Revolutionary Change in the Field of Education by E- Governance Using Cloud Computing Concept: A Blended Learning Approach

Aaditya Jain[1], Afreen Bano[2], Manisha Sarkar[3]

M.Tech Scholar, Department of Computer Science & Engg., R. N. Modi Engineering College, Rajasthan Technical University, Kota, Rajasthan, India[1]

B.Tech Student, Department of Computer Science & Engg., R. N. Modi Engineering College, Rajasthan Technical University, Kota, Rajasthan, India[2,3]

ABSTRACT: Innovation is necessary to ride the inevitable tide of change. Internet broadband connectivity and rich education content has created a useful phenomenon in which information and communication technology (ICT), an emerging era of present decade, is being used to transform education and playing a vital role for the advancement of our global society. E-Governance has been established as a revolutionary approach not only in developed country but also in developing nations. One of the most promising paradigms under e-Governance for education is e-learning or online learning. E-learning is commonly referred to the intentional use of networked information and communications technology (ICT) in teaching and learning under the roof of cloud based applications. Blended learning can be defined as the mixing of face-to-face teaching and online or e- learning. Blended-Learning system, as a great product of modern information technology, is an important way to implement education modernization. The aim of this paper is to throw light on the use of cloud computing technology to facilitate widespread adoption of blended learning to improve teaching and learning.

KEYWORDS: Cloud Computing, e-Governance, e-Learning, Blended Learning, ICT.

I. INTRODUCTION

Teaching and learning has evolved considerably over the years with the use of information and communication devices and technologies. Cloud computing can be a welcomed optioned in the universities and educational institutes for increasing efficiency in imparting education. It gives a better choice and flexibility to the IT departments by building multipurpose computational infrastructure of on campus or off-campus or combination of both depending on the institutions need. Due to the evolution of cloud computing number of services have migrated from the traditional system to the online form.

Charalampos, Adamantios, and George (2009) noted that one of the oldest approaches for dispensing knowledge is the traditional classroom method. This method of teaching and learning later evolved into some more technology-based approaches which involved the use of multimedia and hypermedia technologies, Yue and Yuanchun (2008). Presently, educational institutions deploy a wide range of options for learning. The learning form has gradually evolved from e-learning to mobile learning to blended learning. The need to improve teaching and learning experiences motivated researchers to develop the blended learning model.

Blended Learning is about the latest model in the history of the technology based learning. It strategically integrates the previous learning types with a view to build a better learning environment. The aim of blended learning is to provide the most efficient and effective learning experience by combining delivery modalities. Welker and Berardino (2006) argued that unlike traditional classroom methods, the focus is shifted from the teacher to the learner. The teacher is more of a facilitator of learning and not a dispenser of knowledge as is the case in the traditional method.

Practical instances of blended activities include putting assessments/ supplementary materials online, and accessing instructors live online. Study materials placed online can be updated more easily compared to the printed materials. Also, these materials can be enhanced with the help of audio and video (Sife, L woga, & Sanga, 2007). However, the emergence of cloud computing offers an opportunity for educational institutions to ameliorate most of these identified challenges by effectively utilizing the potentials of cloud services. Mell & Grance (2011) defined cloud computing as "a model for enabling convenient, on demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".

By migrating blended learning services to the cloud, institutions stand to overcome the cost of procuring, hosting and managing Information and communication Technology (ICT) infrastructure in their premises. Thus, rising costs associated with hardware purchase, software licensing and updating, electricity generation, and salaries for IT support personnel would be significantly reduced (Mokhtar, Ali, Al Sharafi, & Peter Odion Izevbizua Aborujilah, 2013).

This paper mainly focuses on educational benefits of cloud computing as blended learning. The rest of the paper is organized as follows. Section 2 describes about impact of e-governance and e-learning, Section 3 presents brief description of blended learning approach, Section 4 deal with basics of cloud computing and its applicability in educations. A case study is given in section 5 and finally the paper concludes in section 6.

II. E-GOVERNANCE AND E-LEARNING

E-Governance and e-Learning are two important folds of electronic transmission of information on two different platforms. If electronic government programs are vital for the improvement of public services and government decision making, then 'e-Learning' is a boon for ensuring qualitative education all around. 'e-Governance' and 'e-Learning' are the two emerging concepts of modern ICT that are introduced and implemented at government and institutional levels respectively to promote efficient and effective communication of electronic information so as to bridge the gap of digital divide worldwide.

The World Bank defines e-governance as the "use of information and communication technologies by government agencies to transform relations with citizens, business world and other arms of the government." E learning is defined as instructional content or learning experiences delivered or enabled by electronic technology (Aydin & Tasci, 2005). Terms that are commonly used include "online learning", "internet learning", "distributed learning", "networked learning", "tele-learning", "virtual learning", "computer assisted learning", "web based learning", and "distance learning".

III. BLENDED LEARNING

Education is not the filling a bucket but the lighting of a fire. William Butler Yeats (1865–1939) Irish poet, dramatist. Blended learning method refers to "mixing of different learning environments". It combines traditional face-to face classroom methods with more modern computer-supported activities using Internet and other advanced technology.

"A course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has some face -to-face meetings." The Sloan Consortium defines blended courses as having between 30 percent and 79 percent of their content delivered online, with the remaining portion of the course content delivered by face-to-face instruction or other non web-based methods, such as paper textbooks.(Allen, Seaman and Garrett, March, 2007)

Figure 1 Ingredients of blended process

A. *Characteristics of Blended Learning(BL)*

Various characteristics of BLs are:
* Blended learning represents instructional strategy shift.
* Increases communication between student-student, student–instructor, student–content and student outside resources.
* It integrates use of educational technology to online curriculum and face to face interactions.
* It is not a single type , rather the continuum expands from fully online to fully face-to-face and is the medium of delivering the content with the help of video, simulations etc., which in turns is more effective than Text –based content.
* Blended learning relies on a significant level of web-based communication and content, it relies on a course management system or a learning management system to organize the content and facilitate communication.
* Blended learning can vary in many ways, it may present challenges for research and policy.
* It helps in inquiry, research, collaborations, presentations and reflections.

Figure 2 Structure of Blended learning

IV. CLOUD COMPUTING

Cloud computing is a buzz word now a days. Cloud computing services are a growing necessity for business organizations as well as for educational institutions. Cruz (2011) specified cloud computing as a collection of applications and technologies which can be accessed and manipulated by a large number of users in real time. Some analysts and vendors define cloud computing narrowly as an updated version of utility computing: basically virtual servers available over the Internet.

A. Adoption of Cloud Computing in Blended Learning

The educational cloud computing as shown in Figure 3 can focus the power of thousands of computers on one problem, allowing researchers to search, find models, make discoveries faster than ever and help build a smarter planet. According to John Omwamba, the cloud allows for information durability, which means information can be placed in cloud storage for as long as needed. He adds that the advent of online video has made the idea of cloud in education even more exciting, providing universal access to teaching videos and demonstrations on almost any topic.
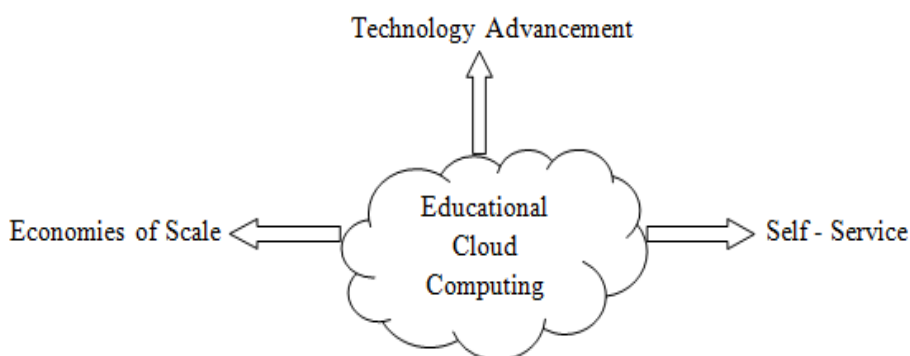

Figure 3 Educational Cloud Computing

According to a survey, colleges had been moving in order to use cloud as a storage space, it increases the efficiency and mobility. Cloud allows taking initiative and to show creative ability, reduce operating costs and also allow working on other projects to IT staff.

#1 Increased efficiency (55%)
#2 Improved employee mobility (49%)
#3 Increased ability to innovate (32%)
#4 Freed current IT staff for other projects (31%)
#5 Reduced IT operating costs (25%)
#6 Enabled us to offer new products/services (24%)

Figure 4 http://www.edtechmagazine.com/higher/article- /2013/02/state-cloud-computing-higher-education

B. Simplified Structure of Service of Educational Cloud Computing

Cloud computing offers different services at application, platform and infrastructure levels in education and academic areas, as shown in Figure 5 [8]
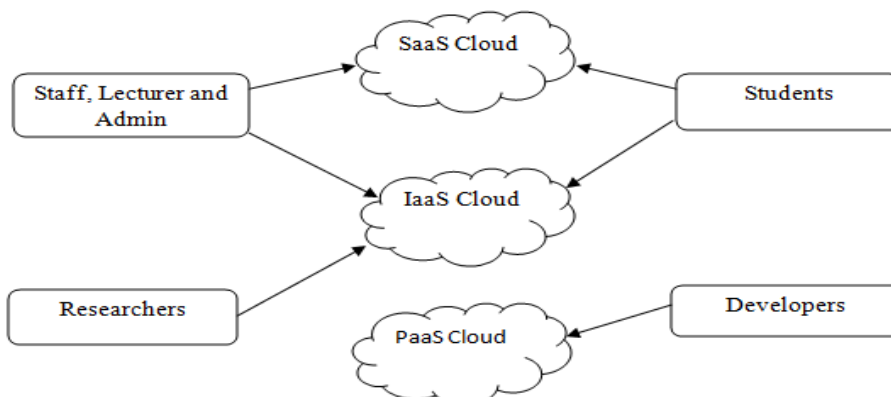

Figure 5 Service Structure of Educational Cloud Computing

Services can be split into three main types as following [8, 9, 11]:

Infrastructure as a Service (IaaS): It offers virtual services via this mode, including the remote delivery of a full computer infrastructure. Using services and products for education means scaling with ease and speed to provide the infrastructure needs of universities or schools.

Platform as a Service (PaaS): It is a set of software and development tools hosted on the provider's servers. The educational platform consists of an operating system, in addition to fully rational storage and consumable web- based services. This platform provides familiar services and developments to test, deploy and support team collaboration for developers.

Software as a Service (SaaS): This application hosts online services that offer a consistent experience across multiple devices for the faculty, staff and students. They can also use to collaborate and communicate online.

C. Opportunities /Challenges of Using Cloud in Blended Learning

Opportunities in the adoption of cloud computing for blended learning include:

- Provision of System Support and Maintenance Services.
- Affordable Investment Cost.
- Availability of High Performance Computing Facilities.
- Metered Cost Model.
- Performance and Troubleshooting.
- Privacy.
- Rapid elasticity and scalability.
- Reallocation of resources.

Challenges militating against the adoption of cloud computing for the implementation of blended learning include:

- Need for Policy Review.
- Security Risk.
- Inadequate Manpower.
- Misunderstood by general public.

V. CASE STUDY

In India, Zaya Learning Labs is transforming the learning experience of students and educators across India and beyond. With pilot programs across the world, Zaya is working with teachers, school leaders, and students to bring the power of blended learning to low-cost schools. The idea was to give students traditional learning and then rotate the same objectives with the help of technology based learning environment. In the trial version, Six Schools in Mumbai shown great progress through the use of blended learning. Also implementation is done in case of three more schools in Malwani which is a slum area.
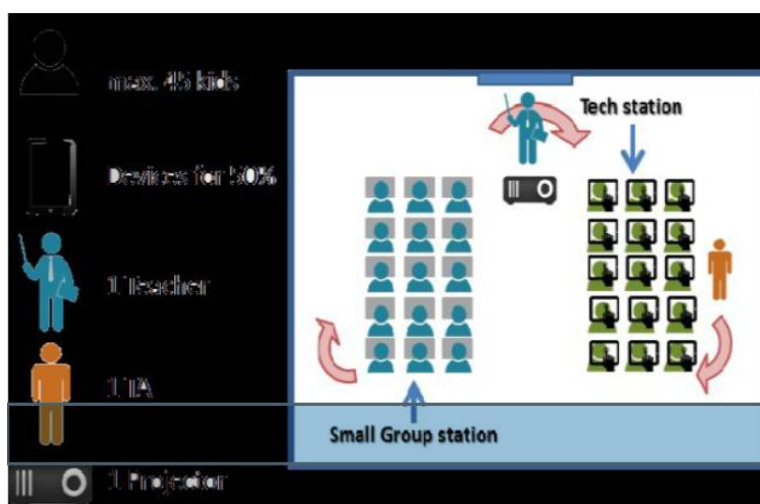
Figure 6 Model that describes new opportunities

Infrastructure Used

- Internet and Wireless: Zaya ClassCloud
- Tablets: Android 4.2 (Lenovo)
- Software : Zaya Learn Platform
- Content: Khan Academy Lite, Zaya custom content for Math and English.

VI. CONCLUSION

The implementation of blended learning approach in the delivery of education has the capacity to tremendously enhance better teaching and learning experiences. Educational institutions are now discovering that blended learning is not only more time and cost effective, but provides a more natural way to learn, work and transform education. The research suggests that an interactive combination of video teaching by local teacher and an energetic peer facilitator can be effective in education sector by looking beyond the traditional boundaries of classroom instruction by augmenting their current best practices with new advances in learning and collaboration technologies to maximize results. This paper proposed the integration of cloud computing technology in the adoption of blended learning and also explored the problems and prospects in the implementation of cloud computing in blended learning.

REFERENCES

[1] Welker, J. & Berardino L., "Blended learning: Understanding the middle ground between traditional classroom and fully online instruction" Journal of Educational Technology Systems, 34(1), 33-55, 2006.
[2] Sife, A. S., Lwoga, E. T., & Sanga, C., "New technologies for teaching and learning: Challenges for higher learning institutions in developing countries", International Journal of Education and Development using Information and Communication Technology, 3(2), 57–67, 2007.
[3] Mell, P., & Grance, T., "The NIST Definition of Cloud Computing", Retrieved from http://csrc.nist.gov/publications/nistpubs/800- 145/SP800-145.pdf, 2011.
[4] Mokhtar, S. A., Ali, S. H. S., Al-Sharafi, A., & Aborujilah, A., "Cloud computing in academic institutions", Proceedings of the 7th International conference on Ubiquitous Information Management and Communication. 1–7. doi:10.1145/ 2448556.2448558, 2013.
[5] Alshuwaier, F. A., Alshwaier, A. A., & Areshey, A. M., "Applications of cloud computing in education" In 8th International Conference on Computing and Networking Technology, 26–33, 2012.
[6] Barrie, S., "Cloud Computing Bible", Indiana, USA. Wiley Publishing, Inc 2011.
[7] Saju Mathew, "Implementation of Cloud Computing in Education – A Revolution", International Journal of Computer Theory and Engineering, Vol. 4, No. 3, June 2012.
[8] P. Shanthi Bala, "Intensification Of Educational Cloud Computing And Risis Of Data Security In Public Clouds", International Journal On Computer Science And Engineering Vol.02, No. 03, 2010, 741-745, 2007.
[9] Microsoft Education Cloud Computing. "The most comprehensive solutions for the cloud. On earth", http://www.microsoft.com/en-us/cloud/
[10] Microsoft in Education — IT solutions, "Microsoft Live@edu",http://www.microsoft.com/education/enus/ solutions/Pages/liveedu.aspx/

[11] R. Elumalai and V. Ramachandran. "A Cloud Model for Educational e-Content Sharing", European Journal of Scientific Research, ISSN 1450-216X Vol.59 No.2, pp.200-207, 2011.

[12] Kaur Inderbir, "Blended learning: A Convergence of Online Learning and Face-to-Face Education for Imparting Better Education In India", 2015.

[13] IBM Cloud Academy, "Education for a Smarter Planet: Cloud Computing in Education", http://www.cetpak12. org/ .

[14] Yue, S. & Yuanchun, S., "Towards blended learning environment based on pervasive computing technologies", Proceedings of the 1st International Conference on Hybrid Learning and Education, 190 –201, 2008.

[15] Charalampos, K., Adamantios, K., & George, L., "M-learning and M-commerce in pervasive environments", The Electronic Journal for Emerging Tools and Applications, 12(1), 42-46, 2015.

BIOGRAPHY

Aaditya Jain is currently pursuing M.Tech in Computer Science & Engineering from R. N. Modi Engineering College Kota which is affiliated to Rajasthan Technical University, Kota (Raj). He received B.E. degree in Computer Science & Engineering from Mandsaur Institute of Technology Mandsaur which is affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal (MP) in 2013. He is the author of many scientific publications in International and National Conferences and Journals. His two papers has awarded by "Best Paper Award" in international conferences. His areas of interests are Network Security, Cryptography, Mobile Computing, Internet of Things, Ad Hoc Networks, and Wireless Sensor Networks.

Afreen Bano is currently pursuing B.Tech final year in Computer Science & Engg. from R. N. Modi Engineering College Kota, which is affiliated to Rajasthan Technical University, Kota (Raj). His area of interests are Cloud Computing and Information Security.

Manisha Sarkar is currently pursuing B.Tech final year in Computer Science & Engg. from R. N. Modi Engineering College Kota, which is affiliated to Rajasthan Technical University, Kota (Raj). His area of interests are Computer Networks, Wireless network applications.