not reflect this, and most teachers and children follow the textbooks closely.	6. Textbooks must be written to allow for the integration of various subjects till class X.
7. There are deep inadequacies in teacher education curricula. Curriculum frameworks for teacher education are usually framed much after the corresponding NCF/SCFs. Further, the need for a large number of trained teachers after the advent of the RTE Act has been met by greater privatisation of the teacher education sector. This has led to a problem of quality of the people joining the teaching and teacher education professions. Regulatory bodies are not able to ensure quality of curricular transaction.	7. Teacher Education Curriculum should factor in the personal, social and professional development of potential teachers, and find expression in in- service programmes as well. NCF and NCFTE should come out simultaneously, and should complement each other. The Open and Distance Learning (ODL) mode has been used for developing a large number of in-service teachers, and has the potential to do much more for updating/developing teacher educators too. However, the quality of mentors and the mentioning assessment, feedback and support process in this model must be addressed. The Administrative chain needs to be continuously updated/trained to allow, and nurture, teachers and teacher educators to use their initiative (agency).

TEACHER AND SOCIETY

OBSERVATIONS	RECOMMENDATIONS
<p>1. Teachers have a low self and social image. They feel oppressed and confused about their role and their status. The community, administration and even children rarely consider teachers as role models, worthy of respect. Teachers are considered to be 'shirkers' and referred to in a variety of derogatory terms, as distortions of the word "teacher or master".</p> <p>Even well-intentioned people and processes threaten the notion, profession and role of the teacher.</p> <p>Systemic failure is attributed to teachers. The collapse of the school and the role of the teacher in it has become a vicious cycle.</p>	<p>1. The highest priority in plans for building a new India should be education. The teacher is a yard stick by which we measure the achievement and aspiration of the nation. The status of a teacher reflects the society; "no people can rise above the level of its teacher community".</p> <p>The role of a teacher expected by the community and society must be aligned with the role provided by governance and administration. It must be in accordance with the commitments made in the preamble to the Constitution of India, and acts and policies based on it. The role has to be placed in the context of education for a democratic society that requires questioning, dialogue and empathy-imbued freedom.</p>

<p>2. There are contradictory expectations, ideas and statements about their role. On the one hand, they are to be the builders of society's ethics, educating children to join a democratic country as per the Indian constitution. On the other hand, they have all kinds of work assigned to them. They are kept out of school for too long with no scope and time to fulfil the wider educative agenda, or even the needs of their students. They are expected to just facilitate student performance in terms of marks in exams, often using short-cuts. The role of a teacher as envisaged in the RTE is narrow and mechanical, and does not reflect a clear way to build the respect and self-respect of teachers.</p>	<p>2. Teachers must be free to fully engage in the work of teaching. They should not be given administrative tasks in the school or asked to work on government programmes not related to the work of teaching. Teachers have to be in the classrooms and engaged with the children in teaching and learning. All other tasks, even census or election work, should be taken away. Section 27 of the RTE must be amended to forbid their being engaged for purposes other than teaching children. Teaching is not only facilitation, it is not only collaboration and cooperation with children, but it is the entire ambit of engagements that would help learning. Teachers need to be seen as promoters, regulators and planners of their schools in a collective process.</p>
<p>3. The general impression is that anyone can teach, the best do not come to teaching and those who come cannot be made to do better. Teachers are the butt of everyone's comments and advice, many of whom have never taught in a school, and yet dictate and direct what they should do. The extreme stratification adds to this feeling.</p>	<p>3. These perceptions must be altered by impartial, rigorous selection processes, well-designed and properly conducted preparation mechanisms, and an increased awareness of the complexity of the role of the teacher. Selection Processes must acquire the status of civil services examinations. Alternative mechanisms of teacher pre-service training and certification can be considered while on job, even as young university graduates with enthusiasm and capability are selected in rigorous processes. Autonomous professional bodies of teachers should be set up to define standards, eventually providing certification of both teachers and schools. These bodies should cut across categories of teachers and build a systematic platform of interaction between teachers at primary, secondary and tertiary levels. These could also include interested academicians and retired teachers.</p>
<p>4. There is a lack of appropriate governance and administration to give teachers a sense of security of being in a profession, and no attention is given to their personal and motivational needs, for example through opportunities for learning. The placements in strata of the government and private school teaching community appear arbitrary. Stratification destroys the seriousness and gravity of their role. It rankles much more as it occurs even within a School of the public system. Teachers are even governed by different rules and administrative bodies. In the private schools teachers are hired arbitrarily with no service rules and conditions, and fired if they cannot ensure success. The challenge is that this is becoming the 'go to' direction even in the public system.</p>	<p>4. The mechanism for governance and administration must strive to preserve and enhance their motivation, professional pride, aspiration to improve and learn more. They should be given enough freedom (structured autonomy) to take innovative steps. They must have the opportunity and time to fulfil requirements of all dimensions of their work, including their own learning. This must not be implemented as forced action research diktats, or cluster meetings merely to Transact exchange of data and get fresh instructions. Mechanisms must be set up for peer support and peer monitoring, to scaffold, orient, counsel and motivate each other, perhaps in small groups. Teachers must receive appropriate wages and be assured good working conditions.</p>

<p>5. A false hierarchy exists between primary, secondary and senior secondary sectors of the education system, amplified by the system of training requirements and promotions.</p>	<p>5. Promotions should stay within each teaching sector, i.e., primary, secondary and senior secondary, rather than between sectors. Teachers must have options and paths for personal and career growth. Lateral entry into higher education courses linked to their areas, as well as inclusion as candidates in other roles including senior school or colleges, must be made available. Wages for the primary school teacher must be in accordance with her significant and difficult role, fixed in accordance with wages of the university professors and administrative officers.</p>
<p>6. Schools do not provide teachers the atmosphere such that they can eliminate ignorance and prejudices in their students. They are not able to create the space for addressing the fault lines in our society.</p>	<p>6. Teachers must inculcate in their wards a sense of fairness, compassion and zero tolerance of corruption, divisive prejudices and other fault lines that affect our society and a sense of humour as well. Teacher must take care of child completely and motivate them in overcoming “I cannot do” attitude. For this the teacher needs to have a working ambience that has the same feeling. She must have flexibility and space to create and adapt to the situation, as well as the opportunity to grow professionally and prepare herself for the next day.</p>

HUMANITIES AND SCIENCE IN SOCIETY

OBSERVATIONS	RECOMMENDATIONS
<p>1. Social science, humanities and science subjects are taught without a deeper understanding of the purpose of these areas in society.</p>	<p>1. Teaching of various disciplines needs to be understood through a philosophical and sociological perspective. For example, a good social science perspective will enable us to understand and analyse structures that support and privilege, inequality and exclusion. This would give us a better perspective to begin to address these issues more seriously both inside and outside the classroom and the school.</p>
<p>2. The universalization of education has brought in children who are amongst the most marginalized both socially and economically. This is an important change which has potential of a transformative change in the country. It has yet had a huge impact on the system that has not been seriously addressed. Teachers are entering classrooms unprepared for the needs of their students. We need to nurture the growth of sensitive, compassionate and knowledgeable teachers who can work for the advancement of these children.</p>	<p>2. Pre-service and in-service teachers need strong components of sensitisation to the history, contexts and needs of children in their classes, as well as a longer term vision for their future than merely a board exam pass Certificate. “Sociological literacy” can help them develop this sensitivity.</p>

<p>3. More generally, social science education needs to address, at different stages of schooling, issues of identity that children grapple with in their lives. In Indian reality, these relate to religion, community, caste, class, gender, language, and so on, and affect how children perceive their place in society. Students from relatively privileged sections of society need to be sensitised to the ground realities of deprivation and marginalisation that exist in the country, and their teachers are the ones to do this.</p> <p>One problem is that the humanities and social science subjects are too heavily content-based. The content is also often contested and controversial, as these disciplines, unlike the sciences, are less likely to invite wide consensus. Therefore, these disciplines are not respected as ways of building critical and clear thinking. This mindset is reflected in poor state of Funding for higher education in the social sciences.</p>	<p>3. Humanities education should shift toward the process of creating knowledge in the humanities— training in the intellectual tools and frameworks that characterise thinking in these disciplines—along with a reduced quantum of facts and information. The sensitive and often contested nature of particular descriptions and narratives must be handled with care and compassion. It is the duty of academia to critique society, and critical discourse and dialogue needs to be an integral part of all learning.</p> <p>More funding should be available to support higher studies in social sciences and humanities.</p>
<p>4. Despite decades of work on the philosophy and sociology of science, school level science is taught as if value-neutral, and STEM teaching is focused solely on the advancement of industry and employability.</p>	<p>4. Teaching of the sciences should include history, context and the values inherent in these areas. The purpose of science teaching should be to emphasise key concepts and facts and their inter connections, and to develop a sense of the process by which these were reached. Rote- and technique-based instructions geared to success in board and competitive exams, do not serve these purposes.</p> <p>To allow for the exploration described above, the overall syllabus load across all subjects must be reduced, following the dictum that 'less is more'.</p>
<p>5. Many areas of study and work nowadays require a cross-disciplinary approach, but there is rigid compartmentalisation of disciplines in school, as well as rigid streaming in the plus-two.</p>	<p>5. Some training for teachers in how to take on interdisciplinary project-based learning, with ideas from other countries and alternative schools in India. The plus-two can be re-designed to ensure that all students continue to have some balance in exposure to humanities and science. Schools can build in opportunities for their own teachers to speak across disciplines and share understanding.</p>
<p>6. History and Geography as currently taught in our schools concentrate on the Indo-Gangetic Plain along with material pertaining to the state or region in which the school is located. The North East in particular is neglected</p>	<p>6. The teaching of history and geography can be a vehicle to promote national integration and elimination of prejudices. Therefore, school boards should ensure that adequate attention is given to all regions/states.</p>

TECHNOLOGY IN EDUCATION

OBSERVATIONS	RECOMMENDATIONS
1. Technology in education refers to all uses of technology and not ICT alone. We need to transform education so that students grow up to be not mere consumers of technology but also participate in its creation.	1. Technology in education must not be reduced to the use of ICT. Technology in all forms (including those involving physical materials in nature) is needed to develop a healthy attitude to technology.
2. The actual potential of technology lies in its use to develop students' thinking and to introduce them to processes which cannot be done in the absence of technology. If properly used, technology can significantly impact Teaching and learning of most school subjects.	2. Curriculum, pedagogy and textbooks should be redesigned to exploit the power of technology for open-ended exploration, experimenting, visualization and inquiry-based Learning. We can consciously include Technology enabled tasks in classrooms.
3. Teachers generally have no training in the use of technology creatively in the classroom, nor can they assess technology critically from a pedagogic perspective.	3. In-service teacher preparation and nurture programs must be designed to help them use technology wisely when needed.
4.No technology can ever replace the teacher, and videos accessed remotely cannot substitute teachers.	4. Such efforts should not be promoted and/or supported.
5. Use of high technology for teaching and learning can lead to commercialization, and there is danger that vendors would decide what technology is used in schools.	5. Educators need to be empowered to become technology assessors.
6. Digital technology can be addictive and great care has to be exercised in its use on an everyday basis in classrooms.	6. The emotional health of children needs to be prioritised in all policy planning for the use of digital media and Internet in schools.
7. High technology can potentially widen and deepen social and economic disparities. In our society characterized by inequality, digital technology can add another dimension of educational inequality.	7. Recognizing the challenges of access and equity, we emphasize the use of open source software, resources in Indian languages and on translation. Open educational resources are critical to overcome in equality. Systems need to be set up to ensure access to technology somewhat equitably for all children.
8. Large scale use of e-resources in schools will inevitably lead to large amounts e-waste.	8.The ecological implications of digital technology in classrooms needs careful consideration.
9. ICT curriculum and syllabus is in need of clear goals and definitions.	9. Three broad goals are recommended: ICT literacy, integration of ICT into the teaching learning of various subjects and creation of software resources.

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