SCRIPT OF TALK

TITLE: **MITx The Learning Revolution** SPEAKER: **Prof. Sanjay Sharma**

NARRATION:

Hello!! My name is Sanjay Sarma, I am a professor of Mechanical Engineer at MIT and the Director of Digital Learning at MIT. The office of digital learning at MIT consists of several groups one of which is OpenCourseWare and the other is MITx which is what I'll be talking but mostly today I have prepared this video for Professor T.V Prabhakar who was my professor when I was a student at IIT Kanpur over twenty years ago. So, let me start by composed about edX as you will have heard by now in professor provocateurs course Moocs, Moocs on Moocs edX is a not-for-profit online site that was designed for learners worldwide and it was established first by MIT and then it was spun out of MIT into edX with an investment from both MIT and Harvard and it now counts amongst its member many other top universities in the world Berkeley, Caltech, IIT Bombay, Tsinghua and so on. The president of edX is professor Annant Aggarwal who is actually still a professor at MIT and is now on leave and he's the CEO of edX and he's the man who actually founded the original MITx project which I'll talk about more in a minute.

The edX platform is open-sourced under the open edX pronoun which means that you can download it and install it on your computer if you want but the edX.org website is the marquee installation and that's where most of these top universities go to put up their up massive open online courses for publication edX today has in nearly three million enrollees from over 195 countries and it's growing very rapidly in very excited about it some should say that I sit on the board of edX and I'm a big believer in digital learning and let me tell you about the history first you see edX was a established as I said first it was a project at MIT that was triggered by Professor Aggarwal. Annant taught a course 6W2x which is circuits and systems to the world and he ended up getting a hundred fifty-five thousand students the course was launched in March of 2012 and by the summer 2012 MIT had realized that this was a big deal. So MIT went

out to the colleagues at Harvard and we founded edX but at that time we also decided to split the functions a little bit you see when usually the MITx was launched at MIT it did two things one is it produce content but it also created the platform on which the content run so when we created edX carved out content production left it with an MIT and so MITx think of it as Disney we make the movies and edX is the platform it's like a theater and edX is now an independent not-for-profit run by MIT and Harvard and the CEO's professor Aggarwal. So, the MITx piece the production piece still resides with an MIT and reports into my office now obviously the launcher for MOOCs is exciting to us that follows in a long tradition of MIT doing outreach work for the world for example in the early 2000's MIT launched OpenCourseWare which was a gift by MIT to the world of its intact curriculum. Today, OpenCourseWare receives more than two and a half million views monthly into unique views from learners around the world and so. Similarly, edX is a gift to the world but since the edX software is open source and in fact the reason it's open source is so that universities can actually use the edX software on campus and I want to give you some insights into why we do that and what some of the outcomes or in the next few slides so edX when my office was created we took the open source software and we ran a version of it on campus and we made it available to our professors and I have to say that we were absolutely blown away by the adoption on campus it was tremendous professors, started using it inside the courses and the number of course is pretty much doubled every semester starting in the fall of 2012 through the spring of 2014 and we have 4500 undergrads about and more than half of them now have used the edX platform through their classes. I'm not talking about going to edx.org. I'm talking about taking it or using this platform intrinsically through their internal classes because the professors have started using the edX platform on campus and this is the growth in the number of courses. It is said it doubled in every semester so what I'm going to talk about now is why, why is this happening why is online learning such a big deal on campus. We hear about learning in the context of massive open online courses but why on campus. The reason is because at some deep level we believed that we are cracking the code on learning I mean these are early days but it's very exciting to see what the possibilities are and or talk to you a little bit about the pedagogy that online learning enables you to see. There's a lot of research it's not recent actually goes back almost 50 years that shows that long

lectures that his lectures that go you know ninety minutes sixty minutes are not efficient and there's a recent publication in the proceedings of the National Academy of Sciences in the United States that further emphasize that lectures kind of don't work, in the reason frankly is because they are one-way and students are passive and you know of course one can always wave a finger at students and say you must pay attention and they assure but the fact of the matter is attention spans of most individuals is in the brain is just but six to eight minutes maybe 10 minutes what we have learnt. In the last few years is the best way to achieve learning actually is to slice everything into very very thin slices in other words don't do if possible a one-hour lecture ninety minute lecture do a 10 minute lecture and instantly give students feedback about whether they understood the material or not by asking them questions now we try to do that in regular lectures today with something called active but that is not that easy to do because you got to break the flow of the lecture and so on. But with online that becomes very possible. So here you saw a video of Professor Eeric Lander giving a lecture and it's transcribed on biology and his lectures are really very captivating but he keeps into under 10 minutes and instantly we then pop up a feedback window. Now, this feed back window is not from biology this from another course this is from Annant's Electrical Engineering course and so instantly at the end of a 10 minute lecture we ask questions. And now student is force to retrieve his or her learning from that 10-minute video from short term memory. Now if they don't know the answer they can go back and watch the video again if they don't know the answer then this act of assessing it's called interpolated learning it forces the student at some level to sort of transfer stuff from short term memory into long-term memory by re-exploring quickly what they learnt so this business of quickly cycling between quick learning modules and then quick assessments at some level. Not for long time this works but online we can really do at a very practical level it's very hard to do a 10 minute lecture in a regular classroom but with online that is how we operate and then the next thing you can do is go straight to practice which is put the student in the lamp put the student in discussion and then have them actually practice what they learn. So, for example they learn biology perhaps have them go do some observations go to assimilation if they've learnt control, quick lecture on controls quick assessment then instantly applied that within a day or two to for example building a robot and

having it move around. At once, if you start doing that you start getting some really amazing learning outcomes I say again this is not new known as a long time. But with on line it becomes possible now how good that is some were put up a very very complicated graph bear with me here. This is from Professor Michael Seamark this is a class that he taught in the fall of 2013 on Solid State chemistry it's a famous class at MIT and down let me explain what these results show, what he did was that he replaced all the homework's, all the assignments and all the exams in this class with weekly online quizzes with instant feedback and every quiz was randomized. So if two students took the quiz they'll get different questions and if the same student to the quiz twice they would get different questions but I'll come back to why the same student might take the question twice in a second. So, what we do here is first of all he spread the course in two modules for example the first module is on atomic structures now ignore the red just look at the blue and the green. The blue is the number of students who would have scored a 100 percent on that topic a he explains in this paper the old way. The course is taught which regular lectures are and green is the number of students who scored a 100 percent on that topic than new way which is where he had dozens to be back and you can see the results are very remarkable actually. the number of students to score you know hundred percent is very high the new way. the way he ran the class was like say if the student took a quiz let's say I took a quiz on Thursday it's a proctored quiz its online setting I'll go and I'll show my ID. I'll take the exam in an online setting I get a score and if I don't like the score I can actually scratch it and then I get locked up for 24 hours and I can go and talk to the TA I can take the exam again or the quiz again so the idea here as I can keep trying until I get my level of knowledge up but in the process of taking the exam and being forced to review what I don't know and then don't clarify my doubts so it forces me to actually do well on the exam. So the result structure tremendous now just to finish this description as graphs the blue was the old star the green was the new star. How many students scored a 100 percent the red is the another student score eighty percent in the old star so what this shows is that in all of you know of regular lectures with feedback you know through homeworks which comes to two or three weeks later a much smaller fraction of students even knew New eighty percent of the material compared to the number of students who get a hundred percent so that is you know just the beginning of how

online is impacting as a campus now when we first started using online material on campus students were somewhat suspicious of it sort of change they didin't like it too much last semester we taught another class 8.02x using the lectures the very famous Professor Walter Lewin and some other online material and we also used more importantly instant feedback and what you can see is that students have been to like this a lot this saying yup I prefer to do 8 or 2 using instant feedback on MITx and should continue to use MITx.

Over alluring majority say yes should other courses use online ad again the majority of students say yes instant feedback this is one of the comments instant feedback equals better study habits and I'm able to retain the material the right way so this is becoming something of a theme sort of a new style of teaching that we're a very excited about now this is not new to MIT. MIT has a long history of learning by doing so if you a look at the MIT logo there's a man with a book but is also a man with a sledgehammer and the reason is that the founding principle at MIT was to bring mind and hand together men's as Manas as it says down here. so for us this is all very natural but it's also very heartening to see how online education online digital learning tools have become a very important part of the way education occurs on campus at MIT so look I'II stop with that I'II obey my own that lecture should be brief I've already gone took 14 minutes which is long but again I hope you enjoy this and thank you very much.

Bye bye