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ICT IN THE ERA OF GLOBALIZATION: INTERVIEWEEING ICT EXPERT

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About Mr. Rajesh Vartak, graduated in Computer Engineering, from Savitribai Phule Pune University, Pune (1995) and holds Master's degree in e-Business from the Birla Institute of Technology and Science (BITS), Pilani. Presently he is working as the Chief Technology Officer(CTO) and Executive Director at SEED InfoTech. He has over 20 years of experience IT Industry in the domain of investment banking, credit cards that include technologies like portal development, business process management and middleware like MQ Series and TIBCO. His areas of expertise include J2EE architecture, web services and performance testing. He has published number of articles in the newspapers and magazines on information technology and IT career. He was part of some of the programs aired on Radio Mirchi, Tomato FM on IT career related question answers. He has authored six books as a part of employability enhancement series on Java, .NET and software Testing. Recently his book on Mobile Computing: A Practical Approach got published.

About the Interviewer:- Dr. Sangiat T. Ghodake is an associate professor in English, Baburaoji Gholap College, Sangvi, Pune. She interviewed Mr Rajesh Vartak face to face, on the occasion of an international workshop on *ICT Education in the Era of Globalization* on 12ht October 2015 a convener of the workshop at Yashwantrao Chavan Academy of Development Administration, A Government of Maharashtra Organization.

Sangita: The pace of innovation and obsolescence in Information and Communication Technologies (ICT) is incredible. How important is it to know about ICT, especially in the field of education?

Rajesh: ICT's first avatar is Online education via web which started in 1994, just two decades ago. Now, it is rapidly getting morphed into various forms from flipped classroom to something like Massive Open Online Courses (MOOCs). MOOCs is sometimes referred to as tsunami of online education and at the heart of this tsunami lies the advancements in Information and Communication Technologies or ICT in short. Today and in the coming years, education cannot be even thought of without use of technologies like internet, mobile phones and so on. Every new invention is changing and challenging the existing methods of teaching and learning. Let us go to the research in neuroscience to understand why ICT is important and will remain important in the days to come. God has given us (humans) an instrument for learning called human brain. Human brain has a component called pre-frontal cortex which plays a key role and is very active in the process of learning. However, being smaller in capacity, it dozes off after every 20 minutes for some time. If one keeps on listening to a lecture for long duration, say in a classroom like setting, learning is not effective due to overload on the pre-frontal cortex. For effective learning, another component of the brain, the visual cortex which has enormous capacity has to come into play. As a teacher, when I am continuously speaking about a subject, I am jamming the pre-frontal cortex. For better learning, firstly, the pre-frontal cortex needs breaks at regular intervals. Secondly, when some aid like power point presentation, video, diagram etc. are used, my visual cortex starts participating and pre-frontal cortex is at ease. Material in the electronic form helps the learner build strong neural pathways by doing revision. In this way, ICT makes learning more effective and enjoyable.

Sangita: From the point of view of learning methodology what were some of the critical discoveries or experiments you have come across?

Rajesh: Distance education was digitized by e-Learning where learning contents were disseminated in electronic form. With the exponential adoption of smart phones, taking photos, making videos and uploading them on internet became easy and less expensive. With this, one of the significant experiments according to me was the discovery of a method called 'flipped classroom'. In USA, one professor of Chemistry decided to video record all his theory sessions.

The students were asked to view these videos before coming to the class. And a classroom session was converted (or flipped) into a laboratory session where students performed experiments, did discussions etc. This flipped arrangement resulted firstly into enhanced learning as the teacher's time was more effectively used in guiding the students while doing the experiments and solving their queries rather than delivering information through a lecture session in the classroom. Secondly, the lecture was available at any time for students to view and re-view it multiple times till he/she mastered the concepts well. In essence, "Knowing" of the information was done using electronic means like video and "Doing" was done in the presence of the teacher in the school. What made this possible are the technology components

of ICT like video, internet etc. The most talked about movement in online education called MOOCs is based on a very similar concept.

Sangita: We are hearing a lot about MOOCs now-a-days. Can you tell us more about it?

Rajesh: Massive Open Online Courses or MOOCs is the talk of the town today and is discussed at many forums. *Coursera, edX, Udacity* etc. are some of the examples of MOOC. Here, typically, an experienced professional designs a course and delivers it too. The course contains various types of artifacts like video snippets, quizzes, assignments and so on. The courses are self-paced and use open material. Learner can go through and assimilate the study material at his/her own pace. The courses available on the MOOC platforms range from technologies like data science to humanities. Some courses are created by independent experts and many others by Universities. Most of these courses are free and charge fees only when one wants to get a verified certificate or specialization.

A key feature of the MOOC platform is that a course from a well-known university taught by a famous professor is available for everyone, beyond the physical confines of the university and anywhere in the world. In the near future, there is a possibility of university level collaboration, wherein a student from one university may take up courses from different other universities as a part of his graduation or post-graduation.

Sangita: Here, I can see one peculiar change. A student is becoming the driver of learning, unlike being driven by a teacher in the traditional instructor-based learning. Will this mode be effective?

Rajesh: You are absolutely bang-on with this observation. All the new learning methodologies which we are discussing are driven by the learner or in other words, they are student-centric. Though conducted in a classroom or a group environment, assimilation of knowledge is an individualistic process. Everyone learns at a different pace. Individual learner's goal, is achieving certain level of competence. Teacher plays the role of a facilitator and a motivator instead of being a one-way knowledge dissemination engine. Adopting Learning Management Systems (LMS) is really a next step in this direction. In this system, a teacher creates a course which contains reading material, videos, assessments, assignments etc. and uploads it on the LMS. Students assimilate the material by repeatedly viewing it and taking the assessment tests. Using LMS, there is a possibility of tracking each individual student and giving him/her feedback for improvement. Here the teacher becomes a motivator, a facilitator and a friend while the learner takes responsibility of his/her own learning.
There are many commercial versions of LMS from various vendors like Blackboard, SumTotal, Upside Learning etc. Even an open source LMS like Moodle does a pretty good job.

Sangita: Almost every student around is seen with a mobile in hand. They are hooked to Facebook and YouTube. Can we use Facebook and smartphones like things for learning?

Rajesh: Rich multimedia contents like animations, videos make learning more interesting. We discussed that Learning Management System (LMS) makes the deployment and tracking of training progress possible for individual learners. Courses on LMS are self-paced and learning becomes personalized. Now with big uptake on mobile and tablet devices and technologies has made it possible to make this content reach to the learner's pockets and be easily accessible to him/her anywhere.

With mobile applications, learning can happen, 'Anytime Anywhere' and 'On-demand'. And this learning need not be restricted for an academic subject, technology or examination. For example, On-demand or Just-in-time learning holds a promise of educating a sales manager with client preferences and pain points just before he enters the meeting for final negotiation to close an order.

This was about the use of smart phones. However, these smartphones do not work alone. The latest 'technology quadro' Social, Mobile, Analytics and Cloud, called as SMAC, is taking the applications in the world to a completely different paradigm. Be it education and learning or any other business domain like healthcare, retail and so on.

Learning does not happen only by listening and reading, it happens in interaction, it happens when you participate in a group activity or listen to the experts. The methodology of social interactions popularized by the likes of Facebook and Twitter is leveraged by many software collaborative platforms. Even LMSs have features like blogs, bulletin boards as built-in collaboration mechanism.

Cloud technology makes it possible to host many applications like LMS, collaborative platforms etc., scale them based on the need and are accessible 24x7x365 or all the time. With cloud technology, it is easily possible to scale these solutions to reach thousands of learners.

There is a huge explosion of data on Facebook, Twitter, YouTube and the likes It is voluminous, has no hard structure, is more like free flow and contains large variety and hence named as Big Data. Processing such a huge data and getting insights from it is a huge challenge. To address it, big data technologies like NO-SQL databases, Hadoop System and so on were created. Imagine that, I would like to know the customers' feedback about my product. The traditional method of collecting samples and using it for estimation may not be

as effective today for this. Instead, just take up relevant product data from social media, funnel it into a system like Hadoop and using analytics tools, perform text mining and we are ready with what is called as 'sentiment analysis'. Same tools and techniques could be used to perform analytics on students' data on LMS, collaborative platform etc. Generate insights into the learning process and fine-tune the instruction delivery, training designs further to make them more personalized and effective.

In short, SMAC technology has promise to make learning more personalized, anytime, anywhere, on-demand and at any scale!

Sangita: You are in the employability training or skill-based education space. Is the usage of these newer technologies and learning methods similar as compared to say teaching a subject like social sciences?

Rajesh: Although at a high level, subjects like 'social sciences' and a skill like 'programming' need a certain level of information, the objectives of their teaching-design are fundamentally different. Skill-based training courses are designed with an orientation of building a particular skill. The skill is about performance in a particular situation or context. Proficiency in skill is referred to as 'competency' in technical terms. Competency has three parts: knowledge, skill and behavior. For each job skill under consideration, these competencies are described in a way that are observable, measurable, transferable and connected to the environment, work place or job role.

There is a learning methodology called competency-based learning. In this method, mastery in the subject is critical to gain credits rather than time-based credit system which we generally see in the colleges and universities. One needs to attain a desired level of competency called mastery (say 86% score) to pass the subject. Till then one needs to work and improve the scores. When the subject that is being learnt involves more of 'Doing' or performance in a job situation, the learning is more from experience of doing. Assessment also tests 'Doing' rather than only the knowledge. We use a combination of competency based learning, technology aids like LMS and competency-based assessments to enhance employability of our 30,000+ students we train every year across all our centers across India at SEED Infotech.

Sangita: Could you narrate any interesting experiments you have done using these new methodologies and tools? What kind of results have you seen?

Rajesh: We are predominantly into Information Technology (IT) training for employability enhancement. Inspired by neurological research and advancements in technology, we have conducted experiments by intertwining various learning methods like collaborative learning,

Synergogy etc. along with ICT tools like LMS, collaborative learning platform, homegrown assessment engine for competency testing. I am delighted to tell you, the results are very encouraging! Although we are at the early stages of experimentation, rates of job placements for these batches are 2-3 times better as compared to other instructor led training batches.

One of the radical premises of collaborative learning is based on the behavior of human cells. Unlike human beings, our cells do not compete with each other, rather they collaborate. A key element of our experiment was motivating the entire class with a target of helping each other in the batch till everybody gets jobs. This is really a contrarian approach of teaching and learning in today's competitive world. We designed the entire content delivery which will facilitate not only individual learning but group learning too. To make this group learning easy ICT tools was a great facilitator. One of the successes of the experiment is changing the mindset of the students and creating bonding amongst them. The trainer acted more like a facilitator, motivator and collaborator while doing every class exercise. The student interaction with each other on collaboration tool built the team spirit and strengthened the bond. A couple of recruiting companies appreciated this bonding and their approach towards teamwork.

You will not believe the extent to which this collaboration can go! It came as a great surprise to us, too!! One of the students, when he was completely broke, was supported by his batch mates until he landed up with a great job opportunity. We were amazed at the impact the teaching, learning and the environment can have on the students. Because of the ICT, the teacher was with them, 'All the Time'. Questions put on collaboration platform or WhatsApp group were answered by peers or teachers. ICT played a vital role in making the teacher available to the students whenever required. This fostered a collaboration that I have my batch or team with me, always. For me, the real takeaway here was, with a non-human medium of ICT we were able to inculcate human values like team spirit and sharing which have immense importance in the current job situation.

Sangita: What kind of challenges do you see in employing ICT in the real learning scenario in India?

Rajesh: ICT based learning is not only about technology, there is no replacement for a good training design. Availability of passionate trainers who can create effective training designs by leveraging technology aids is one of the key challenges.

Internet availability and mobile penetration is increasing day by day. To use the ICT tools, good quality bandwidth at affordable cost must be available at all locations. In India, firstly, we are still plagued with issues of connectivity, bandwidth and higher costs which come in the way of mass adoption. Secondly, virtually hosted computer labs on cloud are difficult to set up and accessed remotely by many learners. Although there are good attempts like *codecademy*, *programmr.com* which allow scripting or code to be done on remotely; speed

still poses to be a hurdle. This may not easily work for complex project structure with multiple artefacts in integrated development environments.
However with initiatives like digital India and penetration of 4G etc. hold promise to alter this scenario in the near future.

Sangita: What are the critical success factors in doing such initiative?

Rajesh: In my experience, changing the mindset of teachers and students is one of the critical aspects. Student should understand that he/she is the driver and teacher would act as facilitator to make the learning happen. ICT and tools is not a panacea: one solution for all problems. Based on what content one is teaching, wise choice of tools and learning methodologies is a key to success. And last but not the least, blessings from top management and buy-in from all stakeholders to challenge the status quo and make learning more interesting and exciting is a must. In my case, it was little easier as our CEO Mr. Narendra Barhate himself acts as a mentor with active involvement in learning related innovations. To my mind it's a big plus!

Sangita: What according to you is the future of learning with ICT?

Rajesh: To the young generation of the current world, which eats fast food, worships speed, hankers after instant gratification and constantly seeks shortcuts, innovative methods of learning with ICT is the ray of hope. Instead of abusing and criticizing the evils of over-use or addiction of technologies like mobile phones and Facebook, indulgence of children and youngsters in the world of games; innovative methods will get created using these addictions as weapons for learning. Using gamification to teach subjects like Maths or even project management, text-based chat app like Whatsapp to teach English language are some of the great efforts. With technology like Internet of things(IoT) coming in the foray, you never know what kind of innovative applications would get developed in the future using intelligent sensors all around us.

Hence, it is the fact universally acknowledged that future education cannot be even imagined without the use of ICT. Let us enter into the world of internet and technologies that provides all kinds of enormous educational resources. ICT is the key for the reform. Initiatives like good policies from Government, public private participation, enriching digital infrastructure etc. are vital. Our dream to make India a smart and shining nation will come true only if we create global quality talent by educating our young generation by adopting these fast-changing technologies.