Feasibility of Cloud Computing in the Field of Technical Education in India

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Abstract: Technical education in India is in a league of its own. The students of the premier technical institutes of India, like the IIT’s, are in great demand all over the world for their technical capabilities. These institutes, along with other core institutes like the NIT’s, have been the backbone of technical education in India. The backbones of these institutes are the faculties, who are extremely talented and qualified. They are also dedicated and have the requisite infrastructure to back them. But the same cannot be said of other technical institutes that have mushroomed all over the country. Consequently there is a huge gap in the capabilities of the students who pass out from the premier institutes and others. Cloud computing has been a buzz word in the IT sector. This paper attempts to look at the effects of cloud computing in the field of technical education with respect to India.

Keywords: Cloud computing, technical education, effects of cloud computing, higher education, Indian education.

I. INTRODUCTION

Technical education in India is in shambles. While the numbers of institutes have increased drastically, the quality of education has seen a steady decline. The top notch institutes like the IIT’s and NIT’s, with their stringent quality checks, have still retained the standards they are known for. The entry of students is filtered through high standard of common entrance examination, either a single tier or a multi tier examination. This has resulted in a high level of competence of the students.

As these students entered the industrial domain, they set India on a glorious path with their performance in their respective field. The world became their stage and there was high demand for the students from India. As the number of technical institutes was very less and mostly government funded, completion was very high. With the economy of India riding the fast track, the government was spending more and more of its funds in sectors which were driving the economy. And education was not in the list.

Consequently, the government with an aim to reduce the demand supply ratio opened up the education sector to private players. Although the aim of the government was rightly focused, mayhem followed the opening of the education sector to the private players.

Number of technical educations mushroomed in the country. Manipulating the norms required for the setting up of such institutes, they became business centers instead of education centers. Untrained and inexperienced faculty was recruited with a pay package less than the government package. Infrastructure was either very little or not there at all. Branches of engineering which required very less investment or space were offered in almost all the private institutes. Sharing of resources was done to lower the investment cost.

This began to reflect in the placements of the students. Suddenly there was a deluge of degree toting students in the market with either no knowledge of the subject or with half baked knowledge. Unemployment in the technical education sector grew to alarming proportions.

II. PRESENT SCENARIO OF TECHNICAL EDUCATION IN INDIA.

At present there are roughly 3400 engineering colleges with an estimated 15,000,00 seats[1]. These institutes are spread throughout India with the South garnering the majority of the engineering colleges than the other parts of India. Most of these institutes offer courses in Information technology, Computer Science and Engineering, Telecommunications but very few offer the conventional engineering courses like Civil Engineering.

Most of these private engineering colleges were setup in the rural heartland. The main reason for this was the cheap availability of land as compared to the urban locations. With the land requirement fulfilled, the rural heartland also provided cheap accommodation facilities for the staff also. Some of these institutes were setup close to the industrial belt in that region. This, to a certain extent, determined the courses that were provided in the institute. Even then IT related courses were available in all the institutes, thanks mainly to the IT boom and the hype created around the IT industry with pay packages offered.

As the standard of education deteriorated, the placement of the students decreased and soon came to a grinding halt.
This was more was very pronounced in the IT sector while other sectors which required the students from conventional branches of engineering were a little better placed. Consequently, the admissions to these courses and institutes reduced a great deal. Applications from the institutes reached the All India Council of Technical Education(AICTE), the body formed for setting up of technical institutes, to shut down courses and in many cases the institute itself. Data from the AICTE[3] shows that more than 200 colleges submitted application for closure of the institutes and in some cases closure of certain courses. Various reasons were submitted for the closure, starting from lack of student admission to lack of placements in the same field.

AICTE permitted closure of 143[3] institutes all over the country. Majority of these institutes were from the southern parts of the country, while the rest were evenly distributed over the rest of the country. Looking at the problem from a holistic point of view, AICTE has stopped the registration of engineering institutes till the academic year 2013-14[3]. This will provide the presently struggling engineering institutes to have some breathing space and attend to the problems faced by them.

III. CLOUD COMPUTING

Cloud computing is a buzz word in the IT sector. The IT people swear by the cloud. Vendors of IT solutions wash and paint their solution with “cloud technologies”. It seems that “cloud” has become a panacea for all problems. What exactly is this cloud computing?

Larry Ellison, CEO, ORACLE, famously said in September 2008[4], “The interesting thing about cloud computing is that we’ve redefined cloud computing to include everything that we already do. I can’t think of anything that isn’t cloud computing with all of these announcements. The computer industry is the only industry that is more fashion-driven than women’s fashion. Maybe I’m an idiot, but I have no idea what anyone is talking about. What is it? It’s complete gibberish. It’s insane. When is this idiocy going to stop? According to NIST (National Institute of Standards and Technology), US Department of Commerce, Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (eg networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.

Cloud computing in simple terms refers to the sharing of computer resources like networks, hardware, software and services over the Internet as a medium. This provided the end user 3 different forms of resource sharing

1. Software as a Service (SaaS)
2. Platform as a Service (PaaS)
3. Infrastructure as a Service (IaaS)

In SaaS, clients are able to access virtual PC’s over the Internet, preloaded with the software of their choice. This software maybe accounting software, database software or and engineering application like AutoCAD, MATLAB. The software’s are delivered to the client through web services. Consequently the client is spared the cost of purchase of these software’s and up gradation as an when it takes place.

In PaaS, the software platform required for any development is made available over the Internet to the clients. Right from the required operating system to the application software or the development software base, are made available to the client over the Internet. The client is spared the cost of having the entire range of products for his work at his end and may be in multiple PC’s.

In IaaS, the entire IT infrastructure, including the network connection from the client end, to the hardware and software at the service provider end is made available to the client in a customized manner. This enables the client to shift his priorities from setting up the infrastructure at his end, to utilizing the infrastructure available at the service provider end.

IV. CLOUD COMPUTING IN TECHNICAL EDUCATION IN INDIA

Microsoft, has argued for the implementation of cloud computing in education[5]. Stressing for a future ready classroom, it has all the three models of cloud computing to push its case. The white paper takes the IT backbone of education into cloud for enabling services like private email services of the school or institution. The cloud model proposed by Microsoft is based on server either hosted on premises or on cloud.
Another IT giant CISCO has also argued in favour of implementing cloud technology in education\[6\]. It has introduced a new model concept along with the above mentioned concepts, the concept of hybrid cloud. A combination of a public cloud and a private cloud.

In all the above models, the base or the foundation consists of IT hardware. Such a condition is fine for courses in IT or Computer Science and Engineering. But other branches of engineering like Electrical Engineering, Civil Engineering, Mechanical Engineering, Electronics Engineering require the use of equipments and machinery which are much different from IT hardware. They have no virtualization and can be accessed manually. They have to be used by the student physically, the results obtained physically and manually. Some sort of automation can definitely creep in, but the major operation has to be physically.

One cannot learn the process of concrete casting by high end servers. Sure, one can place a video of concrete casting on a private or public cloud and have the student visualize the process. But the student has to physically perform the process, in order to learn the techniques. The right amount of mix of cement, sand and water comes from practice of doing it physically. Similarly the use of a lathe machine for shaping, can only be achieved my manually doing it on the machine itself. The chipping of the nails during concrete casting or the peeling of the skin during lathe operations can never be felt in virtualization nor can the same be replicated in cloud computing.

Soldering of electronic components, an essential tool for repair of even sophisticated equipments is purely a hands on technique. One learns the process by doing it on a real life situation, the case of dry soldering, component burnout can never be achieved in cloud computing technology. None of the models of cloud computing are capable of providing it.

India has a history of innovations. Indians are great masters of conjuring up solutions where conventional wisdom fails. This nature of Indians has been brought around by the fact that there is generally an acute shortage of essential learning tools, excepting in the top tiers technical institutes like the IIT’s and NIT’s. Consequently one learns to work around situations without sacrificing the properties of the equipment of device in which it was meant to perform or operate. This does not come from any virtual world but comes from hours and hours of toiling manually on the machines and tools.

Cloud computing requires a robust network technology, a robust power supply for operation. The same is not easily available in India, although India is counted as one of the power houses of IT.

V. CONCLUSION

Cloud computing can be and will be highly effective IT tool. But the present reach and approach of the various models are good enough for the normal school education or for IT education. Even the basic requirement for using cloud computing technologies is a good network connection along with good power backup. Premier institutes can afford to have such a setup, but the same cannot be said of other institutes where funds are a source of worry. Further the institutes in the metropolitan cities can have the power supply need for the setup, but the same will be lacking for institutes setup in the rural heartland.

The effect of cloud computing can definitely play a major factor in the IT education sector. It can help the upcoming institutes overcome their faculty and resource shortage at an extremely low cost to the institute. It can help the students of such institutes to measure up their abilities with the best in the world by using the cutting edge software and IT infrastructure. Students can leverage their theoretical studies with industry dominated software practice through cloud computing.

But the same cannot be said of other engineering branches. Cloud computing can impact these branches in a limited form. It can be used to increase the knowledge of the students in those areas where software can be used. For example, mechanical engineering students can benefit for the use of the latest version of AutoCAD software while electronics and communication engineering students can use the latest version of MATLAB or LABVIEW software without the institute burning a hole in its money purse.

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