Grenze International Journal of Engineering and Technology, June Issue

Cloud Computing Applications in Online Learning

Manju Lata[1], Vikas Kumar[2] and Vibhu Sharma[3]
[1]CSE Department, UIE, Chandigarh University, Mohali, Punjab, India
Email: manjulata94@gmail.com
[2]Central University of Haryana, Jant-Pali, Mahendergarh - 123031, Haryana, India
Email: prof.vikaskumar@gmail.com
[3]Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India
Email: vbhargav13@gmail.com

***Abstract*— The concept of education has been modernized using the cloud computing technology, to propose amazing factors, such as flexibility, scalability, accessibility, collaboration, and so on. In this paper, a brief overview describes the significant aspects and benefits of deploying cloud computing application in online learning. Scalable and flexible cloud infrastructure leading the dynamic requirement of online learning platform. However, collaboration is become the foundation of online learning environment. So, the adoption of cloud applications in online learning brings a paradigm shift in the way education is delivered and experienced. In the digital age, the adaption of cloud application makes more secure, dynamic and inclusive online learning environment. As technology is developing day by day, the integration of cloud applications in online learning is sure to play the essential role in influencing the education landscape for every year.**

***Index Terms*— Cloud Computing, Online Learning, Collaborative Environment, Computing Application, Technology.**

I. INTRODUCTION

Information and Communication Technology (ICT) have a substantial role in propagation of education [1]. A good example of ICT propagation is the use of educational satellite (EDUSAT) in online education**.** Usage of networked ICT in the education process is usually denoted to as online learning [2]. More than a few other terms are also used to define the mode of online education, such as teaching and learning, e-learning, distributed learning, web learning, and virtual learning. In keeping with the category of action, online learning is categorized as:

A. Offline e-learning
B. Individual Online learning
C. Synchronously and Asynchronously learning

Online books are the best and well-known examples of offline e-learning. The persons who reads online book, help to save time and effort. The market of online books has huge growth potential. Online books have generated a great new business opportunity for online publishers. Following are the significant features of online books that distinguish from offline books:

A. Flexible text format and scalable size according to specific requirements
B. Stress-free purchase within few minutes

Grenze ID: 01.GIJET.10.2.566_1

C. Functioning of search and hypertexts
D. In-built vocabulary that make it easier connecting to additional data
E. Markup, insert, and editing tools
F. Modifiable backlight
G. Ease sharing
An online book becomes the best and easiest tool to facilitate online education. Conversely, individual online learning involves a good computing environs and high speed internet connection that delivers a classy learning environment, for example multimedia [3]. On the whole, this become correct during the synchronous and asynchronous learning in nature. Emerging technologies as Web 2.0 are encompassing the levels of learning and improving the education. Using the advance technologies of Internet and wireless, all devices accessing the online tools in education. Therefore, value added services enhanced from the Internet have seen steady growth. Lata [4] offered characteristics of value-added services that relevant to other portable devices, such as ubiquity, availability, security, convenience, location, instant connectivity.

II. EXCHANGING LEARNING NEEDS

Education is a nonstop learning procedure in the life of human. On the other hand, as technologies are increasing day by day, the demand of online learning is also increasing constantly [5-6]. The generation of learners are using online portable devices and continually demand the multimedia content. At educational institute, they expect more stimulating and online learning, and expect that teachers to be tech-savvy. The rapid development of ICT and network technology has led to modifications and rapid development in the user scale of Web 2.0 technologies and mobile devices. This is obvious of the new generations of learners enrolled in the institution of higher education. As a consequence, there is considering change in how learners start learning, and how technology resources increase ethics of learning, learning skills, communication language, creativity, collaboration, leadership, and data literacy (search, review, critical evaluation) from the variety of resources.
Omnipresent computing acquired the upturn of ubiquitous connectivity and access to capture, send, receive, and process the data via different devices (wireless PDAs, smartphones, PDA hybrid, and upcoming PDA) anywhere in 24/7 hours. Though, educators oppose these views. Some believe that the digital people is more interested in learning, but some evidence puts them in the place of the digital citizens. Mobile phones and the Internet is always problematic in a critical learning environment. Educational world is devoted to continuous innovation in learning and teaching, where pedagogy and content play a significant role. The concept of online learning is constantly developing, and cloud computing plays an essential role in supporting and enhancing learning capabilities [7-10]. The changing learning needs in the environment of cloud computing applications in online learning can be divided into several factors:

A. Scalability and Flexibility
Traditional Learning Management Systems (LMS) is an online learning platforms of cloud offers scalability, permitting educational institutes to develop the infrastructure on demand basis. Therefore, the flexibility of cloud resources permits educational institutes to get used to change the workloads all through the peak times, for example enrollment stages or exam times.

B. Cost Efficiency
Educational institutes are using cost-effective solutions with pay-as-you-go estimating models, and optimize the costs by only paying for the resources they consume [11].

C. Collaboration and Communication
The cloud applications enable real-time collaboration and communication amongst learners and instructors. Integration with widespread learning apps and productivity tools delivers all-inclusive learning environment [12].

D. Adaptive Learning and Analytics
Cloud facilitates the development and deployment of adaptive learning systems that personalize learning paths depend on specific learner act. Integration with big data analytics, cloud platforms provision the collection and analysis of large datasets made by online learning deeds [13].

E. Reliability and Redundancy
Cloud providers provide and deal the high reliability and redundancy, make sure that online learning platforms persist accessible while facing hardware failures and other interruptions.

F. Accessibility and Inclusivity
Cloud applications facilitate the device-agnostic access to allow the learning resources from several devices, stimulating inclusivity and make sure that learners involve in learning irrespective of the location or device.

G. Continuous Learning and Training

Cloud computing facilitates the agile development and deployment of learning applications, permitting institutions to get used to altering pedagogical methods and tools [14].

III. Cloud Computing And Education

Cloud computing is increasingly an adoptable technology for all industries, its feasibility for learning institutes is also established. Even though the public clouds are regularly leading the learning innovations, and private clouds are deployed in educational institutes [15]. There also indicated that in the educational institutes cloud computing is observed as an empowering tool that is utilized for the progress of educational expertise [15]. Accordingly, several library's operators are dynamically retrieving and generating digital, virtual, and interconnected data. This is obvious that the increasing online social networks provide the financial support to the general public. Existing nationwide culture give attention on group based action that is essentially run through the collaborations. For example, team work/group based action is the online communities of interest, besides that, web users specify emergent movement concerning Web based collaboration. Web based collaboration permits operators devoid of awareness regarding infrastructure of Internet, generating contents and have an involvement to what is actuality interconnected daily [16-19]. Following are the four specific types of web based collaborations for online learning that become common:

A. Web based Collaborative Documents

In a digital age, Online documents certainly signify one of the most common way to collaborate. For example, Google doc, Microsoft 365, Dropbox, and Zoho have taken a lead by delivering free collaborative services (https:// docs.google.com). These tools generally defined in support of the editing, storing, and managing the documents, for example word processing, spreadsheets, and presentations [20].

B. Collaboratively Website Designing

One of the best example of website designing in collaboratively online learning is become the GitHub and Google Sites. Google Sites is a contented controlling system that consist of all aspects similar to wiki. This is recognized in support of establishing, accessing to, managing, and operators create the files to facilitate searching and recovery. Additionally, GitHub make use of Git that is a distributed version control system, allow groups to work together on code repositories (https://github.com) [21].

C. Collaboratively Search Engines

Google is the best example of search engines (htttps://google.com). This become the primary and widespread tools on the Web for searching the information or data. Google Custom Search Engine (GCSE) become the tools for building customized search engines. GCSE enable the builder focusing on choosing the tuning, the ranking conditions and valuable content, even though Google ensures the substantial crawling, ranking, and presenting outcomes [21].

D. Wikipedia

Wikipedia is a significant facility that represents a Web based tool allowing collaboratively work. Wikis tools design the Website devoid of using the HTML [21]. Wikis, is a simplification for several writers contributing towards the organizing Web content. This provision the design of Web related information constantly modified and extended through many providers. Albany County Public Library Wiki is become the example of Wikipedia (http://albys taff.pbworks.com/).

IV. Conclusion

Cloud computing offers the state-of-the-art applications for online learning. This includes the formal learning, as well as finding the incredible applications in online learning and commercial based learning. Cloud application offers an inclusive possibility for teamwork and for user stimulated content, response, and permitting dissimilar procedures of collaborative and individual learning. The suitability of contribution permits the learners to take part in emerging Web invention and facility, offering esteemed utilities that create product and services. The propagation of cloud based applications in learning environment will surely enhancement the online learning and knowledge based tech learning. Definitely this will be a win situation in support of all investors in cloud.

REFERENCES

[1] D. A. Adams, R.R. Nelsol and P.A. Todd, “Perceived usefulness, ease of use, and usage of information technology: a replication”, MIS Quarterly, Vol. 16 No. 2, pp. 227-50, 1992

[2] S. Naidu, “online learing : A guidebook of Principles, Procedures and Practices”, Commonwealth Education Media Centre for Asia: New Delhi, 2003

[3] M. Lata, & A. Gupta, “Role of Social Media in Environmental Democracy”, In Examining the Roles of IT and Social Media in Democratic Development and Social Change, 2020, pp. 275-293, IGI Global.

[4] M. Lata, & V. Kumar, “Challenges to IoT Security: Industry Perspective”, 14th International Conference on Advances in Computing, Control, and Telecommunication Technologies, Volume 9, Issues 1 & 2, 2023, pp. 61-67

[5] M. Lata, & A. Gupta, “Education During the Pandemic: Technology-Based Solutions”, In Stakeholder Strategies for Reducing the Impact of Global Health Crises, 2021, pp. 209-224, IGI Global.

[6] M. Lata, & V. Kumar, “Standards and Regulatory compliances for IoT”, International Journal of Service Science Management, Engineering and Technology (IJSSMET), 12(5), 2021, pp. 133-147

[7] M. Prensky, ‘‘Digital natives, digital immigrants’’, On the Horizon, Vol. 9, No. 5, pp. 2-6, 2001.

[8] R. Buyya, C.S. Yeo, and S. Venugopal, “Market-oriented cloud computing: Vision, hype, and reality for delivering it services as computing utilities,” Proceedings of 10th IEEE International Conference on High Performance Computing and Communications, 2008. (HPCC’08), pp 5–13.

[9] M. Lata, & V. Kumar, “Security and Privacy Issues in Fog Computing Environment”, International Journal of Electronic Security and Digital Forensics (IJESDF),14(3), 2022, 289-307

[10] J. W. Rittinghouse, J. F. Ransome, “Cloud computing Implementation, Management, and security” CRC Press, pp.183-193, 2017

[11] P. Mell, T. Grance, “Draft NIST Working Definition of Cloud Computing”, National Institute of Standards and Technology. June 2009, 15(32), p.2 https://csrc.nist.gov/groups/SNS/cloud-computing/cloud-def-v14.doc.

[12] M. Lijun, W. K. Chan, & T. H. Tse, ”A Tale of Clouds: Paradigm Comparisons and Some Thoughts on Research Issues”,2008 IEEE Asia-Pacific Services Computing Conference (APSCC 2008),IEEE computer Society Press, Los Alamitos, CA (2008), pp. 464-469.

[13] N. Sultan (2010), “Cloud Computing For Education: a New Dawn?”, International Journal of Information Management, Vol. 30, No. 2, pp. 109–116

[14] J. James,Q. Jin, H.Jong, J. J. Park et al., “Human Centric Technology and Service in Smart Space”, LNEE 182 (Springer Veralag), pp. 311–316, 2012

[15] C. John, C. Elizabeth, "Collaborative teaching and learning: overcoming the digital divide?", On the Horizon, Vol. 19 Iss: 4 pp. 276 – 285, 2011.

[16] E. S. Mark-Shane, “Cloud Computing and Collaboration”, Emerald Library Hi Tech News, Vol .9, 2009, pp. 10-13

[17] M. Lata, & V. Kumar, “Smart Energy Management in Green Cities”, Handbook of Green Engineering Technologies for Sustainable Smart Cities pp. 105-120, 2021, CRC Press

[18] M. Lata, & V. Kumar, “Fog Computing Infrastructure for Smart City Applications”, In Recent Advancements in ICT Infrastructure and Applications, 2022, pp. 119-133, Singapore: Springer Nature Singapore..

[19] M. Lata, & V. Kumar, “IoT Network Security in Smart Homes”, Cybersecurity in Smart Homes: Architectures, Solutions and Technologies, 2022, pp. 155-176

[20] V. Solanki, U. Solanki, A. Baliyan, V. Kukreja, V. Lamba, & B. K. Sahoo, “Importance of Artificial Intelligence and Machine Learning in Fighting with COVID-19 Epidemic”, In 2021 5th International Conference on Information Systems and Computer Networks (ISCON), 2021, pp. 1-8, IEEE

[21] S. Hooda, V. Lamba, & A. Kaur, “AI and Soft Computing Techniques for Securing Cloud and Edge Computing: A Systematic Review”, In 2021 5th International Conference on Information Systems and Computer Networks (ISCON), 2021, pp.1-5, IEEE.