



SCRIPT OF TALK

TITLE: Emerging Learning Paradigms on the internet: NPTEL and NMEICT from India **SPEAKER: Prof. K. Mangala Sunder**

NARRATION:

Let me first of all thank Professor T.V .Prabhakar of the Indian Institute of Technology - Kanpur and Dr. Balaji from the Common Wealth Learning for their invitation to give brief lecture on the national program on technology enhanced learning and the national mission on education through information and communication technology to the participants of this course MOOC on MOOCs. I would give you a very brief introduction to these two programs from the point of view of new and 'Emerging Learning Paradigms on the internet and these are the current contributions in India NPTEL and NMEICT and my coordinates. My address is given here please feel free to write to me. NPTEL stands for National Program on Technology-Enhanced Learning. It was started by the Indian Institute of Technology in 1999 and was funded by the Ministry of Human Resource development government of India in 2003. NMEICT is a program launched by the Minister of human resource development in 2009 and is an acronym for national mission on education through information and communication technology in all of these things and the fact that we provide a lot of content a lot of educational material. I think it is important for us to remember that information is not instruction. One of very profound statements by Professor David Merrill many many years ago from the University of Utah. I would also like to dedicate this particular lectured to my long-term colleague and friend and sort of a mentor Prof. Paul S. Goodman who was formerly Professor of Cognitive Psychology and was a world renowned psychologist and researcher and filmmaker at Carnegie Mellon. For those of you who are familiar with the 'Bombay Dabba Wala' movie it was Professor Paul who made that movie. Paul was interested in technology-enhanced learning and was the collaborator with us for many many years unfortunately he passed away last year. This particular lecture I believe would be useful to those of you who want to design the massive open online course and I would like to tell you that there are many elements that you can get contributed to from the list that you see here. NPTEL or NMEICT or currently addressing here large number of these issues and mooc will be

absolutely you know a beneficiary given that NPTEL are now distributed to the rest of the world under creating comments like share a link and attribution, only we have removed the non commercial restriction that we had earlier. Mooc can tailor content a curriculum there are pedagogies even though I would like to use the word andragogy as far as the adult learning is concerned. Pedagogy still used by many to provide outcome based learning and guide teaching for research which is more open ended. Then the other strategies not obtain to talk about our flipped classrooms and online education but only in certification to mooc you will have many many lectures in this series. Therefore, I would not concentrate I would tell you more about NPTEL and innovation in universities which is now driven by some of these process there are many Open Educational Resources. I'm sure most of you are aware of it and the large volume of material that or the efforts of many nations and there are many international efforts and you are also attempted to go beyond the open educational resources ask for example with the mooc itself. In India NPTEL started in 1999 virtual laboratory programs virtul labs which is funded by the Indian Institute of Technology, Delhi.

A program that was started by Indira Gandhi the National Open University to digitize all its educational content for the free use under the name 'E-GyanKosh' then you have design courses being built being developed by professor Ravi Poovaiah and his team with number of national Institute of design partners and called 'E-kalpa' then the University Grants Commissions wing call the Consortium for educational communications which is responsible for recording a large number of undergraduates science, arts, commerce lectures in video format using 21 of its educational multimedia resource centers which are very high quality TV stations. These are the efforts of the National mission on education and here a lot of it is available I'll show you the website soon please feel free to use them for designing your mooc course. While many Asian universities and institutions Japan, Korea, China, Philippines and many other countries and you can see that the common wealth of learning of course is the driver for creating a larger number. Of these Open Educational Resources (OER's) and of course you have a very large number of such courses such programs started in the early days from the United States. Right from the Project Gutenberg: for digitizing books Google Books which you have seen OpenCourseWareMIT which started incidentally in the same year that NPTEL was

conceptualized in 1990. Independently of each other of course then there are courses by the British Open University and of late you see very large in number of lectures and course materials on the iTunes through the iTunes University. This famous Open Learning initiative you for creating self paste e-learning content by Carnegie Mellon University. Yale university courses online Harvard University membership California, in Berkeley the list is very long and YouTube has many of these educational channels now for free and a very comprehensive list is given by the website that I've quoted here called him here this presentation will also be made available to you.

At the end, of this lecture in the same website you'll be accessing my lecture from NPTEL. To be very brief is program started by 8 partner institutions 7 Indian Institute of Technology and Indian Institute of Science (IISc) Bangalore. The seven institutes were the original seven institutes in 2003 namely IIT-Bombay, IIT-Delhi, IIT-Guwahati, IIT-Kanpur, IIT-Kharagpur, IIT-Madras, IIT-Roorkee and Indian Institute of Science (IISc) ofcourse. Prof. Bhasker Ramamoorthy who is the director of IIT-Madras is also the chairman of the NPTEL program, Implementation Committee and he's the overall national coordinator and myself and Prof Kushal Sen of IIT-Delhi are the two national coordinators who are hopefully bring all the contents which have been prepared with all the necessary formalities and a technological conversions and so on the project itself was the brain child of Prof. Ananth, the previous director of IIT-Madras about ten years. NPTEL project was written by him NPTEL project implementation was guided by him. For 10 years between 2003 and 2011. In the beginning i.e in the first phase of NPTEL we were interested in creating course as you see in Engineering, core science and technology which are also points of strength for the IITs in India. We would also like to build courses in Arts, Humanities and Management we are doing it now. The site NPTEL.ac.in that contains all the courses developed until today and YouTube carries all the video lectures. A little more than 15,000 video hours are there in phase one. We had about 100 courses in a web based course format using HTML or PDF and so on and 100 or more courses recorded using video studios. 130 courses were done in first phase 125 courses in the web based format. In the first four- five years it was an experiment that brought competing institutions competing for under graduate students in the country the best under graduates in the country to solve your problem or even to attempt the

solution of a problem of massive online education for several thousands of institutions where the number of qualified teachers with a PHD or a postgraduate program is quite small and therefore, it was intended and even know it is intended to be a supplement and not a replacement. In the second phase you can see the bar chart here which gives you many of the engineering and science branches where courses are being added to this NPTEL program and they're looking. More than 800 courses are currently available on the website. I would leave the details to be looked at by you leisurely at a later time you can see the largest contributors to this program are chemical engineering civil engineering mechanical engineering and physics chemistry and so on. So, the science course are at the postgraduate level the engineering courses are all at the undergraduate and some are at postgraduate level so that the whole curriculum base is completely filled up, i.e the undergraduate base is been filled up one course a time from first year to the fourth year.

Our objective is to provide a complete curriculum to any university interested in building educational processes. Contents are based on several components they are all integrated they don't appear but if people are interested in getting an animation Out of the course it's possible for them to take it out. The contents largely are lecture materials or video records and then supplemented with animations visual illustrations many courses have them. Video demonstrations of some of the lab experiments, documentaries and even interactive simulations wherever that the teacher thinks are is important and it is supplemented also by case studies anecdotal information as you see it some historical development of the subject wherever the history is important for understanding the growth of the subject. Problems and quizzes which are important for students and assignments and solutions which will drive the students to learn this for your career orientation as well as for understanding the subject from you're certain vantage point therefore these are all important in this sense it's a fairly complete stand anyone who wants to design massive open online course. Each course has approximately 40 or more one hour lecture is much more than what mooc course can offer. I would typically imagine that the course in NPTEL is approximately equivalent of two such mooc courses if it is done carefully and systematically. It is useful for classroom study for colleges for private study in whatever form you would like to. Please feel free to use the course contents. You will have

to share a like any development that you have built other than that there were no constraints for you in using the course with any system of education. The courses were created with university curriculum in mind and even today we look at large affiliating universities in India such as the Anna University, the Jawaharlal Nehru Technological University and VTU University Belgaum and now the Uttar Pradesh Technological university, UP Technical University. We use the syllabi of many of these and the All India Council of Technical Education for modularizing these courses.

These are some templates and some samples of how the course sometimes appear on the website you can see the that video lectures of all components handwritten notes created recreated materials, pictures and the graphs generated they can be very simple board lectures. This is one of the most popular and most well appreciated lecture series in physics by Professor Balakrishnan in Mechanics. These are some of the brilliant lectures that we are able to capture similar examples where the board lectures are captured also with printed materials or supplements. With the students lectures in which each of the elements the pictures, the drawings, the graphs, whatever they are all created by the teachers. Therefore, they are the copy right, they are not taken from any other source or even if the professor had a text book they generally recommend the Professors to redraw these pictures and even the problems we would like them to recreate the new sets of problems and so on. So, that the copyright belongs to the country and for free distribution and is not subject to copyright laws of the publisher from home. We take this material and since we used to create a common stock publishing licenses the corporate requirements are very astringent in our project you know a project so you could see that here is an example of a chemistry course in which a software is used for creating here reaction sequence but the students need not have to have the software. They will see the outcome as what they as a scheme the last one as an example is a lab demonstration is actually captured on the video. In fact this is the most popular video course from the NPTEL side Prof T.S. Natarajan on basic Electronics. The first lecture is about 1.2 million viewers now the entire mission which was started in 2009 has captured some of the basic aspects of the NPTEL project and has built a much larger much much larger program known as the National Mission on Education through Information and Communication Technology. A lot about that

program can be found in the 'Sakshat' website. Though, I would quickly tell you some two or three important programs that you should be aware of one is the virtual labs programs started by the IIT-Delhi with many partners that you see here IIT-Kanpur, Bombay, Madras, Guwahati, Roorkee, Kharagpur and universities like Amrita University, Dayalbagh University, National Institute of Technology College of Engineering. So, you see multiple partners and these are coordinated by Professor Ranjan Bose from IIT-Delhi. The motivation for these is that the laboratories are not always there in incomplete form in many of the university's and physical distance as do limit doing experiments costly equipments can be shared through this process and proliferation of quality labs through simulations can actually make the learning better and so we have several schemes under the virtual lab like the remote access to labs where student can submit their data and get the experiments done then there can be simulations which the students will learn through their own pace and curiosity. Also, the labs are provided with the complete learning management system involving the procedures for the lectures the video lectures the animated demonstration so it's a very large sets of experiment in the field of engineering which we hope will also supplement and enrich the learning of content provided by the NPTEL.

There are many types of virtual labs simulation-based labs measurement based labs and remote triggered labs and there are many partner institutes. I already mentioned the broad area that you can see these lectures are in mostly in engineering but chemical and physical sciences that you see at the bottom are also slowly becoming partners in designing experiments for students from the remote thoughts. So, this is the website that you might want to look at and use parts of it in your old creation mooc program it's www.vlab.co.in and the other one important program that I would like to talk about is the digital learning in design by the IIT-Bombay team headed by Professor Ravi Poovaiah called 'e-kalpa'. This has created a very large number of resource materials for digital learning. It has digital online content that you can see on the right hand side it was digital design resources a large body of it these are all created in house and therefore, they are copyright free and there is a network for learning. Some examples are here, this is the website that you would like to take a look at and the website is also enabled for different types of tablets so that the contents can be downloaded in multiple

formats in multiple devices and some examples are if you character design animations then elements for 3D design. There are pictures of various locations that would be useful in the creation of the concept of design. Then you can see that there are several character design animation schemes not you can actually go to the website and our draw from tessellations mean enormous more love information has been created and has been in and ordered form and also you can see that the process of even little extraction and how people have gone through from the older to the modern time. So, let me complete my lecture I would like to talk about other schemes but I think I know I'm going out of time. Online course Miller as Professor Andrew might have talk to you in the discussion on the mooc. We have used the Google course builder as one of the free resources for organizing course contents for NPTEL. Of course we don't use any course platform or a learning management system. The contents are provided in a free format but the certification program is now being taken up by NPTEL which all these courses which have been created and therefore, I would like to request you to visit the NPTEL website regularly to find how we are using our own courses for the creation of moocs certificate and through that process we would also like to learn from you how to create other moocs certificate. The current courses on the mooc certificates program from NPTEL or two courses in IIT-Kanpur and IIT-Madras. So, technology enhanced learning is what we are always concerned with technology enabling will happen as and when the requirements or their technology enabling is necessary but it's not sufficient enhancement refers to cognition mooc and many other programs which are emerging must also address this issue. Therefore, we have to promote critical thinking. We have to have a visualizability of concepts and visualization methods. We have to have demonstration of hands-on experience that you have and at the end of it we want to build competitiveness. So, you see top we want to build nations to the fullest capacity and I would always say this how lofty these things are that this last line that you see in this slide this country represents the largest one-sixth of the world's population and also all the problems of the world are represented here. Therefore, if we sincerely attempt to solve all our problems we have also solutions for everybody in the world.

Thank you very much for giving me the opportunity to speak to you on the mooc. I wish you all the very best.