Open Educational Resources (OER) for School Education

SAM PITRODA*

As celebration of NCERT Golden Jubilee Year, Educational Technology Lecture Series 2010-11, Central Institute of Educational Technology, NCERT organised an inaugural lecture on Open Educational Resources (OER) for School Education which was delivered by Padma Bhushan Dr. Sam Pitroda. The lecture was organised at CIET, NCERT, New Delhi on 29 March 2011. About 250 academics from various organisations, principals and teachers of neighbouring schools of Delhi participated in the programme. The programme was also simulcast live on Gyan Darshan, web cast on CIET website and 90 Satellite Interactive Terminals (SITs) under the EDUSAT network of CIET-NCERT. The lecture was followed by discussion. The text of the lecture delivered by Dr. Pitroda is given here.

Dr. Sam Pitroda was welcomed and felicitated by Prof. G Ravindra, Director, NCERT who presided over the programme. Prof. Vasudha Kamat, Joint Director, CIET also welcomed Dr. Pitroda and kindly invited him for delivering the lecture.

It is indeed a special honour and privilege to have this opportunity to talk to so many of you on something that's very dear to me– The Role of ICT in School Education. I would like to break this lecture into five topics; one– I would like to talk a little bit about the rise of India in ICT and what does it means to all of us; two– what is our government trying to do on ICT at the national level; three– ICT and education; four– ICT in school education, and five– some actionable items, so when we all go home, we know what we need to do. I had gone to lot of these conferences in India, I find that there are very important, dozens of conferences on same subject every month, and nothing happens.

It is good to meet people, it is good to talk, it is good to discuss, but at the end of the day, if we don't take some action, it is of no use. The other day, I was at a big conference of 300-400 Vice-Chancellors with Mr. Kapil Sibbal at Vigyan Bhawan and I lost my temper little bit which I tend to do a lot, and I said look we have been talking for five years on higher education. Same thing over and over again, same people, same topics, same agreement. Everybody has great ideas, we should do this, everybody says I liked it, everybody says yes, yes, we understand it, nobody

* Dr. Sam Pitroda is currently Advisor to the Prime Minister of India on Public Information, Infra structure and Innovations and is Chairman of the National Innovation Council (NIC). Transcription is done by Dr. A. P. Behera, *Associate Professor*, CIET, NCERT, New Delhi 110016

does anything. If at the end of today's interaction, we can collectively agree to do two or three things, I think, we will make a big difference in the lives of our children. So let's start with first- ICT, and rise of India globally in ICT. I remember, not too long ago, in 1981, first conversation with Rajiv Gandhi, in Delhi, I had never met him before, but we accidentally met at Mrs. Indira Gandhi's house. Mrs. Gandhi was running little late, so I had time to interact with him, and the conversation we had was very subtle and very short, saying we ought to use information and communication technology in nation building, and not for building business. What does it mean. It meant that ICT could be pervasive in India in the next 20 years, so we will see the role of ICT in everything we do. But to do that, we will have to first focus on telecom. If we can really provide telecom access to large number of people in India over a period of time, this would trigger a whole new revolution and we were also not very clear then, but we had conviction, that information and communication technology is a tool for nation building. We started with a simple idea of improving the telephone access. Then we had 2 million telephones for 750 million people. It used to take 15 years to get a telephone connection. When you get a telephone connection, half of the time, you were waiting for dial tone. From those days to today, in a span of about 20-25 years, we have come a long way. We have 800 million cell phones and we are a nation of connected billion people, which is a huge accomplishment in the history of this nation. I do not think people are paying attention to this great milestone in the history, that all of a sudden, this nation is connected, you can go from anywhere to anywhere, you can talk to anybody anytime, not very expensive, so this big event needs to be celebrated. But also, this event ought to remind us that we need to do things differently. And not do the same way that we have been doing in the past. Along with connectivity to billion people, we have now large number of experts in IT, there are all kinds of brains in ICT in India. Experts in every little narrow field you can find smart young people, talented, well recognised world over. We have build our own companies - TCS, Infosys, Wipro and there are lots of others. No matter where you go in the world, people respect that Indians are full of brains. Scientists, Engineers, IT professional, Software people are all over the world. I bumped them, you know, these people at the airports, international hotels, in weirdest little towns, in remotest corners of this world. I found an Indian software guy, believe me, once I was in a place called Tampere, it is a very small town in Finland and I was with the Mayor, and as we were going out for lunch, I saw 6-7 Indians walking together, so I called them and said "What do you do", they said "we are software people working for Wipro, and doing Tampere's software work for the city". We also generate as a result 70 billion dollar worth of foreign exchange reserve, every year, year after year. Because of all that, now we have hundreds of billions worth of foreign exchange reserve. In Rajiv's time, worst times, we had million-million and half worth of foreign exchange reserve. So world has changed completely for us and the ICT success story ought to give us lot more confidence. Great deal of pride, international recognition, to really look

beyond how we do things today, to how we ought to do things tomorrow. The idea is to improve collaboration, exchange data, Indian government has recognised this now. Prime Minister Manmohan Singh personally is committed to improving education, and information infrastructure. Several years ago, he decided to launch National Knowledge Commission, to look at all aspects of knowledge, including school education, higher education, vocational education, distance learning, open courseware, teachers training, and lot more. You can go to www.knowledgecommission.indiangov.in and you will see, all of the recommendations of the Knowledge Commission. Simultaneously, govt. is equally committed to building the IT infrastructure required to improve knowledge. So first programme of the goverment. is to build national knowledge that work, to connect 1500 nodes to 40 Gigabytes bandwidth to connect all our universities, all our major Research and Development Institutions and all our major libraries. The idea is to improve collaboration, exchange data, and then provide the connectivity that our Research and Development people need. This is going to cost us about 8000 crores, all of this is approved. We are building the network, 212 nodes are already working and this network will be fully operational in the next 12-18 months. In the back of it, we are connecting some 26000 colleges to fibre, so if you have local area network, you have connectivity not only to the national knowledge institutions, universities and all, but also to international because this knowledge, that work is already connecting to European Union, Japan, US in a big way. So you can look at open courseware material from the MIT, Standford, Yale, Cairo University in Japan, Cambridge and so on.

In addition, we are going to be connected with 250 thousand Panchayats to optical fibres. So every Panchayat will have broadband connectivity of 100s of Mega bits and that we will get in two years. This is going to cost us about 20 to 30 thousand crores. So all of this investment today, is being put in to really look at the future of our children, 550 million of young, below the age of 25, we need to educate them, provide them the tools and the jobs for tomorrow. If we don't do that, we won't be able to create 10-15 millions new jobs we need every year, year after year. No government that I know of today, is willing to make this kind of commitment, or spending this kind of money, anywhere else. When we mentioned this to Obama, he was quite surprised that how do you get to convince these politicians to put this kind of investment and that is the kind of vision we have, nobody talks about these things. Our newspapers are full of cricket, bollywood and gossips. This is the real India being created today that hardly people know about. It requires lot of guts, lot of vision, coupled with this network you could do what Nandan Nilekani is doing on UID (Unique Identification Number), Kasturi Rangan is working on GIS (Geographic Information System) and various platforms for payment, procurement, applications, security, servers, you probably will wind up spending 100 thousands of crores. Then the delivery of services will improve, leakage in the Govt. will reduce and you will create a

whole new infrastructure for tomorrow. All of this is in place, its being pushed, some will happen fast, some will have some problems but that is part of growing up, but I can assure you, in 3 years, you will have all of this done. Then we will get to a point of documenting billion people, till date we have already documented 5 million people. This is the biggest programme in the history of mankind to document with fingerprints, facials and all.

People complaint about, you know, piracy and privacy and all, but all of that is taken care of. Any time you do something new, it brings with it little bit of concern here and there. I always give example of a knife. The same knife that cuts fruit, also can cut somebody's body, but you still need knife. So all of these programmes essentially show the vision of this government and its ability to back it up with huge amount of funding.

Third, then is, what do we do with this ICT infrastructure in education? I am very concerned that we are not doing enough with ICT in education. The country that specialises in ICT, does not use ICT for education and government. On one hand, we have all this commitment, but we still have this nadawali file, that runs our govt. So I am one of those people that said that nadawali file has to go. You can't celebrate it some point of time, that nadawali file in government. If you can't do that, you can't go too far. But everyone wants to resist that, because that's the comfort, that's your little blanket, when you are a little kid and you don't want to let it go, but it has to go. Similarly in education, there are lots of opportunities to use ICT but mindset is such, that we will fiddle with it, but we won't change. From my perspective, unfortunately, when we think of education today, we automatically assume duster, blackboard, chalk, teacher, textbook, exam, grades, certificate. None of these things matter any more, you get to kill lot of these things? How do you do that? Immediately teacher would react, saying what do you mean, and if we don't kill the old, we don't create the new.

So how do we prepare ourselves to create something new? When I look at the teacher of the day-to-day, I know that teacher normally creates content and delivers content. I used to have a Professor in Baroda, who took great pride to prepare his notes and not changed them for 20 years. Is it good or bad? Then we thought it was great, when we learned more, we realised a little later that it was a disaster as people would copy his notes, and they would exchange his notes. This whole business of following the same notes year after year creates dumb robots. So do I really need teachers to create content today, because best of the best content is already available on the net, by great experts, I can't do much better, believe me, I can only quickly make diagrams with Indian looks.

But overall, most of the content is created in a good way, lot of content is already being added to that, everybody is creating content right now. And nobody is paying attention to what is already created. So I don't need teacher to create content. I perhaps don't need teacher to deliver content. So what do I need teacher for? I really need a guru, who is a mentor. I need somebody I can go to in difficult times, I need somebody I can look up to, I need somebody I can respect, and know he is there or she is

there for me. But I don't need them to teach me any more. This is the paradigm of tomorrow. It is going to happen, you are not going to resist it, you can try for few years, it is better not to resist it and join the movement. Because this movement is in our favour. So the ICT in education really imply paradigm shift in learning models. It is not about doing same thing we do using the IT. It is about doing different things that we do today using IT. So teachers will have to realise you don't need to deliver anything. You just need to love children, help them, support them, make them feel good, increase their self-esteem, pet them on the back, if they make mistakes, hold their hands, lift them. Because the children are already too smart. I know that when I can't operate my TV, I give it to a 7 years old kid and he fixes it. Because they don't really read any instructions. I have never seen any kid reading any instructions; they don't need any instructional manual, because instructional manuals are only for old people.

I don't know how they figure it out, but they just do it. You see them playing games; their reflexes are so fast.

They are acting in milliseconds, when it takes me seconds to interact. So there is something out there that we don't understand. Do you think all of the stuff that we all grew up with? I had never seen TV in my life before going to America. I had never made a telephone call in India in my life before going to America. This was in early 60's. There were no telephones, hardly few telephones, so if somebody had phone, he would be too rich to be your friend, so who do you call?

But these kids think- this is all given. Cellphone is like your body, everybody wants cell phone. You want a web page, you want facebook, you want twitter, I mean think of this and when the kids go to school at the age of 6 or 7, the teacher is going to teach A,B,C,D, he already knows all that stuff. It is in this kind of eco system we need to think, of ICT in education. It is about paradigm shift, it is about new learning model, it is about doing things we haven't done before. It is not about incremental little tweaking, it is about changing the whole structure of school, classroom, duster, blackboard, teacher, textbook, exam, everything has to change. I don't think we are ready for it. It is a radical departure from how we have been running our educational institutions for hundreds of years. I am beginning to question things like who decide it that it should takes 4 years to get a degree, why do we all take 4 years, Chinese take 4 years, Indians take 4 years, Japanese take 4 years, Americans take 4 years, who so ever came up with the idea must have been very smart that he convinced the whole world. But does this make any sense? I think this is the time to question things that we have never questioned before. And we may not find answers to all these questions. But the fact that we are willing to question, is very important. So ICT in education is all about paradigm shift, it is not about doing same things we do today to set up National Education Foundation, to develop webpage, open source material, establish credit bank to effect transition to a course credit system, even in colleges, it's a shame that I can't take one semester in Kerala, and next semester in Gujarat. I don't know why we can't do that?

You know it is weird system. If my father got transferred from Kerala to Gujarat, I

should be able to go to a Gujarat college, but in our system, we are still following most of the processes that British Raj left behind. At times, we are computerizing same processes and calling ourselves experts in computerising our governance. If we don't reengineer lot of these things, computerisation is not going to help us at all. Then we set facilitate conversions, with conventional universities, set up research foundation to support research activities, on ODE, overall training programmes for educators, increase access for learners with special needs, create a new standing committee for the regulation of ODE, develop system for quality assessment, to me this is all standard stuff. The big idea is how do we change here. So we begin to do things differently. When I met with the vice-chancellors, I told them, just go and look at your websites, it is disaster; you don't need to go too far, can you fix your websites? Look at the websites of all our schools and universities, there is no picture of the professor, there is no background of the professor, it doesn't tell me anything about what they teach, what is their track record, nothing. These are the great institutions, which are producing highly talented ICT people.

I think we need to really go into the basic stuff. That brings me to actionable items, before that I will tell you about two experiments that I know little bit about. There is a fellow called Khan, who has a Khan Academy in the US, some of you may have heard of him. He went to school with my son. He was a successful investment banker, young guy, made some money and decided to quit. I believe he is from Bangladesh. Quit and said what do I do now. So he turned down to one of his cousins, some little kid had some problem with maths, so he started teaching him maths in his free time, then he decided that he should do some web courses on maths. So sitting in his bedroom, on his laptop with a camera, he decided to do some courses on maths- multiply, divide, trigonometry, algebra, geometry and all, started putting on the youtube, and all of a sudden realised that 100s of thousands of kids are watching this. He set up a thing called Khan Academy, run out of his bedroom, you can go see it on the web, one man show, 2200 courses ready; in US hundreds and hundreds of schools use this. Half a million to millions of kids learnt from Khan, see the power of one guy. So I called him and talked to him. I said let me take out the material out and translate it in Hindi. And see, if I can put it on web, not that it is going to change maths teacher in school. Because he will fight it or she will fight it that is okay. But In India, we have this tuition system which I think is the biggest racket in my opinion. If I go to school, pay attention, why should I go to tuition, I don't understand. But everybody goes to tuition, tuition fellow make money, so I said– can I learn at home, and augment by learning in schools, using Khan Academy with the world we are trying to experiment with this in 10 Panchayats.

We are just planning right now in collaboration with the US government, we take some material from Khan Academy, put it in Hindi or Gujarati or whatever and see what happens and learn a bit about the model. Then I can take 10 other smart kids, do something on physics, do something on chemistry,

on social sciences, and get thousands of these courses on the net. His idea is don't bring more than 10 minutes or 7 minutes of material because the attention span then goes away. Let the kid play after 7 minutes, may play games, then come back again after 7-10 minutes to learn a new concept.

Similarly, there is a lady, Nirmala, we met her during Knowledge Commission days four years ago, we again met her yesterday and she has series of things on Maths, developed in India, connected at schools in US who is using her material and have decided to eliminate all those maths textbooks in US, not in India, so we don't need any math textbooks. Just take her materials and that is only way to teach maths. Fascinating stuff, you need to look at, so lot of these stuff is going on, how do we get this and not just say, I am also going on to do maths, but see what they have done can we just try to do little bit to tune into standardised maths, standardise Chemistry, stardandised Physics, so you have at least standard material and then you have extra that you can add to augment that material, rather than 50 people doing same maths and teaching Algebra in 50 different ways and confuse everybody. With this background, let's talk about actionable items.

I am sure you all have challenges related to infrastructure, hardware, software, equipment, funding, these are all given, but can we at least get some schools to have better websites. Can we standardise a website for schools, a template so all our Indian school should have websites like that so people get used to it. If you want to know about teacher, click there, if you want to know about fee, click there, you want to know about admission, click here, if you want to know about facility, click there, so everybody has same feel and touch. That much we can do, what does it take, it doesn't that is have to be 100% right. But we all will have to agree up on whatever we decide.

We can have 15-20 wise people, men, women, teachers whatever, come together and say this is India's schools website format for the next 3 years, then we will review it again after some time and all schools filled that in properly, if I need to go to school website, learn about my school facility, learn about my teachers, courses, fee structure and all the other related stuffs, sports, library, why can't I do it today, I do not understand, that is the starting point. If you can't do that much, don't expect anything more, because this is the real window to your school. Through that website, I can see what kind of school this is. If I look at the faces of the teachers and their experiences and their background, I can tell you, it is really okay school but if no, I will never send my kids here. So one actionable item would be to really focus on standardising websites for school and there may be 3 standards, I don't care, may not be one, may not be agreeable to everybody, we need these websites in local languages, not in English, certain actionable items is to really start focusing on creating domain experts. In 20-30 different school domains, Algebra, Physics, Geography, History whatever you decide and create 10-15 domain experts in that subject and tell them to select standard materials. Again standard is a broad term, but 80% is a standard to me. Can we then say for our kids that this is how the Algebra material will look like? You are already

doing this in schools, in textbooks but the idea is to get rid of textbooks.

The other day I was walking near Lodi Estate, and I saw 6-7 young kids walking. One little kid was about 7-8 years old, malnourished, very thin and carrying a big bag full of books, so I stopped him. He got confused because I don't look normal with my hair, and beard and all, may be he thought I might rob him of something, so I said I want to talk to you. I asked what is this?, he said "Kitaab Hai". Why so much, he said "I have to carry all these to school" I said you just go and get a cart with wheel that we get at the airport I said "you shouldn't carry all these in your bag", must have been at least 35 pounds, the books were very thick, so I asked "do you do it every day". He said "yes every day". "Why can't you leave these books at home?" He said "no, my teacher will fire me or whatever, she does". Poor kid was so miserable because parents and teachers have told him that you better to carry these 35 pounds, may be 40 pounds, that's okay, just sick and nobody is concerned about it. I just don't get it. Everybody thinks this is a normal thing to do. I don't think when I was 7 years old, carrying so many books, and I studied okay. Something must have been done, right? What is that we are doing that requires 35 pounds of books. I think we need to look at some of these things very carefully. I think that we are losing the interest of our customer, our customer is out there, poor customer has no voice because parents know what is good for them, and teachers know what is good for them and its okay, this is the way the things are supposed to be. Our kids are not supposed to be taught to question. I remember growing up as an Indian father, I assume that you know what is good for the kid, and first shock I had was when my daughter was 7 years old. When I said something, and she said "that is not fair". I said "What do you mean", she said "Dad, that's not fair". And I started thinking that may be she has a point here, I think its fair but it is not fair, thereafter everything I did, first I asked questions, is it okay with them. If it is okay with them, then its okay with me, so never asked what grades you make, never in my life. I have two kids, never asked them where do you go, what do you do, if you do come at 3 o'clock in the morning, okay come at 3 0'clock in the morning. I trust you; I love you and I am there for you, you are a free bird. Only thing I can do as father you can look up to, because that is in my control, and nothing is in my control except that but I guarantee you that I'll give you a father, that you will look up to and say okay. He doesn't hide on income tax, doesn't cheat, does his stuff, he is fare to everybody. And that's makes a big difference. I have learnt that in my life. Our children don't have a voice in the system. And I think we need to really listen to them as to what their needs are, what are we trying to teach them, are we really teaching them the right stuff, do they really need to know all of these stuff that we think they need to know, does that really help them be a good citizen, if after all these turn out to be they would into a corrupt, and useless, what had we taught them. I get lots of chance to speak in America, which I do a lot, once I was invited to speak to by Condolisa Rice, to speak to 400 Vice Chancellors and Presidents in Washington, Presidents of Universities including Harvard, MIT and everybody, I said look, one hand we are

talking about grade, higher education in this country America, and 2 per cent of Americans are in prison. It is a huge number, And they are building more prisons. Everybody says more police, I said what is wrong with your education, how could 2 per cent of people in prison in a country where this education system is so great. Because We are focusing more on quality of products, we have quality control all this mathematical modelling, for quality of a product but not of people. We don't produce six sigma quality people, we produce six sigma quality products, there is a huge difference. We want to produce six sigma quality kids, and the actionable item is to really get this domain experts, prepare material, put it online, eliminate textbooks, I know printing press guys will be very unhappy, I know book publishers will be very unhappy. That's the transformation we are talking about. So kids have one little device ultimately, may be not now, may be 5 years, may be 10 years down the road and everything is online and everything is searchable, and everything is worth exploring and the world out there opens up all of a sudden.

I remember Rahul Gandhi and I had gone to Amethi and we had inauguration of some computer, and one little kid was there and they had dressed him up, everybody was there, TV was there, Rahul Gandhi was coming, so he goes there and asked him to do something and he did it quietly, nice kid, so I said you know what thing is this, he said no, so I said "from here you can see the whole world, you don't need to go anywhere", I said 'this is not software, this is not computer, it is a new window for you'. In Hindi, I said "Khidki se dhekh sakte ho, this is a new khidki" so I said who do you want to see. After looking at three other people, he said "Tendulkar", we typed Tendulkar, then Tendulkar was on the screen and I said "what do you want him to do", so he said "I want him to play, hitting a six" or like that, we did that and he was amased. The kid thought this was magic, think in his term or her term, I think everything we do, has to have kids as the focus. I have taken longer time than I thought, but you know I don't get chance like this. To talk to real teachers, who are concerned about this but I would say we have a lot of actionable items we can work about that but I think I have conveyed my concerns to you. We can open up for question-answers; I can stay little longer, if you wish. But I am very concerned about the future of our children, I am very concerned about using IT for a paradigm shift, I am not happy with the incremental thing we do and the way we do things today, it has to change, and we need people like you to make that change. Okay….Thank you.