

Consultation on 'National Policy on ICTs in School Education'

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Short Discussion Paper

ICT in the context of education system

IT For Change

Bangalore

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Short Discussion Paper on National Policy on ICTs in School Education (NPISE)

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Background

Significant changes over the past decade in information and communication technologies (ICTs) have impacted many aspects of our lives – including booking train tickets or banking, using search engines for information, communicating with friends and colleagues, and participating in virtual professional and social networks. What we are witness to is deep structural changes, at least as far reaching as of the Industrial Revolution, but perhaps in much reduced time.

In such times where major institutions of society are in flux, it is important to ensure that these changes, as far as possible, take the route determined by a society's priorities through its political processes. The education system has close relations to society's knowledge processes; and the latter are the ones impacted first by these new ICTs. It is therefore important to understand where our public education system stands in relation to these changing times – in terms of both opportunities and challenges.

Though computers have been introduced in schools, the education system is still to feel the influence of pervasive change intrinsic to ICTs. Hence, a proposed increase in the spending on ICTs in school education from around less than a 1,000 crores in the 10th Five-Year Plan to more than 6,000 crores in the 11th Plan (working group draft report), by the Ministry of Human Resource Development (MHRD) reflects an urgency to harness ICTs for systemic change in the education sector. To guide such huge spending, MHRD has also initiated a process to draft a national policy on ICT in school education (NPISE). This note attempts to discuss different 'themes' for such a policy and engages in some 'loud thinking' on desirable policy directions.

Why ICTs in education?

The engagement with ICTs in various areas of social policy, including education policy, needs to be guided by the potential of these technologies to significantly impact progressive social change. However, the relationship between technologies and social phenomena is structural in nature and constitutes a complex terrain. This is even more so with new ICTs, which apart from being *general purpose technologies* with uses in almost all human activities, also seem to present possibilities for endless innovation, much of it at the hands of its users. Thus the social (including the 'pedagogical') determination of ICTs is much more iterative, yet potentially, diffused and democratic, than it has been for most other technologies. In this context, an approach based mostly on innovation and provisioning of technologies, which can be called a *supply-side* approach, does no more than provide the starting point for using ICTs for development, while the real issues lie in the *social realm*, of the possibility for transformatory change in the social processes employing and building over these new technologies and

hence need engagement from the actors in the social or developmental domain.

New ICTs have far reaching impacts evidenced in the changing nature of business and trade; cultural practices and social relationships; public institutions and state-citizen interactions, creating the contours of an '*information society*'. The exact nature of such a society, as also how far these movements are in the direction of a just and equitable society may be debatable. However, since education is primarily concerned with the shaping and reshaping of society, actors in this domain cannot afford to ignore the tremendous flux defining social phenomena in present times.

Although the monolithic market model is the prevalent one, the imperative is to move beyond this simplistic version of ICTs for education, and allow the principles of our current education policy to guide structural change potentialities of ICTs. Actors in the education arena have a logical reason to engage with the social changes that ICTs are bringing about and reflect on needs of learners to understand these changes for engaging in *active citizenship*. Hence education activists must engage with ICTs and related phenomena to assess the positive and negative implications with respect to educational goals, and build a progressive policy. Furthermore, ICT policy making must necessarily proceed from an understanding of education aims and accepted education principles and policies; this suggests a responsibility on the part of education activists, to make such connections. These principles include universalisation of education, local and contextual curriculum, teacher professional development including autonomy and agency, constructivist pedagogies etc. New possibilities that arise with ICTs will require moving beyond existing techno-education paradigms and approaching them without prejudice, and in a progressive manner, anticipating the emerging society where digital processes are increasingly important to most social activity.

Also *school education* will need to be interpreted broadly to cover the entire system of school education, including institutions relating to teacher education and administrative support and be restricted to the classroom alone. Clearly, there is a need to understand the emerging scenario for implications for education including aspects relating to equity and social justice and to propose a progressive policy that would to inform programs initiated by the Government and other institutions. In a policy vacuum, the default thinking veers toward narrow and short-sighted specifics like buying specific hardware, software and 'content' for schools on a large scale, and there is the risk that these instrumental considerations get legitimised by the policy landscape.

Teacher Education and ICTs

In each theme it would be good to begin by looking at the critical challenges faced in achieving the vision.

The issues with Teacher Education begin with looking at the learning theories that appear to be used in teacher training programs - often the programs appear to suggest a 'deficit model' of skill building by 'resource persons' imparting knowledge to teachers. This results in the methodologies of mass dissemination of standard 'modules' in a 'cascade mode' across geographies. Whereas 'constructivist' pedagogies' that give a greater role to the learner in the learning process are even more critical to adult learning.

Other key issues in Teacher Education relate to the SSA norms for teacher training that often make residential programs impossible and require large learner groups of 50+ to enable the program to be funded etc, making a mockery of the learning processes. Teachers are sometimes 'deputed' to training programs, without considering their needs - either assessed or articulated, often reflecting a numbers game.

Similarly the issues of pre-service and in-service teacher training (which should certainly be the concern of 'capacity building' for ICT in education) cannot be discussed without relating it to the state of our current teacher education institutions - the DIETs. The vision with which this academic support institution was setup, its current existentialist crises and their structural causes need to determine the possibilities for appropriating ICTs for teacher education. These set of issues need to be addressed in any 'capacity building' planned for appropriating ICTs in education.

The National Curriculum Framework for Teacher Education stresses on the need to look at the larger and holistic process of teacher professional development, emphasising the agency and autonomy of the teacher in this process. Given the perspectives of the NCFTE, possibilities such as collaborative networks amongst teachers that can support peer learning as well as build relationships and professional networks can be visualised. Also similar possibilities to leverage the potential of ICTs exist in decentralised curriculum preparation - which in itself can be a teacher professional development process, and distance-mode 'on demand' academic support for teachers. Curriculum development can itself become much more dynamic, with new experiences and learning of each community being woven in regularly into the curriculum.

Wiki kind of models for collaborative creation of learning material including text books and work books are already happening (wikibooks, mathwiki); wikis also provide a base for discussion on issues

that can help create learning resources. Blogs have become popular for allowing expression and sharing of ideas and can be useful for teachers to publish their experiences and insights. These tools are still in their evolution stage, but their potential for creating new virtual public spaces where participation is even easier (since asynchronicity of space and time is possible), is recognised. (Habermas for e.g. suggests the Internet is a significant alteration to the public sphere). Mailing lists may sound mundane, but such e-lists have become virtual dialogue spaces. Arguably, the most critical component in Teacher professional development is for teachers to have the space for reflection and growth and the new virtual spaces can be powerful possibilities in this regard.

Thus ICTs can support shifts to desirable learning processes, for both students and teachers. However, this is contingent on the active application of ICTs across the system by different actors in a participative manner, allowing learners to co-construct their learning experiences, and collaborate with others to create learning networks.

Some policy imperatives

Connecting teacher education institutions and supporting peer and horizontal networking can be a big opportunity to break out of 'knowledge and authority can only come from the top' syndrome that our institutions and schools suffer from. Peer learning, local knowledge repositories, community networks are all possible, and what's more important, are actually happening in many parts of the world. Policy should encourage and push this process, by earmarking resources on both the hardware, software tools required as well as equally or more importantly, on the processes that will enable teachers to acquire comfort and even mastery over the medium.

Elementary Education and ICTs

In a sense, many of the problematic issues relevant to teacher education are also relevant to the analysis of elementary and secondary education – e.g. the emphasis on rote learning of 'education content' and the issue of standard texts across diverse communities, which straitjackets learning processes.

The recent efforts to make enrollment universal through large expansion of the elementary school system has also led in many places to shortages of teachers and very high pupil-teacher ratios. The 'norm' of 40:1 itself being an average is a problem, since it masks variations across geographies. Also given the small size of many schools, we find single and two teacher schools, forcing multi-grade teaching as an administrative solution and not for any pedagogical reasons. The large expansion is still in progress, with deficits on many infrastructural fronts as well, such as on adequate number of classrooms, drinking water, functional toilets, compound wall (safety and security), libraries etc. Many states have adopted a policy of 'no-detention' by which children move from one class to the next without a summative assessment. One advantage of this is perhaps reduced dropout, but this also implies that

whether children are ready for the next class is not established

The NCF 2005 discusses these issues and discusses education aims as well as curricular possibilities that can help us work towards these aims.

Given this, an ICT in education policy should not treat children as passive consumers of centrally produced education content, or users of proprietary applications (that cannot be opened and modified), and teachers as instruments to promote ICT literacy in the classroom, without giving them the required autonomy to make contextual learning choices. The policy needs to encourage teachers and students to use ICTs as tools to locally create learning material.

Constructivism

This principle implies that it is essential for each individual (or institution) to engage with a tool or a process to gain an understanding. This understanding cannot simply be thrust on the individual. The NCF position paper on Education Technology quotes projects that sought to 'provide' information to schools through centralised statewide programs, including through radio programs or satellite programs beamed from the state level and found these had little use. It is quite obvious that expecting schools across an entire state to clue into a specific language lesson for a class at a specific time will not be convenient to the schools. Only when schools have the option of deciding if and when to use these materials, and in the manner that they see value in, will the process have any potential for learning. This certainly requires the facilitation of the teacher education/support system but the decisions should be made by the schools and not thrust on them by fiat. A centralised 'one size fits all' suggestion would thus be of limited use and, in straining the thin resources of these institutions, actually prove a burden on them.

If appropriately applied, ICTs can address some critical educational priorities. At the highest level, they can provide capabilities for full membership in the emerging information society, strengthening citizenship. They can enable activity-based and collaborative learning processes (suggested by NCF 2005), that is anchored in the local context that the child deals with regularly in her social life, and help move from traditional 'rote-based learning' that afflicts much of our current system.

Some policy imperatives

- Leaving sufficient flexibility for the schools to decide their ICTs systems, processes and content, with policy providing overall guiding principles.
- Providing the entire repertoire of ICT tools and engage with schools and support institutions over a period of time on different possibilities and let the institutions take the decisions on which tools and in

what manner they would like to use these tools for their processes. It may be wrong to presume that there would be no interest. In fact, given the attraction of these technologies, there may actually be a need for such engagement to clearly look at the realistic possibilities and then make choices.

- Avoiding the purchase of ready-made 'content' and instead using ICTs as tools to create content, and sharing this content in the public domain and making it freely available for others to use and add to.
- A push for investments in local language resources, including local language interfaces for ICT tools.

Secondary Education and ICTs

Secondary education is a relatively neglected arena. The issues of 'retention', 'failure' of large number of students in clearing public examinations and the limited vocational possibilities offered during secondary education need to be addressed. In addition, there is a need to equip students to face the challenges in the new digital environment that is increasingly dominating all aspects of our lives.

The increased investments in elementary education have ensured, to some extent, greater reach of the system whereby most children today have access to elementary education. However, the number of high schools is much, much lesser than what would be required if all the children moved from elementary to secondary education. In many cases, this reality leads to dropout at this stage or compels children to study in private schools, which may be out of reach for the poor.

One crucial goal of a common schooling system is to minimise stratification and to be able to provide a social experience in schools within some ranges. As digital processes in society become more prominent, one big divide will certainly be between those who are able to use new ICTs and the others who are not in a position to. Abilities to access digital information resources, participate in networks (circles of inclusion as well as exclusion) results in greater social stratification. This needs to be considered by the public education system. A simple example of stratification of the 'public sphere' made possible by the new ICTs is the stratified access systems to TV, the most common media in India. Internet, driven purely by commercial considerations, is going to make this stratification many times worse. The implications of this for the values driving 'common schooling' is obvious.

While many of the points discussed in elementary education will also be relevant here, however, higher levels of complexity of education content, dealing with higher levels of abstraction of knowledge, need for more diverse learning resources and vocational opportunities will suggest a different set of possibilities in the use of ICTs in secondary education.

ICTs can support shifts to desirable learning processes, for students and teachers. However, this depends on the active application of ICTs across the system by different actors in a participative manner, allowing teachers to collaborate and create learning networks, children to use hardware and software tools to access local content as well as custom-build applications and create content during

their own learning processes. Such decentralisation definitely requires significant investment in the processes concerning use of ICT tools including in capabilities of teachers and students to decide how they want to use these tools, and how can they do so.

The notion of simple ICT literacy as students learning standard office applications is a trivialisation of the possibilities of learning ICTs. What is required instead is to make the software and hardware tools available to students, which they can use for their own creation and enhancement. It may be a very different scenario, from the current thinking, to expect that students should be able to prepare simple applications and change features of the existing ones, working in a collaborative manner, but this is the real potential of learning ICTs. Simply supplying hardware and software applications and treating the students and teachers as users, goes against the grain of the participatory potential of the new ICTs. The NCF Position paper also warns that our programs have largely remained supply-driven, equipment-centered, and disseminative in design and, as an obvious result, largely ineffectual.

For instance, using proprietary software which does not enable the learner to investigate into the tool itself is a big 'pedagogical' problem. It is the very process of engaging with software tools to co-construct them, and enable new and contextual uses, that can be the epitome of learning through the use of ICTs. It is this context of democratic and participatory technology regimes like open source and open content that need to constitute the critical themes of any educational policy. Other than this pedagogical issue, there is another one of how software choices of the public education system is perhaps the single biggest factor in helping set up *de facto* technology standards. Allowing a proprietary software to take advantage of the public education system to consolidate itself as such a standard implies huge profits to its owner, and loss to society both by monopoly lock-in costs and innovation losses, as well as poor development of local software building skills, and lesser possibilities of contextual adaptation of software. At the secondary education stage, it should be possible to visualise students working on and with software and hardware tools, to co-construct information artifacts and tools. Merely placing computers along with other prescriptive ICT artifacts in schools, ignoring the specific context and needs, can only add to the current heavy load on the system and derail it further.

It is also important to recognise that in well-directed, relatively large-scale collaborative efforts, the costs of ICTs can actually decrease by greater participation rather than increase. This is known as the 'network effect' and is widely accepted as a key feature of the new ICTs, because of their inherently participative potential. We already are aware of this phenomenon in the area of open source software and in the Wikipedia type of knowledge building systems. Such collaboration gains can also be obtained in connectivity infrastructure and costs through community-based mesh networks, where each user node itself represents an infrastructural installation which both 'uses' the wireless 'signal' and relays it further.

On the other hand, there is also a need to emphasise critical pedagogy (reflecting critically on the

content of learning in terms of the underlying premises and values, since there is really no such thing as value neutral content). This means multiple sources of information on a given topic need to be studied without taking any one of them as truth. An ability to reflect and question becomes even more critical when access to digital information sources becomes easy, resulting in a potential deluge of information.

Some policy imperatives

- Providing a variety of ICT tools to teachers and students in high schools, and enabling local and contextual choices.
- Using ICTs to move towards the objectives of participatory and constructivist education rooted in the local context. The extensive reach to learning material made possible by ICTs should be used to construct choice based local learning processes.
- Encouraging 'open' ICT systems for education both as a pedagogically sound strategy, as well to promote 'commonly owned ' ICT standards to take root in society, for larger public good.
- Encouraging the local creation of information repositories, including in local languages.

Education administration and ICTs

There is a need to look at using ICT more as a systemic resource than only as specific artifacts with given applications or a tool to support existing education processes. One important part of such systemic use of ICTs is in overhauling education administration, which is recognised as a major factor in the failure of our education system. This means the potential of ICTs for democratisation of decision making in our education system and its institutions, networking possibilities for teachers and teacher educators, local digital resource creation and sharing, as well as developing better accountability processes within the education administration set-up and outside, to the community, are all possibilities for systemic reform. Teachers need to be comfortable with the use of ICTs before they can facilitate children's learning. In the same manner, teacher educators need to be comfortable with the use of ICTs before they can facilitate teachers' learning. And the whole system needs to be accountable to the society and the community.

Traditional teacher education has suffered from being largely top-down, mass-based (non distinctive), and supply driven. The underlying belief is that preparation of material and of master resource persons can only be done on a cascade model, to disseminate the same content uniformly. However, the biggest potential of ICTs is in enabling 'hyper linked' (cross-linked) horizontal structures and relationships to replace traditional top down authority based relationships. ICT enabled peer-to-peer learning, accessing support when required, non formal interactions, asynchronous interactions (not being limited to being

required to be available in the same space and time as traditional training processes require) can greatly complementing physical interactions on which current training systems are mostly reliant.

The enormous advances in radio and video technologies mean that it is possible for DIETs and block and cluster centers to create digital forms of their own materials and resources and make it available to teachers and teacher educators. In some ICTs for development initiatives disadvantaged, rural dalit women have shown that creating digital material, that is reflective of their contexts and experiences is empowering in itself and also provides a counter knowledge to existing hegemonic, centralised knowledge sources.

Transparency

Increased transparency in government systems will help to enhance accountability towards the citizen and community. Information asymmetry creates hierarchies between the official and the citizen and also within the bureaucracy, where higher officials sometimes use information for 'monitoring' and fault finding, while possibilities for local decision making remains starved for required information. Community databases and local knowledge repositories are eminently possible with new ICTs and can change the existing balance of power. (The real power of RTI for e.g. can only realised if information is stored and processed digitally and made available across space and time, on a 'push' rather the current 'pull' model, where information is available against specific requests. Information relating to number of teacher posts, vacancies in a school, entitlements of the students (text books, uniforms, mid day meals etc), educational officials' and teachers' availability and attendance etc if readily available to the community can help (though cannot ensure) in processes of accountability of the system.

This again is a process requiring huge investment in social processes, but these are the directions policy should take, instead of seeking to invest most of the amount in hardware that will remain dysfunctional in the absence of the enabling investments towards technology appropriation.

Drudgery of information processing

The Cluster Resource Person is jocularly called the 'Courier Resource Person' in many parts, reflecting the huge pressures within the system to continuously collect data from the school. It is also a complaint that the same information is often required to be collected multiple times, perhaps in different formats. Another unfortunate aspect is that though data is collected and 'sent up', it is seldom used at the school or cluster/block levels for local decision making. Though all over the country, an annual child census is conducted with huge investment of time and resources, the information is used more at the national level, in terms of preparation of district report cards and is used less at the state and even lesser at district levels and hardly at the block, cluster and school levels. Information about teacher postings, scheme (entitlement) provisions, infrastructure gaps and efforts can be useful to the administration if it

is easily available at local levels. This requires information to be available in electronic form for easier processing and access. Organisations also use digitisation as a process to ensure a single authentic version of information is available to all (while for instance, currently dropout statistics have multiple versions, even on similar assumptions).

Digital information repositories at the cluster level can reduce the drudgery of the teacher in collating, writing out information repeatedly. At more sophisticated levels (which are from pure technology point of view, quite simple, but need investment in the social/learning processes), web based information repositories that can be updated by people in different positions/locations, using computers or even short messaging services on cell phones (Indian Railways recently announced ticket booking through sms) can be useful.

Some policy imperatives

- Providing connectivity across all institutions starting with the district and block teacher support institutions with unconstrained computer and Internet availability. Connecting teacher education institutions can support peer and horizontal networking. This can be a big opportunity to break out of 'knowledge-and-authority-can-only-come-from-the-top' syndrome that our institutions and schools suffer from. Peer learning, local knowledge repositories, community networks are all possible, and what is more instructive is that they are actually happening in many parts of the world. Policy should encourage and push this process, which will actually make a meaningful participatory education system possible.
- Maintaining required information repositories for decision support. e.g. databases of teachers and teacher programs, to provide a need based support at all levels, including training support to teachers.

Technology Issues

Promoting an open ICT ecosystem - open standards / open access / open source / open hardware / open connectivity

We have dealt with the issue of open source and open content in the section on secondary education, which please refer. We also referred to 'open' telecom models, like mesh networks, that are relatively inexpensive and leverage collaborative and community resources. Similar open ecosystems also exist in the hardware domain. ICTs in education policy should promote these open ICT ecosystems both as a sound choice for educational technologies, as well as to promote them as more widely used 'standards' in the society, because of their participatory, and at least in the mid to long term, more cost effective nature.

To give just one example of how the dominant ICT model can exploit 'ICTs for education' policy

domains for private profits, Project Shiksha of Microsoft usually has an explicit clause in its Memorandum of Understanding (MoU) signed with state governments that Microsoft will exclusively determine the curriculum in these institutions and no software models and applications other than those of Microsoft are to be taught here. Academies created under these MoUs, thus equate world class ICT learning with learning only Microsoft applications. The teacher and student learners become dependent and locked-in to these propriety platforms thus greatly contributing to their establishment as de facto standards. The gains to the private company involved, which often passes these efforts under the garb of corporate social responsibility, are obvious, as are the losses to the society in allowing what should be a public resource of common standards to be used by the private company for both controlling the costs as well as all other features of the most widely used software platform. Other losses to the society in the form of local and collaborative innovation possibilities on one hand, and poor development of local software building skills, and fewer possibilities of localised and contextual adoption of software for various societal purpose, on the other, have been earlier referred to.

There is also an important need for pro-active public effort for local innovations in ICTs that are relevant to India's public education system, since it is well known that most ICTs available in the market are designed in developed countries and not contextualised to the local needs. To take an example of contextualisation of ICTs, One-Laptop-Per-Child is one effort at contextualising ICTs to educational needs, keeping the needs of some developing countries in mind. Availability of simpler, inexpensive and robust tools is critical for widespread dispersed usage. Power saving, mobility, hardiness etc could be other required features. Availability of information in multiple languages, including 'local' languages is critical. Tools that can support the process of creating digital repositories of local knowledge, culture etc are important to develop. Policy should actively promote investment in these areas. It must be noted that, unlike what has been true in the past for India for most cutting-edge technologies, in case of ICTs we have world class local talent, even dispersed in smaller towns, for shaping new ICT technology development, which is in addition to the fact that these technologies themselves are very malleable to local and continued development outside typical R and D lab situations.

Some policy imperatives

- ICTs for Education should use and promote open ICT ecosystems for both pedagogical and cost-effectiveness reasons vis-a-vis the educational system, as well as, more generally, as a progressive ICT model for a more just and equal society.
- Local contextualised ICT innovations for development purposes, especially serving poor and disadvantaged groups, require public efforts and investments and cannot entirely be relied upon to be provided by the markets. The policy on ICTs for education has to be mindful of this issue, and while leveraging markets for what is available, should also focus on non-market options for technology development.

Radio and video

ICTs are often construed to only refer to computers and the Internet and exclude other technologies. However, in many contexts, radio or video serve as more 'appropriate' technology and have been witnessing significant changes with respect to their malleability, reach as well as costs, making community radio and community video more feasible to further social development. Many of these changes are in fact owing to the digital revolution, and in this context, the binary between new and old ICTs - with the implication that the 'old' ICTs such as radio and video may alone be appropriate for countries like India - is not very useful. Community radio is now accessible to many grassroots groups primarily because of the manner in which digital technologies have transformed the costs of the program production process. The same is true for video. Therefore, the policy issue here is that rather than slipping into clichéd categories of 'old' and 'new', conditions that make contextual appropriation of all useful ICTs possible must be created. The new possibilities of radio (with the new 'community/campus' FM radio allowing for highly decentralised information and communication processes at district, block or even cluster levels) and video (with the processes of creating, enhancing and sharing digital video content now far simpler and cheaper) can also support the principle of 'local and participatory knowledge generation and sharing'.

This has been largely rhetorical in the print era while new ICTs can actually make it a reality. As the *NCF Position Paper on Education Technology* says, Information and Communication Technologies (ICTs) have brought in a convergence of the media along with the possibility of multi-centric participation in the content- generation and disseminative process. This has implications not only for the quality of the interchange but also for drastic upheavals of center-dominated mindsets that have inhibited qualitative improvement . The experiences of *Deccan Development Society* with respect to 'participatory video' or of *Myrada/Voices* with respect to 'community radio' can provoke thinking for the applicability of these tools for school education. In these programs, marginalised groups (poor dalit women) have mastered these technologies for creating their own media, focusing on their issues etc. Community based radio- and video- based initiatives have the potential to challenge existing hierarchical networks with peer learning networks. They have relevance for schools and school support institutions at the block or district levels which can use these tools for creating local audio-visual material in a cumulative and participative way.

Some policy imperatives

- Policies need to actively promote new possibilities in 'decentralised' radio and video, especially encouraging education institutions, specially at district and block levels to explore innovations in this area. The new community/campus radio licensing policy is supportive of this.
- Provision of budgetary support for local radio and local video is critical.

Process of policy formulation

The issue of greater and broader participation in policy making process often brings in its wake the

issue of vested interests having disproportionate influence on policy making. How do we resolve this apparent paradox? What kind of guidelines should policy making processes follow?

This issue is further complicated in case of application of new ICTs to social sectors where policy spaces have often been dominated by the technology domain, and also, taking the cover of technology expertise, by technology companies. This has largely succeeded also because of a certain diffidence in policy circles, and among other social area actors, about what it may require to engage with policies involving new ICTs. This real or perceived 'knowledge gap' in relation to technologies and technology possibilities is a major issue to resolve for all policy initiatives in the area of application of ICTs in the social sector.

It should be obvious that policy making requires a deep understanding of the specific domain and context. However ICTD (ICTs for development) policies (in India and elsewhere) appear to subvert this logic, and push forward concepts that are primarily technology and market focused, mostly sidelining the imperatives generally accepted in a specific domain. In addition, a new group has emerged in civil society that is engaged with 'ICTD', consisting predominantly of enthusiasts for the new technologies, many of them who have previously working in the technology sector, but have shifted to development, believing in the power of its application to development, and who may not have prior experience or grounding in development work or theory. Their techno-enthusiasm applies indiscriminately to all domains of development (hence, the generic term, ICTD) – education, health, governance etc, as they seek to focus on technology related issues that transcend the development domains – infrastructure, content, connectivity, capacity building. (Each of these terms requires deconstruction to understand the techno-centerdness of the ICTD phenomena).

This phenomena is not new, the same processes happened in the business world too, where ICTs were the first employed. In the initial phases, 'technologists' drove 'computerisation' efforts - since the business heads and their teams were technology illiterate - and automated business processes of financial accounting, payroll etc. The inherently simple and clear logical nature of these processes made them easy to 'code', yet 'automating' these did not have any great benefits for business. Over time, through a series of ICTs-for-business thinking failures, when the decision making power was finally taken up by the business heads, they sought to use ICTs to transform business processes in the key areas of manufacturing, purchase, sales etc and then to integrate these areas to create ERP (Enterprise Resource Planning) systems. Real benefits to business in terms of reduced costs and cycle times and higher revenues through seamless information sharing and quick decision making etc only came from these applications.

In the same manner, we are in the first phase where the domain actors have by and large avoided engaging – either due to ignorance or belief that ICTs are of no great significance, or due to the belief

that ICTs present largely only dangers to the values and objectives of their endeavors in their respective sectors, and keeping them out entirely may be the best option. The typical ICTD themes of infrastructure, content, capacity etc are the constructions of technology-focused ICTD experts. These themes are of very limited use or meaning in developing the outlines of what changes any specific domain requires and which may be possible through use of new ICTs. Addressing these themes therefore will not in any way enable the work in the domain to be more effective or meaningful. ICTD and technology actors have seized the vacuum left by the lack of engagement with new technologies by substantive development domain experts to present their omnibus solutions of business models, infrastructure, content and capacity building. Real benefits to development will arise only when the domain actors start engaging with ICTs, understand their possibilities and power (which like all power will be double-edged, meaning with possible positive or negative impact) and determine what is the nature of using ICTs – beginning with the goals that must be met, guiding principles, processes that are essential, caveats and assumptions that must be made, limitations and dangers that must be attended to etc. While it is accepted that in early times of technology appropriation some reliance on their knowledge and expertise is often required, it certainly has to be subservient to both the knowledge and the objectives articulated by the domain experts. Technologists can provide information, suggest possibilities and dangers, but should avoid the temptation to design and implement solutions or processes, given their lack of 'expertise' about the social domain of application of ICTs.

While the novelty of ICTs – defined by continuous technological innovations, cost reductions, new and better powerful hardware and software applications – may imply a significant role for vendors in policy 'implementation', their role in policy making needs to be interrogated. In current governance parlance public-private partnerships is a buzz word. While there is certainly some justification in using private parties in some aspects of implementation of projects and program, for greater efficiency etc, and also much of procurements will necessarily come from the open market, a private sector role in implementation should not be confused with a role in policy making. The two may even be antithetical, in fact more is the role in implementation more is the possibility of conflict of interest in influencing policy, and more these players may need to be kept away from the corridors where policy gets determined. This is an accepted canon of policy making in most sectors, though for mega-corporates that monopolise big parts of the market, influencing policy increasingly appears to be an easier and faster way to greater profits rather than doing business better. In the arena of new ICTs, the situation is especially bad in this respect both (1) because technology companies take advantage of gaps in 'technology knowledge' in policy circles and among social area actors, and present themselves as 'readily available technology advisors', and (2) because ICT sector is unique for extraordinary market monopolies, for example, Microsoft, Intel and Google have more than ninety percent market in major segments of their business.

All policy processes pertaining to application of ICT in social sectors, and in this case, an ICTs in education policy process, need to examine the issue of disproportionate influence of the market players

and of the technology domain, and take corrective steps. Clear guidelines need to be laid in this respect, which should be the first and foremost step in policy making process in these areas.

ICT in school education is basically an education issue, be it related to curriculum, learning processes, teacher education or education management, and hence needs to be driven by those working in the domain, i.e. educationists, including those working in academic institutions, NGOs, CBOs etc. The discussions and debates over the recent National Curriculum Framework (NCF) were led by these educationists and their output, the NCF 2005, is acknowledged as a curricular landmark in India. Unless the dominant model of ICTD policy making is turned on its head in this case, and domain actors are engaged with, to bring in their perspectives and priorities into policies for ICT appropriation, there is a danger that the school education system will only further suffer in its haphazard engagements with ICTs. Educationalists bear the onus of engaging with and understanding the new possibilities as well as dangers, and to design and drive the policy process accordingly.

Involving these actors centrally in determining the policy agenda will be useful to shift the basis of discussions, and the eventual policy, from the domain agnostic technology-centered themes that often frame ICTD policy processes, to domain based and domain driven themes for a meaningful policy. It will also serve to check the influence of market players on policy making. After all, ICT in Education policy is but one, though an increasingly important part of education policy.

Some Overall Challenges for ICTs in Education Policy

The realisation of the possibilities outlined in the earlier parts of this document obviously requires public investments in basic infrastructure and required techno-social processes to not only address current deficits, implied in the need to catch up with the rest of the world, but to also enable people and institutions to achieve comfort in the use of ICTs to further their own self-determined goals. For instance, even in case of the relatively trivial issue of information processing, there would be a need to maintain local data repositories for use by the local authorities and communities, whereas currently, information tends to be collected not for local use but for use by 'higher ups'. Such use will require infrastructural investments as well as efforts for policy changes and capacity building to enable users to become familiar with, and capable of using, these tools for decentralised decision making.

While policy would need to be guided by current contexts and challenges, it would be problematic to argue that this is an either-or situation and that ICTs should necessarily come much after all other requirements are well in place, since ICTs represent powerful intangible resources that can address institutional transformation issues in non-linear ways. At the same time, placing computers on a large scale in schools, without necessary collateral processes and investments, with the mere goal of enabling 'ICT literacy' (learning how to use *office* applications) is likely not to produce much desirable 'educational' outcomes, and policy needs to regulate such *supply-side* pressures.

In conclusion, it can be said that that the discourse on ICT in education is still only begun to take shape and hence the current ICT processes and resources as they are 'presented' to us need not be considered a *fait accompli*; there is great scope for developing progressive designs of ICT in education. However this does call for some immediate engagement and action by educationists and education policy makers. Such new 'ICT in education' designs would need to incorporate *guiding principles* for an ICT in education policy such as constructivism, collaboration, diversity, equity, autonomy, local-ness, and decentralisation / subsidiarity; covering areas such as teacher education, curriculum, learning process, institution building and networking, and creating local and multi-lingual digital resources. Such designs would also need to meet some basic imperatives like universal connectivity and access, resources available in a free and open manner, robustness of technical systems, multi-lingual system abilities to meet varied local needs etc. Each of these principles, areas and basic imperatives require discussion and ideation, drawing on our educational philosophies and educational aims.