

## **e-Learning, Tablets, K-12 Education and All That Stuff!**

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Good afternoon, everyone. Patricio mentioned the difficulty of starting a post-lunch session and I have the honor. A dubious pleasure of wrapping up the post-lunch session. When the topic came up, the future of virtual universities, I was in the process of actually looking at where our own institution was going. I thought that I would build that in as a case study from Pakistan about its own university and its future direction. But perhaps it represents food for thought for everyone here. So I'm not titling my talk as the future of virtual universities and giving you my ideas on that. I'm talking about e-learning, tablets, K-12 education, and all that stuff.

For those of you who are new to the Virtual University of Pakistan, I'll give a very brief introduction and then talk about the state of K-12 education, look at the challenges, talk about technological ideas, and the intervention that we plan. The Virtual University of Pakistan was established in 2002. The idea was to provide high quality, affordable, uniform education across the country. If you looked at the drivers for the development of such a university in Pakistan, we had two major problems.

One was an absolute shortage of capacity in our existing institutions. And the higher education sector was basically serving about 3.5% of the college age cohort. No more. And the other major problem was that we had an absolute shortage of qualified manpower. So you could build brick and mortar institution, but you couldn't staff them. And to build a professor, or to develop a professor, we knew it took like two decades. So we thought that we would use technology and then provide higher education to all aspirants, regardless of where they were located. And also in the process, elevate the quality that was being offered by using the best talent that the country had to offer.

So the basic model of the Virtual University of Pakistan. It initially used broadcast television. We still operate four free-to-air television channels, which are carried by the cable operators. But more and more so we are using the internet for the delivery of video lectures. And then we interact with our students through a comprehensive learning management system. This is our own development. So the internet has a big role. It is the lifeline of the university.

And the assessment is done through proctored examinations. Examination centers that are designated, again, nationwide. So just a brief look at the picture. At the bottom left is where we sit: the virtual university headquarters. We develop the content, we have permanent staff in terms of tutors and academic support. We broadcast and we all support all of our lecture videos on YouTube, on the internet, to our OCW site, but more so through our learning management system. Students can attend from home or they can attend from a campus, which is basically an infrastructure provision place, but they have to do it as per schedule. So the maximum flexibility of the Virtual University of Pakistan is a 24-hour time window. So we are a very formal institution. We're not an open university. And the idea being that if you tape today's lecture, you may be able to answer the quiz tomorrow. That's what we do.

So 10 years down the road, where are we? We have an established presence and this is in the form of these infrastructure campuses in over 120 cities of Pakistan. We have more than 200 active campuses. We called them Virtual campuses because there's no staff there. There is no academic staff. There is, of course, adult management and there's networking people. Or as Vijay would say, "geeks."

We have 26 of these campuses that are owned and operated by the university, itself. While over 174 are in very thriving public-private partnership. Our enrollment right now stands around 100,000. What does that imply for the higher education sector? As I mentioned earlier, when we started, we were serving about 3.5% of the college-aged cohort. Ten years down the road, it's not just that the Virtual University of Pakistan has been established. There have also been many other conventional institutions that have come up. The current enrollment in Pakistan stands at about 7% of the college-aged cohort – so ages 18 to 23 or 25 – who are actually enrolled in higher education.

So we're still a long way away from where we would like to be. In terms of the country itself, it's down in the noise. We ranked 145 out of 187 countries in the UNDP Human Development Index. We are very unlikely to meet the Millennium Development Goal of universal primary education by 2015. So, whereas, looking at the virtual university, I'd say that we're great at surmounting almost impossible odds and obstacles. We're also great at digging a huge hole, in which we put ourselves, and then we try to climb out of. And I'll come to that in a minute.

So higher education is still serving only 7% of the relevant age group. It is still concentrated in the largest cities only. It is still expensive. Rather, I would say it is *more* expensive. Because there's been an influx of universities in the private sector in Pakistan. And that actually has raised the cost of higher education. And the faculty shortage still exists. Although we've had a very good human resource development program launched by the Higher Education Commission, nonetheless the demand side is outpacing the supply.

Now, I'll switch to the hole that we've dug ourselves in a parallel sector. Having been associated with university education all my life, I would say that the most disappointing day in an academic year is the first day of classes at the university. When we face an audience, which is quiet, and critical, and questioning. And they just sit and they stare at you. You can talk all you want. You can be as energetic as you like, but you do not find a response. And the reason is for the first twelve years of their education, we have made sure that they do not become critical, inquiring individuals. We've always told them to please keep quiet, don't ask, don't question. I'm the sage, listen to me. And suddenly on the first day of classes, the university expects them to be university students. And they're not. So we spend a substantial amount of time in the first year. And we do succeed to some extent, but it would be nice if you could hit the ground running.

I'm going to take the example of our largest province, which is the Punjab. It represents almost 65% of the country. We have 58,000 functional government schools. The public sector still is a major player. We have more than 8.4 million children enrolled in grades 1 plus. We are more than 300,000 teachers. Looking at these statistics, I think it roughly works out to a student-teacher ratio of about 20 something to 1. Very fair, very decent. Looks nice. But look at the population trend. I got these figures out of Wolfram Alpha. And we are roughly adding 3 million new school age people into the system every year. If you think in terms of the requirement on the teacher and the school side, we don't have 3 million exiting the system. But we do have 3 million additional students coming in. And that represents an additional load.

But it would still be all right if we didn't have this, on the other hand, to cope with. The ones that have writing in red, now these are statistics again from the Punjab, and the numbers represent the number of school teachers in the system. The term, metric, actually represents 10 years of education. The FAFSC is actually an acronym for Faculty of Arts or Faculty of Signed Certificate, which represents 12 years of education equivalent to the US high school. If you think about it, there are three red lines in there. Close to 100,000 teachers have only 12 years or less of education.

And they are school teachers. They do have the PTC and the CT on the left. It's the primary teacher's certificate or a certificate of teaching, which is professional education. But they still have 10 to 12 years of formal education only. Which is abysmal. If you look at the other numbers, there are a certain number of graduates, but without any professional education. So they have a Bachelor's or Master's degree. Only the last two lines – it's about one third of the total number – represents teachers who hold a real Bachelor's of Education, in conjunction with a regular Bachelor's or Master's degree.

So we have a teacher retraining problem existing. We need to bring them up to speed, to make them cope with modern technology. So that they're able to deliver better education in the classroom. But don't forget, that we also had an increase in population. So we've got a double whammy staring us in the face. We've got poorly trained teachers in the existing classrooms, and we need to increase the output of our teacher education

programs phenomenally. So one of the things that the Virtual University is doing is that we are launching a Bachelor's of Education Honors Program. This is with USAID support. We have a modern curriculum, et cetera.

But traditionally, and this is the other hole that we have dug ourselves into historically, school education has not been the career of choice, ever. It's been the career of last choice. So the left over people. People who were academically low performers or low achievers. They have gone in, so let's be a school teacher. Whereas higher education is slowly getting better, school education is still in a very sad state. So we have a huge growing demand. We have a shortage of properly qualified teachers. Production of teachers is not meeting the demand. And teacher education has quality issues.

All of this sounds very familiar to me. Because these sound like exactly the same problems that we had when we were starting out the virtual university aimed at higher education. So can we do something? What we are planning to do again, is in an e-intervention. Bring technology into the picture and see if it can help. Hopefully it will. And the issues are the justification for this thing. We have a shortage of properly trained teachers, we need to train them quickly. Bring them up to speed. And in large numbers. Use technology.

We have capacity issues in institutions. Or, we cannot provide a quality teacher all over the place, so we'll plan an intervention. I'll come to that in a minute. The whole world is going "e," so why can't we take the e-word into the K-12 education domain? Obviously, it is not a one-size-fits-all perspective. In higher education, I believe that over the past 10 years, we have a fair idea of how to do things. It does not mean that we have conquered the delivery problem. We are constantly innovating and we are looking at what's happening in the world around us.

The morning has been spent talking about MOOCs. If you think of an average freshman class at the Virtual University of Pakistan, we have about 10,000 to 12,000 new students coming in. So a single class, let's say, Introduction to Computing, is a 12,000 student class. So whether we called that a MOOC or a SPOC. Or perhaps it's just a "spook," I don't know, but we've been practicing that. But when we come into K-12, it's not the same thing. We have to look at the age of the children. We have to look at the pedagogical aspects. We have to look at the teaching aspects, the teacher training aspects. So it's a much more complex picture. At the very younger ages, we would probably look at entertainment as the mode of delivering knowledge. In the middle years, it would be discovery. And in the senior years, it could be constructivist approaches. So let's look at the philosophy.

The idea is to get inspiration from everywhere, but it needs to be designed and developed for local conditions. This is something that we learned very early in the virtual university experience. We couldn't pick up a course from outside and then transplant it in the Pakistani landscape. The context was completely different. And for younger children, this

problem is a serious one. So you can take the example from anywhere in the world. Take best practices, but always contextualize, localize, bring it into the understandable domain. “The Physics of Donkey Carts” is BLOSSOMS module. It's precisely meant in this context. Look, it is physics, It is Newton's laws, but let me show you something that you have seen in your own real world experience.

Find the development of content, but deliver for free. That has been the virtual university philosophy. We have an OCW site, inspired by the MIT OCW site. It won the Best Site of the Year Award last year. All of our content is there for free for anybody who wishes to learn. It's only when you want to acquire academic credentials that you actually register and pay a fee. Now, I would like to do the same thing for school content. So we would fund the development of content, but then make it an open education resource. There is a movement on crowd sourcing of knowledge or information. We would welcome contribution of content, but we would only publish it under our banner, after moderation or editing, making sure that it conforms to the university's own standards.

Now, this intervention will require a multifaceted skill set on the part of the university. “domain knowledge.” I believe that's easy to conquer. I mean we've already done university-level courses, so asking a domain expert to develop school material should not be that difficult. At least for the higher school classes. The instructional strategy, it probably is going to be domain-specific. I'm sure that teaching science and technology courses requires a different approach as compared to, let's say, teaching English as a second language. We would have to do it differently.

Younger children require a different approach, as compared to young adults. Then there's instructional design. You need content design and writing. You need e-tools and skill sets. You need to do pilot studies and testing. You need to do scale-up and deployment. All of these represent individual challenges. But that's the direction we are headed in. When we talk about tools and skill sets, we're talking on the non-technical side. We're talking communication skills. You have to have good communication skills to get the message across. If the content is written, or web-based, or whatever, it's ebooks. You need to have writing skills, script writing skills, illustration, graphics design, and so on.

You need to have assessment design. And it was thrilling to hear this morning that amongst the open source offerings that are going to come out of the edX experience is going to be automated assessment. Rapid or immediate feedback to students. So we're looking very, very closely at what we've accomplished here. On the technical side, they are all specific tools. HTML5, or web design, scripting, et cetera, which are IT related. And this scripting is not the audio scripting. This is the JavaScript or something like that. But we would like to be platform independent. So that's why I mentioned HTML5. That it should be available on my little Android phone, as well as on my laptop, or my tablet, or my desktop, or whatever device is available.

Videography, if you go in for small videos, which we will. This requires a different type of expertise – professional graphics design. In this context is going to be professional, but influenced by IT. Interactive animations, almost exclusively developed by IT professionals, but then influenced by the graphics people. And then, incremental publishing ideas in terms of pushing updates. And not to mention, not the dreaded, but the as yet unconquered, M-domain. What do we do with these ubiquitous devices that are sitting in our pockets? Again, in Pakistan, the mobile or the cell phone penetration is phenomenal. Every student is getting a device. But we don't know how to harness the power of these devices for the purpose of education yet. I mean it's still not completely understood.

So we should be looking at platforms, browser-based, WiMax, collaborative networks, loads of stuff. These are now the planned projects. We're looking at e-books for school, browser-based, again. With English and Urdu, which is our local national language content. Tablets will be provided free of cost and there would be an incremental charge that will be meant towards content development. So nobody pays for the content. And I can get into the specific model if anybody's interested.

An immediate project that has already started, and this is obviously the low-hanging fruit, we've started with senior high, so grades 11 and 12. That is right next to university level, and easier to handle. We don't have to worry about very young children. We can worry about automated content. We can worry about technology-based content the students would be able to handle.

The most interesting part is, again, in terms of having a shortage of adequately qualified school teachers, we are planning on using the BLOSSOMS pedagogy. Where the guru on the screen would be doing the basic explanation of concepts, and the person in the class would be doing the drilling, interaction, and the coaching. And if you think about it, by developing high quality content for the screen – which is going to be three to five minutes long, these are not one hour lectures – and then spreading it across the school landscape, you've actually given a huge shot in the arm to the entire school system. And using a learning management system and tablets, et cetera. So where is the Virtual University of Pakistan going? Back to school.

Thank you very much.