

Using ICT to place Indigenous Knowledge Systems at the heart of Education for Sustainable Development

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Abstract

Existing ICT implementation are largely top-down in their information flow: from experts to target groups. Merely incorporating indigenous knowledge within this structure places it at a considerable disadvantage.

A wealth of knowledge is already available within the developing world, particularly with regard to health and agriculture, two spheres of great impact on their populations. This knowledge is by definition, culturally sensitive and context-specific. It needs to be acknowledged, validated, reinforced, disseminated, innovated upon and preserved through practice. A bottom-up approach may provide a more realistic opportunity to capture the ideals of people-centred, need-based sustainable development.

This paper argues the need for a bottom-up process in which indigenous knowledge systems are placed at the heart of the process of education for sustainable development. It also indicates how ICT may be used to facilitate such an approach.

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Introduction

“Over the last few years, a wide consensus has emerged on the potential of information and communications technologies (ICT) to promote economic growth, combat poverty, and facilitate the integration of developing countries into the global economy. [...] First, our efforts must be based on the real needs of those we are seeking to help. They must be fully and genuinely involved.”

UN Secretary-General Kofi Annan,
General Assembly 2002

The role of Information and Communication Technologies (ICT) in sustainable development has been hotly debated over the past few years. Gerolf Weigel presents the development of the debate from the ‘bread or computers’ argument to its current status: “The issue is, whether we accept that the poor should, in addition to the existing deprivation of income, food and health services, also be further deprived of new opportunities to improve their livelihood. The strategic choice is whether to accept the rapidly growing gap caused by a very asymmetric architecture of opportunities or whether to use ICT in a creative manner to level the playing field in economic, social, cultural and political terms.” ICT are today meant to be a mix of appropriate technologies that are demand-driven, people-centred, and need-based.

Much as the definition of ICT¹ has grown to be more inclusive of ‘low-tech’ devices, existing implementations of ICT are still largely top-down in their structure of information. They are based on the assumption that flow of information must be predominantly one-way: that the developing world needs information *of and from* the developed world to reduce poverty and to improve its standard of living.² There is acknowledgement of the importance of local knowledge and the need to tailor information to be culturally sensitive and context-specific. However, in this scheme, local knowledge is to be *incorporated*, implying that the mainstream information will be that which flows from the developed world.

The aim of this paper is to argue that the starting point for ‘Education for Sustainable Development’ needs to be indigenous knowledge. This paper further examines how ICT may facilitate such an approach. It is not sufficient to incorporate native knowledge within

¹ Definition: The term “Information and Communication Technologies” (ICT) refers to technologies designed to access, process and transmit information. ICT encompass a full range of technologies – from traditional, widely used devices such as radios, telephones or TV, to more sophisticated tools like computers or the Internet. The mix of technologies used should be determined mainly by the specific local context and demand.

² By ‘developed world’ this paper refers not just to the nations of the First World, but to all parts of the world that follow similar patterns of production and consumption. Similarly, ‘developing world’ includes several million poor people in the nations of the First World.

a larger package that is delivered to the developing world. A wealth of knowledge is already available within the developing world, particularly with regard to health and agriculture, two spheres of great impact on their populations. This knowledge is by definition, culturally sensitive and context-specific. It needs to be acknowledged, validated, reinforced, disseminated, innovated upon and preserved through practice. A bottom-up approach may provide a more realistic opportunity to capture the ideals of people-centred, need-based sustainable development.

Status quo: Top-down approach

Existing ICT implementations largely provide access to two sources of information: experts and the Internet. While these are valuable sources of information in certain situations, they present two problems in the context of sustainable development: 'knowledge incoherence' and 'information overload'.

Experts and 'Knowledge Incoherence'

Expert knowledge consists of a largely static knowledge base created by information providers who are considered experts in their domain. ICT are used to communicate this knowledge in the form of radio and television programmes and campaigns. Experts are typically contacted through tele-centers and information kiosks, where villagers may call a city hospital to ask for a cure or an agriculture research organisation for solutions obtained in laboratories. The direction of information flow is one-way: from experts to target groups. There is little opportunity for interaction with experts. Feedback on the expert content is minimal, or perhaps even non-existent. *More importantly, there is no provision for discussion with others who have used the same information to determine whether it has been beneficial or not.*

The biggest difficulty, yet, is what may be called 'knowledge incoherence': the new information is often alien to the experience of the recipients and cannot be integrated in a meaningful way into their own knowledge base. Providing mere access to information is not enough without providing a framework to understand the new information and integrate it with existing knowledge. Failure to provide such a framework would erode the grounding in one's own knowledge system and deepen the dependence on an alien one.

Internet and 'Information Overload'

While the Internet provides opportunities for interaction, it presents the problem of 'information overload'.³ Sifting through the Internet to find information that is relevant and authentic is a well-known problem. It is a daunting task even for highly educated individuals who are familiar with the technology.

A person seeking information on the Internet needs to ask the following questions:

1. How do I find what is relevant to me?
2. Who decides what is relevant to me?

³ The Internet is rife with a variety of other contentious issues. To name a few: the lack of relevant vernacular content, issues of privacy, pornography, spam (it is estimated that 80% of email traffic is spam) and bandwidth. This paper is focussed merely on the process of finding information on the Internet.

3. How do I know what I find is authentic?
4. How do I reconcile information from multiple sources that is conflicting / contradictory?
5. How do I reconcile / incorporate 'expert' information with my own knowledge?
6. How do I understand the bias / hidden agenda of the information source?
7. Do I spend enormous time and energy in acquiring information that may be irrelevant or even misleading?

The above questions are non-trivial, particularly for a person with limited education.

Search engines highlight the problem of 'information overload' quite remarkably – increasingly sophisticated algorithms that look at keyword analysis, number and quality of external links and clustering have produced matching complex web design principles and search engine optimisations (SEO). The result: *most people still use only one or two search engines and look rarely beyond the top 10 results*. It is possible to “buy” a higher ranking in a search engine listing either directly with the search engine or indirectly through other means such as paying for a link from a page with a high page rank. Creation of newsletters, blogs and syndicated content are some other techniques for increasing traffic to one's website. Smaller sites unfamiliar with or incapable of complex SEO simply lose the battle. They do not stand a chance of appearing in the top 10 results. The sites at the top are often 'polished', official sites of large organisations. Once again, this is a situation where a dominant minority filters access to information.⁴

The search for newer methods of aggregation (using meta search engines), syndication (using Really Simple Syndication) and specialization (domain-specific search engines) further highlight the problem of 'information overload' and the overarching desire for relevancy.

In approaches that rely on expert knowledge and the Internet, indigenous knowledge is at best incorporated as 'alternative', and at worst ignored completely. This places native knowledge at a disadvantageous position and it may be entirely lost.

An Example: Ayurveda and health care in India

Ayurveda is an ancient system of health and medicine practiced in India. It is, unfortunately, known more for its commercial rejuvenating spas than as a 'science'. This is an example of how definitions can be crushing. Science is defined from a western framework as an objective system that works the same for everyone and everywhere. Ayurveda, in its very approach, takes a variety of factors such as age, climate, diet and stage of the disease into account and hence prescribes different treatments in different situations (though the 'disease' may be same). It is not objective in the sense of western science as defined above but it has its own set of axioms and a systematic methodology of reasoning based on those axioms. Denial of the label of 'science' creates an obvious bias – Ayurveda is seen as 'lesser' than the western medical system.

⁴ Center for Digital Democracy - www.democraticmedia.org - warns that broadband technology may narrow the Internet. In the absence of public-interest safeguards, broadband may pave the way for a select few companies to control the dominant content on the Internet, as they do with cable television.

Knowledge building is a social process. Vandana Shiva writes: “Knowledge [...] by its very nature is a collective, cumulative enterprise. It is based on exchange within a community. It is an expression of human creativity; both individual and collective. Since creativity has diverse expressions, science is a pluralistic enterprise which refers to different ‘ways of knowing’. The term ‘science’ cannot be used only to modern western science. It should include the knowledge systems of diverse cultures in different periods of history.”

Profile of Indian Medical Heritage		
	Knowledge and Tradition of Common Folk	Knowledge and Tradition of Scholarships
Evolution	Direct natural observations	Vedic origin
	Undocumented	Philosophical refinement
	Empirical	Documented & classified; 8 main branches
Transmission	People to people	Earlier non-institutional
	Non-institutional	Now institutional
	Social acceptance in widespread but eroding. Natural resources like plants, animals, metals and minerals are used.	Social acceptance in widespread but eroding. Natural resources like plants, animals, metals and minerals are used.
	Has no legal status.	Has a legal status.
Promoters	Households	Scholars from all castes and communities
	TBAs and Visha healers	Educational institutions
	Bone Setters (Barefoot)	Commercial institutions
	Barefoot Vets	Research organizations
		Service organizations

Table 1: Profile of Indian Medical Heritage. Source: Darshan Shankar.

Many people in India, particularly rural populations, speak the language of Ayurveda quite naturally. There is a fairly close correlation between Ayurveda and several folk health traditions. Table 1 illustrates the broad profile of Indian medical heritage. Some of the practices of Ayurveda are still followed, in terms of seasonal regimens, diet and the use of local medicinal plants. A villager suffering from diarrhoea may already know to use crushed pomegranate rind for her condition. However, an expert in a city hospital or the Internet would advise the use of an anti-diarrhoeal. There is no way the villager can determine what the iatrogenic effects of the anti-diarrhoeal are, let alone whether it has been irrationally combined with other medicines or if it is banned. Clearly, this is not an empowering process. The greater coherence between folk health traditions and Ayurveda needs to be leveraged to strengthen local knowledge.

New approach: Building knowledge bottom-up

One of the vital strengths of the virtual community is that for any problem, there is a high possibility that at least one other person has encountered the same problem and perhaps has worked a solution. It is rare to come upon a “new” problem that no one has encountered before. Mailing lists, e-groups and discussion forums are logical groupings of common interest. This is a powerful model – pop a question and wait for the world to answer. When people share their own experiences, it is easier to evaluate empirically what works, what does not work and why. Multiple views are gathered in one place, which helps to go beyond experts, who may have limited perspective or vested interests.

Building Circles of Knowledge

Relevancy of information demands that quality is more important than quantity of information (or the speed with which it is accessed). In the context of sustainable development, relevancy is even more critical: there is simply no time, money or capacity to wade through a jungle of information. As Gerolf Weigel states: “It can be more effective to link people with relevant knowledge directly rather than accumulating knowledge in ‘stores’.”

There is one critical difference between virtual and real communities: geography. Virtual communities cut across borders and are able to interact with people physically distant from them. Physical communities are largely concerned with local issues that are geographically determined, such as health, agriculture, water and land management. Therefore, experiences in similar geographical settings are more relevant. Relevancy, for physical communities, has a geographical component, unlike for virtual communities. For example, a farmer in Salem district in Tamil Nadu may benefit more from experiences of a farmer from within his own district than from neighbouring Coimbatore district. Similarly, experiences from Coimbatore may be more relevant than from Alwar district in Rajasthan. It helps to begin with local information and expand outwards. One possible way to do this is to create ‘Circles of Knowledge’.

A circle of knowledge is a relevant and expanding body of knowledge identified by the members of the circle. The smallest unit may be a village. The existing knowledge about critical spheres such as health, agriculture and water management could be captured using

a variety of existing means such as stories, songs and skits. These may be recorded using a variety of existing media such as paper, images, audio and video. Unlike the methodology proposed by Holland and Smith for preserving Native American culture digitally, this paper postulates that not all aspects of living traditions of indigenous knowledge can be captured as 'artefacts' using digital technology.

The idea is to collect and record existing practices using 'low-tech' ICT without adding large, expensive infrastructure. Each village chooses how to capture their knowledge – there is no need for standardization. The process would depend on the knowledge itself, the prevailing structures of knowing, and the available ICT. A simple index (meta-data) of this information may be prepared which captures what is practiced, what works, what does not work and why (if this is known). This index may be electronic or non-electronic, depending on the availability of suitable technology. A hierarchical network of indexes can be built on top. A multi-layer peer-to-peer network of indexes would provide the means to query other circles of knowledge.

A person seeking information may 'query' their index, which will give information from the closest circle of knowledge. What is returned is meta-information: which village has the relevant know-how. The person may then choose to contact that village to obtain the relevant information using existing communication channels. If the information is inadequate, the person may then choose to expand the circle. The 'query' may then be submitted to the next level of indexes and the results collated. Once again, if needed, the circle may be expanded to resubmit the query. (Of course, in practice, this method can be made more efficient by using caching techniques and running the query at multiple levels before the user explicitly expands the circle.)

Some key features of this scheme are:

1. Knowledge is retained in the local language using local techniques for capturing it.
2. Indexes are also maintained in the local language. There will be a need for translation between indexes only when the query is expanded beyond the linguistic border, and that too only of keywords used in the 'query'.
3. The index at each level may be accessed using a phone, radio, mobile/fax or even a low-bandwidth wireless connection.
4. What is exchanged is not the knowledge itself but meta-information: Who has the relevant knowledge and how to contact them.
5. Information exchange may then happen through various means - a letter, a phone call, a visit or even through a web site.
6. When a piece of information is received and practiced, it may be added to the local circle of knowledge - thus it expands.
7. Knowledge is translated only when it is needed, saving translation costs. Not all information needs to be available in all languages. People at the grassroots level may be networked without having to wait for large investments in ICT. Future investments may pave the way for incorporation of newer ICT, should a particular community feel the need for it. This provides space for an organic assimilation of technology within the larger context of sustainable development. Kenneth Keniston

asserts: “*Information and communication technology projects must build on an assessment of local needs, as locally defined by local people.*”

8. Indigenous knowledge may be propagated within a circle of knowledge and its immediate neighbours with local media initiatives.

The implementation of this scheme is not spelt out here in detail. This is only a pointer to a possibility. There may be other ways of placing indigenous knowledge at the heart of education for sustainable development.

In Conclusion: Raising other contentious issues

In conclusion, this paper raises three distinct contentious issues that are outside the immediate scope of this paper but nevertheless pertinent:

1. Ownership of knowledge
2. Revenue model for implementing ICT
3. Scope of ‘Education for Sustainable Development’

Ownership of knowledge

Placing indigenous knowledge at the heart of Education of Sustainable Development raises the critical issue of ‘ownership’ of knowledge. Existing patent laws are clearly biased towards western methods of knowing. While the Panos publication on patents focuses on the increase in the cost of drugs within the patent regime, Vandana Shiva brings into sharp focus the frightening practice of bio-piracy by multinational pharmaceuticals which threatens indigenous knowledge. Patents are essentially instruments that *prevent access* to a particular technology or information until there is compensation to its ‘owner’. This is a ‘negative’ definition with a purely commercial intent. We need a different notion of ownership of knowledge if we are to build a more equitable world. A more positive definition of ownership would actively encourage the sharing and use of existing knowledge and prevent its monopolisation.

Revenue Model

The ICT4D Forum cites the following as one of the ‘Priorities / Potential for Action’: “Encouraging the diversity of content, especially the production, sharing and distribution of Local Content while at the same time guarding against ‘cyber-condescension’: recognizing that freedom to choose implies the extension of mainstream, commercial brands and content.”

This is a statement with enormous implications. The label ‘cyber-condescension’ attempts to pre-empt any objections to advertisement as the leading revenue generator for implementing ICT. Yet it is important to object. It is well known within newspaper and television circles that advertisers influence and sometimes determine content. Unless a different model of revenue generation is framed, proliferation of ICT will be a thinly veiled attempt at creating an enormous market for corporations of the developed world.

Scope of 'Education for Sustainable Development'

The need for sustainable development has two primary facets: the unsustainable production and consumption patterns of the developed world and the crushing poverty of the developing world. Both facets need to be addressed within the scope of 'Education for Sustainable Development'. However, the emphasis so far has been on 'Education (of the developing world) for Sustainable Development'. The debate does not seem to encompass the need for, or the measures required to educate the developed world towards building a sustainable existence for the entire world.

What might such an endeavour imply? Would the developed world adopt ecological practices of the developing world to change its existing unsustainable consumptive patterns? Is there scope for an inversion of information flow so that developed nations can be educated to change their lifestyles based on knowledge acquired from developing nations? It seems unlikely within the existing ambit. For example, the practice of using toilet paper costs the earth several thousand acres of forests every year. The solution being sought is to use 100% recycled toilet paper, though cultures in other parts of the world have favoured the use of water. It seems that sustainable development within the developed world is geared towards finding technological solutions rather than shifts in habit.⁵

Is it acceptable that solutions proposed for the developed world do not really challenge their comfortable and unsustainable lifestyles while those proposed for the developing world stand to threaten their very way of life?

Can this UN Decade be committed to educating the *entire world* about sustainable development?

⁵ The example of 'toilet paper vs. water' is not as frivolous as it may initially seem, considering the fourth World Toilet Summit has been organized in Beijing in November 2004.

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