

Cloud Computing: A facilitator in Education Sector

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Abstract:

Cloud computing provides various services in various sectors to make the work easy. Technology must reduce the work burden of all stakeholders. Cloud computing is providing a hand out to education sector where usage of technology makes effortless task. For technical education like Engineering sector is majorly getting affected due to its leverage. The research was conducted by surveying few engineering colleges where results are coming out amazingly. In this research paper few of its results are combined for reference.

Key Words: Cloud Computing, Facilitator, Stakeholders, Academic practices etc.

Introduction:

Engineering education with dynamic skill sets and as per industry need is high in demand. Nurturing and polishing skill sets of engineering students compatible for industry and society's need is the key driving factor in the era of Globalization. Cloud computing can provide those services which help the educational institutes to match with industry requirements. To understand its need in education sector, survey was conducted in various Engineering colleges in Pune region. The data collected from engineering colleges in Pune revealed the current status of on-campus engineering courses.

Usage of Cloud Computing before Pandemic:

Cloud computing or cloud based technology is useful to provide efficiency in ICT Technology. It is not a new term and evolved over the period. In education sector especially for technical courses, cloud can be proved as best solution for various aspects. But still its leverage in education sector in India is limited. This research paper had gone through data collection in engineering colleges in Pune by designing questionnaire. After the analysis of collected data few key findings are as below:

Key Findings:

1. In academic practices barring use of website, mobile application which is at optimum level the rest of activities including informing students about specific instructions, or other important communication still the traditional methods like putting hard copy notices on notice board, or at the most sending emails are used at elementary level.
2. The use of Internet is very low in sending e-notifications for students either for academic or non-academic purposes.
3. The overall satisfaction level of students about institute's website is average.
4. There are no qualified System administrators employed; in case of most of the institutes, the charge is given to technical assistants or lab-in-charge. This solves problem of typical maintenance of infrastructure but lacks taking initiative for cloud computing to improve overall efficiency of the institute.
5. Principals felt the need for more delegated powers in executing various responsibilities towards application of cloud computing, it's purchasing, training to faculty, system administrators, cost benefit analysis. Principals expressed that there is a need to set appropriate system of cloud computing with focused efforts and systematic approach exclusively to improve the performance of the institute.
6. Students and faculties agree for adoption of cloud computing in learning with industry interface, digital library access anytime anywhere, third party certificates for value addition, supporting expert lectures online for current subjects for value addition but institutes are lacking in implementation of such focused blended learning approach with the benefits of cloud computing.
7. Faculty still prefers to deliver lectures in classroom than opting for either online, videoconferencing or discussions through social media which is very rarely practiced or are at elementary level.
8. Students and faculty members understand the significance of expert lectures or guidance. However, there are issues related to infrastructure to manage online lectures/video lectures.

9. The demands from the students vary department wise so it is mandatory to maintain a standard infrastructure along with different software implementation as per department.

10. The use of free cloud computing applications in most of the institutions is with ad-hoc approach. There is a need for systematic approach to assess the status of use of cloud computing and mapping needs of the institute with available resources and desired outcomes.

11. There is no initiative to adopt cloud computing management framework as no well-established, tried, and tested models/ frameworks are available which suits to Indian scenario.

12. In general, a wholehearted support and participation at all levels of the institutions including all stakeholders are extremely necessary.

Cloud computing has already been proved to be beneficial in all aspects revealed through review of literature in spite of having different pros and cons. Cloud computing approach is an emerging trend that overcomes the problems of traditional teaching methods and adds flavor of face-to-face learning methods. There are many successful programs of cloud computing in education at national and international level. The following are few examples of educational organizations with cloud computing:

➤ **Global trend of cloud computing in education sector:**

- **North Carolina State University, USA:** Students are not getting overburdened due to higher fees, Maintenance of Infrastructure is very low, Easy Access of current software's which was previously inaccessible.
- **Texas A&M University, Kingsville, Texas:** Satisfaction of continuous demand of updated applications to student and employee, very fast processing and performance is reliable, ownership total cost is reduced, efficiently use of resources, Reduction in time for deployment of software's
- **Tennessee Tech University, Cookeville, Tennessee:** Enhance academic experience through immersive educational programs, Computer lab hardware aging can be reduced, Reduction in tuition fees
- **Feather River College Quincy, California:** Demand of IT resources is increasing by student and staff, h reductions in IT budget, created the need to do more with less.
- **Eastern Washington University in the United States and Lake Head University in Canada:** Saved plenty of money by outsourcing email services.
- **The University of Washington:** Collaborative learning for students at different locations can be implemented
- **The Pennsylvania State University, United States:** Sharing of resources among its numerous campuses and colleges.

Thus, the penetration of cloud computing globally is phenomenal with increased enrolments of the students. Although India is said to be second largest market of Self-paced learning, its penetration in engineering education is less as compared to global scenario. There are very few initiatives in India taken by Advanced Data Processing Research Institute (ADRIN), Department of Space, Government of India S Ramaiah Institute of Technology, Bangalore India, M.A.M College of Engineering, Tiruchirappalli, India, Thapar University, Patiala, Punjab, India. There are few initiatives for engineering courses viz IIT, IIM etc. The current study revealed the facts of use of cloud computing practices in engineering colleges in Pune are at very nascent stage.

Thus engineering institutes in Pune need to cater this situation tactfully with appropriate policies and practices and consistent efforts to develop students-centered learning environment on the campus and Empowerment of students in true sense.

Cloud Computing usage during Pandemic:

The impact of the pandemic was grossly affected education sector at all levels. Due to global economy and its associated effect on businesses education sector is affecting. As online teaching was preferable and need of the system vacant classrooms were emerging, where was the need for a Virtual Learning Environment (VLE) and, that is where cloud computing came in picture.

Due to pandemic requirement all organizations made online space faster as compare to their expectations. Because of lockdown, all educational institutions faced unmatched disruption.

43% of higher institutions of learning have adopted cloud computing. Cloud computing enables organizations to control hugely superior resources they can maintain. Students and teachers can get space to operate remotely. Cloud computing

had provided tremendous teaching learning facilities to all organizations coupled with those institutions that were disinclined to make technological changes. Universities and schools, need to change their mind set, to remain relevant in the education sector and deliver an improved experience for their students and staff.

So it has been observed that willingly or unwillingly all stakeholders were adopted working using cloud computing. Stakeholders could understand the importance of cloud computing and its usage in education sector.

Concluding Remark:

This research paper has explored facts of engineering colleges in Pune relating to awareness, perceptions, expectations of users, use of cloud computing practices in academic and non-academic functions and strategies of institute about implementing cloud computing before and after pandemic. The attempt was also made to throw light on use of cloud computing practices by selected engineering colleges in Pune. It is accepted by all engineering colleges in Pune that cloud computing would be an enabler for better performance and efficiency of engineering colleges in Pune to cater the current need of delivering quality education. As the strategic approach are not on agenda for cloud computing, there needs many initiatives and strategic implementation of cloud computing for engineering education.

Before pandemic leverage of cloud services in education sector was quite less. But after pandemic its usage is increased as need of virtual usage is increased. So the awareness level is increasing day by day for its adoption.

References:

1. H. A. Ali and Haitham A. El-Ghareeb 'Implementation of Cloud-based Virtual Labs for Educational Purposes' IJCSNS International Journal of Computer Science and Network Security, VOL.14 No.7, July 2014.
2. R. Soundhara Raja Pandian, K.S. Kasiviswanathan 'Effective use of Cloud Computing concepts in engineering colleges' 2011 IEEE International Conference on Technology for Education.
3. Bogdan GHILIC-MICU, Marinela MIRCEA, Marian STOICA 'Main Aspects of the Adoption of Cloud Solutions in Managing Service-Oriented Organizations – the Case of Higher Education' Economy Informatics, vol. 11, no. 1/2011.
4. Baginda Anggun Nan Cenka, Zainal A. Hasibuan 'Enhancing Educational Services Using Cloud Technology' 2013 International Conference of Information and Communication Technology (ICoICT) 978-1-4673-4992-5/13/\$31.00 ©2013 IEEE.
5. Nilam Choudhary Dr. Baldev Singh Gaurav Bagaria 'Vital Role of Cloud computing technology in Indian education system: a study in Special reference for Technical Education' IJSRD - International Journal for Scientific Research & Development | Vol. 2, Issue 04, 2014 | ISSN (online): 2321-061.
6. Pranay Kumar, Sumitha Kommareddy, N. Uma Rani 'Effective Ways Cloud Computing Can Contribute To Education Success Advanced Computing' International Journal (ACIJ), Vol.4, No.4, July 2013.
7. Madhuri BHAVSAR1, Archana BHAVSARN 'Cloud - Experimenting with Architecting and Facilitating Utility Services for Establishing Educational Cloud' Journal of Mobile, Embedded and Distributed Systems, vol. V, no. 2, 2013.
8. Chaker El Amrani, Hicham Gibet Tani, Lamiae Eloutouate 'Setting up IBM Cloud Computing VCL at Abdelmalek Essaadi University'.
9. Safiya Okai, Mueen Uddin, and Amad Arshad, and Raed Alsaqour, and Asadullah Shah 'Cloud Computing Adoption Model for Universities to Increase ICT Proficiency' SAGE Open 2014 4: DOI: 10.1177/2158244014546461.
10. G.M. Muriithi J.E. Kotzé 'Cloud computing in higher education: implications for South African public universities and FET colleges' Proceedings of the 14th Annual Conference on World Wide Web Applications Durban, 7-9 November 2012 ISBN: 978-0-620-55590-6.
11. Shaik Saidhbi 'Cloud Computing Framework for Ethiopian Higher Education Institutions' IOSR Journal of Computer Engineering (IOSRJCE). ISSN: 2278-0661, ISBN: 2278-8727 Volume 6, Issue 6 (Nov. - Dec. 2012), PP 01-09.
12. Shaik Saidhbi 'A Cloud Computing Framework for Ethiopian Higher Education Institutions Ethiopia'.
13. G.M. Muriithi, J.E. Kotzé 'Cloud computing in higher education: implications for South African public universities and FET colleges' - Proceedings of the 14th Annual Conference on World Wide Web Applications Durban, 7-9 November 2012 (<http://www.zaw3.co.za>) ISBN: 978-0-620-55590-6.
14. Olukunle A. Iyanda 'Application of contingency theory to cloud computing: a strategy for enhancing research and learning in the Nigerian universities'.

15. https://en.wikipedia.org/wiki/Cloud_management.
16. Paul Korzeniowski 'Overcoming complex multi-cloud management challenges' TechTarget.
17. Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Fern Halper 'Managing Cloud Computing Resources from Cloud Computing For Dummies'.
18. www.bmcsoftware.in/it-solutions/cloud-computing-software.html.
19. <http://www.aicteindia.org/downloads>, 2013.
20. How to Manage Foundational Issues with Cloud Computing Virtualization
Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Fern Halper from Cloud Computing For Dummies.
21. Sean Marston, Zhi Li, Subhajyoti, Anand Ghalsasi Cloud Computing – The Business Perspective
Proceedings of the 44th Hawaii International Conference on System Sciences –2011.
22. Ioan Petri a,c,, Omer F. Ranaa, Gheorghe Cosmin Silaghi c, Yacine Rezgui 'Risk assessment in service provider communities' ELSEVIER Future Generation Computer Systems 41 (2014) 32–43.
23. www.microsoft.com/educloud.
24. www.bmcsoftware.in/it-solutions/cloud-computing-software.html.
25. Wu He, "Exploring Cloud Computing for Distance Learning", <http://www.westga.edu/~distance/ojdla/-fall143/he>.
26. Gaga deep Kaur, Dr. Sonal Chawla 'Cloud E Learning Application: Architecture and Framework' International Journal of Computer Science and Engineering© 2014 by SSRG - IJCSE Journal Volume 1 Issue 4 Year of Publication: 2014.
27. Reza Salim. 'Computer Education at Secondary School level'
<http://www.amadergramonline.net/publications/KT4DSecondaryEd.pdf>.
28. Carnegie Mellon "System of Systems, Barriers to Adoption", [Online].
Available: <http://www.sei.cmu.edu/sos/researchcloudcomputing/cloudbarrier.cfm>.
29. Morgan Stanley, — "Measuring Cloud Impacts: Stronger than Investors Anticipate, Cloud Computing Takes Off", [Online]. Available: http://www.morganstanley.com/views/perspectives/cloud_computing.pdf.
30. "Cloud Computing: Top 5 Cloud Applications for 2010", [Online]. Available: <http://www.channelinsider.com/c/a/Cloud-Computing/Top-5-Cloud-Applications-for-2010319995/?kc=EWWHNEMNL02262010STR2>.
31. Lohr S., "Google, 'I.B.M. Join in Cloud Computing' Research", New York Times, 10th August, 2007. [Online]. Available: http://www.microsoft.com/education/en-us/solutions/Pages/cloud_computing.aspx.
32. http://www.cisco.com/en/US/services/collateral/-ps10658/ps11785/cloud_101_higher_education_wp.pdf.
33. James Temple, "Web 2.0 Summit: Data Explosion Creates Revolution" SFGate.com, October 19, 2011, [Online]. Available: http://www.cisco.com/en/US/services/collateral/ps10658/ps11785/cloud_101_higher_education_wp.pdf.
34. IBM, "Google and IBM Announced University Initiative to Address Internet-Scale Computing Challenges", October 8, 2007, <http://www-03.ibm.com/press/us/en/pressrelease/22414.wss>.
35. IBM, "IBM Introduces Ready-to-Use Cloud Computing", <http://www-03.ibm.com/press/us/en/pressrelease/22613.wss>, November 15, 2007.
36. Sultan, N. 2010. Cloud Computing for Education: a new dawn?
<http://www.sciencedirect.com/science/article/pii/S0268401209001170>.
37. <https://education.alberta.ca/media/6884876/final%20cloud%20computing%20tech%20briefing.pdf>.
38. <http://www.thehindu.com/features/education/college-and-university/computing-in-the-cloud/article5433501.ece>.
39. <http://educationinjapan.wordpress.com/2014/01/06/yomiuri-shimbun-cloud-computing-to-be-used-in-schools-from-fy-14/>.
40. <http://iite.unesco.org/pics/publications/en/files/3214674.pdf>.
41. http://www.capgemini.com/resource-file-access/resource/pdf/Cloud_Computing_in_Banking.pdf.
42. www.manjrasoft.com/.../Manjrasoft%20Case%20Study%20-%20Solution.