A review on Cloud Computing in Education

Priyank Gupta, Krishna K. Gupta

Department of Computer Science & Engineering and Department of Mathematics, Shri Ram Murti Smarak College of Engineering and Technology, Bareilly, Uttar Pradesh, India

*Corresponding author Email: priyankgupta292@gmail.com

DOI: 10.29218/srmsmaths.v6i1.04	Abstract
Keywords: Cloud computing, education, e-learning, security and privacy.	Cloud computing is a currently developed computing paradigm that can be utilized to deliver all services to various platforms. Cloud computing is rapidly being implemented in educational institutions and is quickly becoming an integral element of the learning process. For educational institutes to find chances to apply cloud computing in its context, a systematic review of these various contributions, which give a consistent taxonomy, may be deemed valuable. This review will strengthen this information by offering a deep analysis of the existing data to bridge any gap and add to the current body of knowledge. The study identifies and analyses the benefits and hazards that cloud computing may have for education's primary stakeholders, which might be beneficial in identifying instances where cloud computing may have numerous advantages in an educational environment.

1. Introduction

A technical definition describes Cloud computing as computer clusters, such as vast data centres and server farms, which provide a client with on-demand services and resources through a medium in the network, typically the Internet. Moreover, Cloud computing providers can offer users the flexibility to dynamically scale up or down service utilisation based on their needs; additionally, they can use the metering functionality to charge subscribers based on their actual consumption.

Cloud computing is an allotted computing model that permits get entry to simulated sources such as computer systems, networks Garage, improvement platforms, or applications (Mell and Grance, 2009). With minimal interaction with the cloud provider, those resources can be demanded, allocated, and configured by the user on their own. Moreover, Sources can be scaled down and up quickly to meet the needs of customers, creating the illusion of infinite resources available at any time. The strategy by Kitchenham and Charters (2007), which has already been used in similar works in other research fields, is used in this paper to review the existing literature on the use of cloud in education. In education, cloud computing provides desirable properties for providing e-learning services, particularly in scenarios where these services are computer-intensive (virtual worlds, simulations, video streaming, etc.) or offered in a large-scale manner, such as Massive Open Online Courses (MOOCs). Teachers and students can use the cloud to install computing resources on-demand for lectures and labs based on their learning needs. For example, instructors can create virtual computers (also known as digital machines or VMS) on demand with pre-installed software programmed to quickly set up computing labs. (Chine, 2010). Cloud computing is already being used by a few educational institutions to outsource email services, provide collaboration equipment and data storage for college students, and host institutional digital mastering environments. (Sclater, 2010a). The first attempt to bring out such an overview was converted into made by Fasihuddin, Skinner, and Athauda (2012). This paper is for that reason primarily based as follows. Segment 2 gives a little information on cloud computing in the past such as tendencies, offerings, and deployment models. Segment 3 explains the method observed to perform this evaluation. The primary benefits of cloud Computing for training are unique in phase four, as well as its dangers in segment five. In segment 6, the precept research demanding circumstances are recognised, and in section 7, the conclusions are set out.

2. Research method

This survey was supplemented by the methodological considerations proposed by (Kitchenham and Charters (2007) for literature evaluations in software engineering. Other systematic reviews in similar disciplines have already employed this methodology. After that, a data extraction procedure was used to collect the following information from each contribution: summary and main effects, applicable instructional regions and contexts, benefited educational roles, expected mastering outcomes, adulthood of the studies, stated affordances and benefits of cloud computing, cloud deployment fashions used, cloud systems and programmes Defined, as well as a bibliography relating to it. From this information retrieval method, a brand-

new set of candidate research for the evaluation appeared from the Analysed catalogue. A new iteration of quality evaluation resulted in this batch of seventy-five new studies. There have been 25 extra pieces of research that Exceeded the second great evaluation and went via some other records extraction system. The research is notably crucial on the theoretical facet due to the fact it could offer an examination for the Instructional unit that researchers have now not previously and almost dealt with. Secondly, this study aims to provide all service competences for the use of digital equipment and systems that are not already available to the benefiting college students and instructors via the electronic cloud.

Benefits of cloud computing for education

The principal stakeholders in training (i.e., beginners, educational practitioners, educational establishments, and its personnel) can take advantage of using cloud computing, however, not they all profit equally from all its benefits. Some of these affordances talk to the getting to know and Coaching system, while others address one-of-a-kind components in education such because economics or generation management and operation. In The subsequent sections, advantages and affordances have been classified, rising from the consequences discovered inside the reviewed literature.

Cloud computing affords each learner and educational practitioner with an extremely good range and form of programmes that may be used on the internet to help a huge variety of getting to know eventualities. Those programs are generally internet-primarily based, reachable anywhere, every time over the Internet, consequently extending the publicity time to studying of students. The built-in collaboration and communication capabilities found in some of these cloud services are used by a considerable proportion of the reviewed contributions, which is especially advantageous for certain pedagogies like constructivism or collaborative learning.

Risk of cloud computing for education

Even while there are numerous advantages to using the cloud for training, the reviewed literature has also highlighted a few risks. These hazards have an impact on instructional stakeholders and must be considered prior to acceptance and at some point during the use of Cloud computing in educational environments. This part covers the key dangers associated with the use of cloud computing in education institutions and recommends various mitigation techniques to address them, which can be described in the following section.

Security and privacy: In the educational arena, sensitive data protection is critical, and there is particular anxiety about how cloud computing handles this issue. However, sensitive data stored in the cloud (for example, student information or debts) might be purposefully or accidentally leaked or monetized, which can lead to cyberbullying or abuse (Chandra and Borah, 2012). The literature suggests technical, felony, and education approaches to address the aforementioned security risks. The use of hybrid clouds will be an answer from a technical standpoint. (McDonald et al., 2010; Mircea and Andreescu, 2011; Sclater, 2010a; Weber, 2013) touchy and organisational information might be saved in personal clouds (e.g., grades, fitness facts, or disciplinary facts), and less relevant data may be hosted on public clouds (e.g., electronic mail). Regardless, educational institutions must investigate how records are coated during transmission and storage. To defend you from threats such as packet sniffing and traffic analysis.

Vendor lock-in: Academic institutions find it difficult, both technically and financially, to move virtual machines, information, or offers from one cloud to another due to a lack of compatibility among excellent cloud vendors. Because of vendor lock-in, establishments are at the leniency of varying charge and provider situations or discontinuation of cloud services. Vendor lock-in and cloud service discontinuance may also result in the loss of uncollectible educational records. For instance, according to Weber (2013), the old Google's online virtual worldwide, active, was shut down in 2008. Academic content may have been lost in this situation due to the fact that records were no longer easily exportable. According to Weber (2013), one way to mitigate this risk is to sign contracts with a variety of cloud providers to spread out the risk, but businesses may find it difficult to manage. This will, however, prevent provider termination, but not information loss.

Performance and reliability: Some cloud-based academic applications, particularly those that need contact and collaboration, may be particularly sensitive to network speed and latency. The content on the cloud isn't always reliable, and its pace doesn't always meet user expectations.
4. Licensing and price models.

3. Limitations

The key issue is the diversity and foundation of a few Databases, yet the chosen assets give a stable Illustrative collection that is favourable. Second, this problem has a fast-paced personality. As a result, the findings of this study might be swiftly outclassed by fresh research and technology. By employing a predetermined search length, this look was limited. As a result, a feature-specific assessment document may be completed. Finally, the secondary nature of this investigation just reflects the

researchers' criticisms. As a result, the study's primary focus isn't on the technology employed in colleges or the country's success or failure in the contemporary era.

4. Conclusion

In this review paper we describe the introduction of cloud computing, research method, benefits of cloud computing for education, risk of cloud computing for education and limitations. The application of cloud computing in education will continuously be increasing day by day. Today approximately most of the educational institutes and colleges are using cloud computing to manage the student record, and to store data .so it is very clear that there is good effect of cloud computing in the field of education.

REFERENCES

1. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.582.9108&rep=rep1&type=pdf
2. https://www.elsevier.com/__data/promis_misc/525444systematicreviewsguide.pdf
3. Mell, P., and Grance, T. (2009). The NIST definition of cloud computing. Technical Report 15, National Institute of Standards and Technology, Information Technology Laboratory.
4. Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., and Ghalsasi, A. (2011). Cloud computing e the business perspective. Decision Support Systems.
5. kitchenham, B., and Charters, S. (2007). Guidelines for performing systematic literature reviews in software engineering. Technical Report EBSE 2007-001, Keele University and Durham University.
6. Chine, K. (2010). Learning math and statistics on the cloud, towards an ec2-based google docs-like Portal for Teaching/Learning Collaboratively with R and Scilab. In Proceedings of the 2010 IEEE 10th International Conference on Advanced Learning Technologies (ICALT '10) (pp. 752e753).
7. Fasihuddin, H., Skinner, G., and Athauda, R. (2012). A holistic review of cloud-based e-learning system. In Proceedings of the 2012 IEEE International Conference on Teaching, Assessment and Learning for Engineering.
8. McDonald, D., Breslin, C., and MacDonald, A. (2010). Final report from the JISC review of the environmental and organisational implications of cloud computing in higher and further education. Technical Report, University of Strathclyde.
9. Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., … & Zaharia, M. (2010). A view of cloud computing. Communications of the ACM, 53(4), 50-58.
10. Sultan, N. (2010). Cloud computing for education: A new dawn?. International Journal of Information Management, 30(2), 109-116.
11. Alexander, B.: Social Networking in Higher Education (2008). Selection from: The Tower and the Cloud. Copyright, Educause.
12. Keele, S. (2007). Guidelines for performing systematic literature reviews in software engineering.
13. Ibrahim, M. S., Salleh, N., & Misra, S. (2015). Empirical studies of cloud computing in education: a systematic literature review. In Computational Science and Its Applications--ICCSA 2015: 15th International Conference, Banff, AB, Canada, June 22-25, 2015, Proceedings, Part IV 15 (pp. 725-737). Springer International Publishing.
14. A. O. Akande and J. P. Van Belle, "Cloud Computing in Higher Education: A snapshot of Software as a Service," in Proceedings (2014) Ieee 6th International Conference on Adaptive Science and Technology, S. Misra, C. Ayo, N. Omoregbe, B. Odusote, and A. Adewumi, Eds. (IEEE International Conference on Adaptive Science and Technology.
15. Riahi, G. (2015). E-learning systems based on cloud computing: A review. Procedia Computer Science, 62, 352-359.
16. Chrysikos, A., & Ward, R. (2014). Cloud computing within higher education: Applying knowledge as a service (KaaS). Continued rise of the cloud: advances and trends in cloud computing, 339-362.
17. Chrysikos, A., & Ward, R. (2014). Cloud computing within higher education: Applying knowledge as a service (KaaS). Continued rise of the cloud: advances and trends in cloud computing, 339-362.
18. H M Deitel, P J Deitel and D R Choffnes (2004). Operating Systems. Delhi: Pearson Education.
19. Mero, R., & Mwangoka, J. (2014, July). Road map towards eco-efficient cloud computing adoption in higher learning institutions in Tanzania. In Proceedings of the 2nd Pan African International Conference on Science, Computing and Telecommunications (PACT 2014) (pp. 154-159). IEEE.
20. Bouyer, A., & Arasteh, B. (2014). The necessity of using cloud computing in educational system. Procedia-Social and Behavioral Sciences, 143, 581-585.