whether in the long run we pursued science or any other stream. This essentially shows how fundamental these principles are.

However, all the modern fields of scientific research are not equally fundamental in nature, though scientists or academicians whose fields of research are quite naturally close to their hearts often refuse to take cognizance of this. So much so that some of them expect nanotechnology should be included in the UG curriculum of physics. Some expect that VLSI technology should be made known to the UG students of physics or electronics in all detail while others feel that UG physics students must know something about biological systems, where the laws of physics can be applied. Some also expect that all the intricacies of a solar cell should be part of the plus-two syllabus. It seems as though scientists have adopted the slogan 'catch them young' and are trying hard to catch the attention of young students by an impressive presentation of the relevant topics from the respective fields at a more elementary level.

All these are giving rise to a phenomenon that is often termed as the concept of 'downloading' from the syllabus-framing point of view. What happens in the process? Classical experiments in physics for understanding some important and basic phenomena are replaced by experiments based on electronics, microprocessors or computers. We train students in the use of sophisticated instruments, while the involved physics in the studied phenomenon takes a backseat. Probably detailed studies of different aspects of Newton's laws of motion may have to provide space for 'introduction to particle physics' or 'special theory of relativity' at the higher secondary level. Unfortunately, the capability or the interest of the majority of students of a particular level is not taken into consideration while framing a syllabus. Focus remains only on students who may pursue the subject at a higher level, leaving out other possible vocations for the students of physics. As some UG students could become future teachers, the UG syllabus should cater to them as well.

As such, there is a dearth of good school teachers. UG teaching is also not that attractive. If we expect to have more committed science teachers in schools and colleges, who will be able to ignite young minds, we have to address the problem of overburdening the UG syllabus. More stress should be given to the basic concepts and not to mere exposition to some frontier topics.

The problem, it appears, is bothering all teachers of science, not only of physics, teaching at the plus two as well as at the UG level. However, the solution possibly lies with the people involved in active research and with those responsible for framing the plus-two level and UG syllabi. Different stakeholders, viz. the plus-two level UG teachers and PG teachers, and scientists and researchers must have a common platform to talk about these issues[1]. Otherwise, the concept of downloading will make UG students equipped more with jargons and less with the understanding of the basic concepts of the concerned subjects.

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Chikungunya epidemics due to Central African genotype in Andhra Pradesh

Chikungunya virus is an Arthropodborne virus (genus *Alphavirus*, family Togaviridae) transmitted by *Aedes aegypti* and *A. albopictus* mosquitoes. Although the first recorded epidemic of chikungunya in India was in 1963 in Kolkata[1], existence of chikungunya virus antibodies in human sera collected between 1954 and 1956 suggests[2,3] that the disease was prevalent in India prior to 1963. Many epidemics were recorded in Chennai, Vellore, Kakinada, Nagpur and Barsi.

Andhra Pradesh (AP) was the first state to report chikungunya virus during the epidemic in December 2005, and was among the worst affected[4]. Phylogenetic analysis of 330 bp E1 region of chikungunya virus of AP isolate (accession no. DQ888620) showed that it was closely related to the Central African isolates from Reunion Islands and also from the Democratic Republic of Congo (Sai Gopal *et al.*, unpublished data). Several interesting observations were made from the current epidemic. Compared to early outbreaks (which were confined to cities), the current epidemic was predominantly rural[5]. Chikungunya virus isolated between 1963 and 1973 belonged to Asian genotype, whereas the current epidemic isolates of Karnataka, Maharashtra, AP and the Yawat isolate (2000) belonged to Central/East African genotype[5].

How did chikungunya virus emerge after such a long gap was a question of serious concern? Yawat isolate was earlier reported as Asian genotype, but NS4-based phylogenetic analysis showed Yawat isolate as Central/East African genotype[5]. Grouping of Yawat isolate with Central/East African genotype suggests that this genotype had been introduced more than five years before the current outbreak[5]. Absence of herd immunity in the affected population can also be considered as one of the reasons for such a large outbreak[6]. Chikungunya virus might have been maintained in nature at a low level and cases were misdiagnosed as dengue due to similar symptoms[7]. There are reports of simultaneous co-infection of chikungunya and dengue viruses[8,9].

The work done by Schuffenecker *et al.*[10] on chikungunya virus and its dependence on cholesterol for replication has developed interest among the scientific community. Schuffenecker *et al.*[10] have observed a specific change at position 226 of the E1 protein (membrane fusion glycoprotein). The virus normally needs cholesterol to infect the cells of human and mosquitoes, and mosquitoes often do

not have enough cholesterol. The newly emergent E1226V variant could have survived and multiplied better in mosquitoes, which in turn could have contributed to its rapid spread[10]. Mother-to-child transmission, myocarditis hepatitis and extensive dermal lesions were encountered in the current epidemic[11].

Humans, laboratory mice, rodents (*Mystromys albicaudatus*), African vervet (*Cercopithecus aethiops*), Asian monkeys, primates (rhesus monkey *Macaca radiata*, baboon *Papio ursinus*), prosimians (*Galago senegalensis*) and bats (*Tadarida*, *Pipistrellus* and *Scotophilus*) are susceptible to chikungunya virus and develop high titre viremias[12]. Antibody to chikungunya virus has been detected in various primates and domestic animals and in other vertebrates[12]. Chikungunya virus was isolated from *Culex quinquefasciatus*[11]. Studies on differential role of *Aedes*, *Culex* and various other species of mosquitoes and rodents in chikungunya virus epidemiology have to be carried out, to understand the maintenance of virus in nature during the interepidemic period. The recent chikungunya epidemics was restricted to the southern states of India while in the northern states, comparatively only a few cases have been reported.

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Research and development for renewable energy

Recently, an International Conference on 'Energy, Environment and Development' was held in Bangalore, India (14–16 December 2006), organized by The Energy and Resources Institute (TERI, www.teriin.org), the Institute for Sustainable Development and International Relations (IDDRI, Paris) and the Institute Veolia Environment of France (Paris). This was an extremely interesting conference, where the related issues of climate change, global warming and development repeatedly surfaced in various themes and settings.

It was interesting to note that some universities in Europe have made it compulsory for students of all disciplines to attend a one-year course in Ecology, Environment and Sustainability, as a prerequisite for obtaining their final degree, and as a way of increasing the content of sustainability and environment in all professions. While this has not yet become a worldwide practice, one hopes that this will spread further.

At this conference, there was a perceived need to increase the use and develop renewable and clean sources of energy with appropriate pricing, low emissions of greenhouse gases and low amounts of toxic wastes, which could be implemented globally and in time.

To work well, long-term and large funding for Research and Development (R&D) is needed, which may be secured by taxing energy consumption at about 0.5, 1 or 2%. This would ensure a 'critical mass' of scientists and engineers, based in R&D Centres for Renewable Energy in different regions.

This approach could be adopted in several parts of the world to create and fund R&D Centres for Renewable Energy on a long-term basis in the European Union, USA, Canada, Mexico, Brazil, Argentina, Russia, China, India, Israel, Japan, Taiwan, Korea, Australia and South Africa. A special opportunity arises if these R&D centres collaborate with each other in a global strategic alliance to maximize synergy and thereby achieve considerable scale.

Some sources of renewable energy with a huge and under-utilized potential include geothermal energy, ocean current energy, river current energy, wave and tidal energy, solar and wind energy. There may arise a need for further technological advances to better utilize some of these sources of energy.

This has been proposed to the European Union and the Government of India in December 2006 as a way of initiating such discussions among and within the countries mentioned above. Nevertheless, improving energy efficiency is the next best way of saving energy and reducing emissions of greenhouse gases.

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